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PRACTICAL MEDICINE.

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VOLUME VII.

CONTAINING BOYLSTON PRIZE DISSERTATIONS FOR 1836,

BY OLIVER W. HOLMES, M. D.; ROBERT W. HAXALL, M. D.,

AND LUTHER V. BELL, M. D.

BOSTON:

PRINTED BY PERKINS & MARVIN.

1836.

DISSERTATIONS

ON THE QUESTION

HOW FAR ARE THE EXTERNAL MEANS OF EXPLORING THE CONDITION OF THE INTERNAL ORGANS TO BE CONSIDERED USEFUL AND IMPORTANT IN MEDICAL PRACTICE?

FOR WHICH PREMIUMS WERE ADJUDGED BY THE

BOYLSTON MEDICAL COMMITTEE OF HARVARD UNIVERSITY,

1836.

BY OLIVER W. HOLMES, M. D.; ROBERT W. HAXALL, M. D.,
AND LUTHER V. BELL, M. D.

The following Dissertations were communicated to the Boylston Medical Committee of Harvard University, in reply to the question proposed for 1836,—"How far are the external means of exploring the condition of the internal organs, to be considered useful and important in medical practice?" At the annual meeting of the Committee, August 3, 1836, the Boylston premium of a gold medal, of the value of fifty dollars, or its equivalent in money, was adjudged to the author of the Dissertation with the motto, "Inter labores et tædia," and on opening the accompanying sealed packet, it appeared that the author was Oliver Wendell Holmes, M. D. of Boston.

The Committee were then informed that in case they should consider any other of the Dissertations offered, worthy of that distinction, the sum necessary to confer on the author a similar premium of equal value, would be furnished by a liberal friend of medical science and improvement. Whereupon it was voted to award a premium of fifty dollars to the author of each of two other Dissertations on the same question. The authors were found to be Robert W. Haxall, M. D., of Richmond, Virginia, and Luther V. Bell, M. D., of Derry, New Hampshire.

The Committee believed that the publication of these Dissertations would be of great practical utility, by calling the attention of the profession to the subject discussed, and by the important information presented in them. The means of defraying the expense having been tendered by the same gentleman whose liberality had already enabled them to grant the additional premiums, the Committee voted to recommend to the Committee on Publications of the Massachusetts Medical Society, to publish the three Dissertations in

a volume, to be distributed gratuitously to each Fellow of that Society, and to every other respectable physician in Massachusetts.

It is under this recommendation that the Committee on Publications have acted in presenting this volume to the Fellows of the Society; and they have thought it best to connect it with the useful series of practical works already published by the Society, and have accordingly arranged it as the seventh volume of the Library of Practical Medicine.

The estimation in which the Dissertations were held by the Boylston Medical Committee, is sufficiently attested by their proceedings in regard to them. It is however made a duty, by an order of the Committee adopted in 1826, in case of the publication of any successful Dissertation, to print with it the following vote passed at the same time, viz:—

"That the Board do not consider themselves as approving the doctrines contained in any of the Dissertations to which the premiums may be adjudged."

CONTENTS.

DR. BELL'S DISSERTATION.

DR. HAXALL'S DISSERTATION.

DR. HOLMES'S DISSERTATION.

DISSERTATION,

BY

LUTHER V. BELL, M. D.

Expertus affirmo quòd *signa* de quibus hic agitur gravissimi momenti sint non solum in cognoscendis, sed etiam curandis morbis.

Avenbrugger.

DISSERTATION.

In the rational study of medicine, disease presents itself for examination under three principal points of view. First, the consideration of the abnormal vital or physiological actions which have taken place, and are still exerting their influence on the various structures, and organs, and functions of the system; secondly, the morbid or pathological changes or alterations of structure which are consequent upon the deranged physiological conditions of the organs or tissues; and, thirdly, the symptoms, or signs which give evidence to the observer, of such morbid actions or structural changes. The knowledge comprehended under the first mentioned of these considerations, if it could be fully developed and fully appreciated and understood, would be the perfection of medical science. It is this which constitutes disease, and like the principle of life itself, cannot be expected ever to be wholly unfolded to the human intellect. Symptoms, it is evident, are not disease; they are merely the language, the signs, the appreciable evidence of some internal change, which is invisible to our senses in a great degree during life, and the

presumed effects of which are in part manifested after death. Neither are these morbid alterations of structure, revealed to the knife of the pathological anatomist, disease itself; they, like symptoms, are merely its effects; the original vital aberration from sanity lies still further anterior in the order of events. If, to use the illustration of Bayle,* we examine the lesion of an artery affected with spontaneous aneurism, we find a sac of greater or less size filled with blood deposited in layers of coagula, and an aperture through the parietes of the vessel. The primitive disease was not, however, the opening into the artery. It was a perversion of its vital properties, which, by inducing the opening, has produced the aneurism. The alteration of the lungs, in those who have fallen victims to pulmonary consumption, is not a primitive malady; it is an organic which has resulted from some vital lesion; but when this has arrived at a certain degree of development, it produces in turn certain functional derangements, such as impeded respiration, cough, hectic fever, emaciation, and finally a cessation of the functions.

Like other primordial causations, the nature of these vital conditions is known only in their effects, and not in their abstract existence. That science, physiology, which comprehends within its circle these considerations, it must be confessed, has thus far been of little service to practical medicine;—nay more, its false and delusive lights have served rather to mislead, than to guide, ever from its earliest history to the present era, when it is to be expected that the more extended and accurate accumulation of facts, a better mode of philosophizing, and a more rigid system of induction may give a firmer basis, and a more applicable utility to what has been so long unstable, obscure and deceptive.

That physiology, using the term in its widest acceptation, deserves no higher character than this; that it has been rather an injury than a benefit to the healing art, is evident to any inquirer into the effects to mankind which have re-

* Anat. pathologique in Dict. des. Sciences Med. T. II. p. 64.

sulted from all the theories and doctrines based on this foundation, which have held sometimes a divided and sometimes an absolute empire over the domains of medicine. The humoral, the chemical, the mechanical, the physico-mechanical systems of physiology, the visionary hypotheses of Boerhaave, of Hoffman, of Cullen, of Brown, of Darwin, of Rush, and shall I say it? of Broussais, are a few of the consequents of the pretended application of the principles of physiology to the healing art. Their physiology was imperfect in part, and in part false; and as a consequence, their doctrines are either mere assumptions of unproved, and as time has demonstrated, unprovable facts, or downright imaginations; and just so far as they, respectively, have had an influence in turning away the mind from the discovery and consideration of facts, and from the application of experience, just so far have they been the cause of incalculable injury to man, and to the progress of science.

As yet, then, practical medicine must mainly rely, for all that is true, and valuable, and capable of being applied, upon the knowledge of pathological anatomy or the changes produced by disease, and upon the external indications which mark these morbid alterations. The former of these auxiliaries to the healing art is comparatively a subject of modern origin. Not a century has elapsed since the great work of Morgagni on the seats and causes of disease was given to the world, the first valuable contribution to pathological science; after him in slow succession appear the labors of Portal and Baillie, of Corvisart and Bichat, followed in more recent times by the bright galaxy of French pathologists, as Bayle, Andral, Laennec, Louis, Cruveilhier, and Hope, Carswell and others in England, whose labors will be felt to the latest days of medicine, because they depend upon facts for their eternal basis.

The knowledge of the signs presented by disease to the external senses, known as symptomatology or semeiology, or in their application as the science of diagnosis, is the oldest,

as it still is, the most important subject of medicine.* We can hardly conceive of a state of medicine so imperfect or of society so rude, but that the study of symptoms must have preceded the study of curative indications. And did the occasion or our prescribed limits warrant, it would be an interesting subject of research to examine how far the successful cultivation of the true end of medicine, the means of treating disease, has kept pace with the art of detecting similarity of internal changes, by the correspondence of external symptoms, and whether the true and valuable application of remedial agents is not grounded solely upon the basis of symptoms and experience.

To arrive at the ability to judge of the identity of internal alterations and conditions through their external signs, and thus to obtain the data for the application of former experience, is the end of the science of symptomatology. It is, in short, the learning to understand the obscure *language of disease*, without rightly interpreting which, its calls cannot be attended and supplied.

The division of symptoms into *vital* or *physiological* and *physical*, is a sound one. Though the judicious student of diagnosis will never allow the advantages which might accrue from the due consideration and combination of both, to be lessened by over partiality for either, it may still be asserted that the latter are the more constant, and of course less likely to mislead; and it is upon them that the distinctive characters of disease will be most certainly decided.

Amongst individuals affected with entirely different organic

* Puisque le diagnostic n'est autre chose que la connaissance exacte d'un état morbid présent, il est facile de sentir toute son importance, son utilité, et même son indispensable nécessité pour le médecin practicien, et d'apprecier sa grand influence sur la traitement des maladies. En effet, comment osera-t-on déterminer un mode curatif avant d'avoir fait un sevère examen des signes diagnostiques, de s'être bien assuré du siege du mal, et d'en avoir reconnu l'espèce, les causes, les effets? C'est ici quil faut dire avec Baillou: *Antequam de remediis statuatur, primum constare oportet, quis morbus, et quae morbi causa: alioque inutilis opera, inutile omne consilium.*— Renauldin. Dict. des Scien. Med. T. IX. p. 163.

alterations, or in other words suffering with dissimilar diseases, the vital symptoms, such as the pulse, the seat of suffering, the bodily expression, &c. may be identical, or at least analogous to the perceptions of the observer. The appreciable evidence, for example, apart from exploration and other physical signs, of two patients' maladies, the one suffering under an incurable disease of the heart, and the other from a sympathetic gastric derangement merely, may be the same; or, to employ another illustration of Bayle, a schirrous stomach, and an absolute absence of structural disease of that organ cannot in certain cases be discriminated by the concomitant vital symptoms. Whenever the physical signs, then, are capable of being appreciated, they are of paramount value. It is true, it is difficult to draw any line of accurate divisions between these two classes of indications; nor is any such accuracy of practical importance. In exploration of the abdomen, for example, by pressure, the detection of tumour, or tension, or fluctuation is surely a physical sign of disease; the existence of pain, its degree and character, are vital, and subject to the uncertainty of the physiological symptoms. It is only by not losing sight of any of the evidence of disease, that the most complete diagnosis can be obtained.

It is only by the aid of both these means, that the knowledge derived from all the other departments of learning, can be applied to the treatment of diseases. Upon this must be founded their diagnosis, and the judgment of their probable result, the demonstration of the suitable remedial agents, as well as the favorable or adverse effects of such remedies. The most exact knowledge of pathological actions and conditions, the most minute and thorough acquaintance with morbid anatomy can be brought to the test of practical usefulness only through the accurate observance and due appreciation of symptoms. These alone can point out such conditions during life, and form, in fact, the key, without whose aid the hidden mysteries of disease cannot be reached.

The symptoms of disease are addressed to various, indeed it may now be said, to the entire circle of our external senses. Not one of our perceptive organs but is capable of affording us more or less valuable information in disease, and upon a successful cultivation of these faculties, much of the skill of the practitioner in recognizing its presence and character will depend; the symptoms forming a language which addresses itself not merely to one or two, but to the aggregate of the senses, and on the greater or less perfection in which this language is understood, the more or less perfect will be the ideas which are available from it.

To use some of those illustrations which are common, and demand nothing more than common observation to be apprehended, the eye determines, in disease, the various circumstances in which color of the external organs and surfaces, of the secretions and excretions, or in which the expression of countenance and position of body are indices; the touch presents to the mind those classes of ideas which arise from heat or its absence, from dryness or moisture of the cutaneous surfaces, to say nothing of that volume of signs presented by the pulse;—the ear gives numerous auxiliary aids in developing the existence and very frequently the character of pain, of laborious respiration, and of cough to the most superficial observer;—the smell, that lowest of the senses, informs us in some dreadful forms of disease, by a pathognomonic sign which can neither be misapprehended or forgotten, as is exemplified in the odor of the small-pox, of cancer, or even of that exhaling in fever, in which, to use the language of Dr. Southwood Smith, "it is so characteristic that a person familiar with the disease might, in many cases, be able to pronounce merely from the odor of the effluvia, whether the disease were fever."* And lastly, the sense of taste in one fatal and highly interesting disease at

* See also Dr. Nathan Smith's remarks on this subject, in relation to the typhus of this country, in his essay on that disease.

least, diabetes mellitus, yields us a ready and certain means of diagnosis.

Such are some of the prominent apprehensions of the language of symptoms by our senses in their comparatively rude and uncultivated state. When these inlets to knowledge have been improved by assiduous cultivation, until they approximate towards that pitch of perfection to which they are capable of being brought, they afford results alike astonishing and inestimable. The extent and certainty of the pulse in the diagnosis, and prognosis of disease, to one gifted with the *tactus eruditus*, as contrasted with the common observer, affords a striking illustration of the perfection to which this sense may be brought, and even this illustration may perhaps be surpassed by referring to the skill of some surgeons in detecting the fluctuation of deep-seated abscesses, in recognizing the thrill of an internal aneurism, or in the appreciation of the size, and almost the figure and structure of urinary calculus by sounding.

Again, the sense of sight, so valuable in communicating so many marks of disease in every day practice, becomes, by a peculiar acquisition of tact and skill, gained by long and persevering application, capable of affording results totally inappreciable to a common observer. The expression of the countenance in the insane, the physiognomy of disease generally, the peculiarities of certain forms of affection of the organ of vision itself, are clear, legible tablets to those who have the *visus eruditus;* and we also have witnessed the cultivation of a sense, that of hearing, once scarcely available to any extent in the healing art, producing results most extraordinary, unequivocal, and useful. Some of the signs of disease have been noticed, and applied from the earliest periods of medicine. Within a few years, in the progress of science, new ones have been added, and the importance and value of those formerly somewhat employed and appreciated, has been extended, and rendered more certain. Of these, the *external* means, (contradistinguished

under this term from those depending on the internal sensations of the sufferer, communicable only by his language, expression, &c.) of exploring or ascertaining the condition of the internal organs, stand conspicuous, and their application and value in the practice of medicine, and *especially in the practice of the American practitioner* will, in part, be considered in the following essay.

The particular external modes of exploration referred to, are, *thoracic percussion*, and *auscultation*.

In the detail of the manner of taking advantage of these means, the weight and indication of the signs elicited through their agency, the connection between the internal conditions and the external symbols, much originality can hardly be anticipated, nor is it believed to be desirable. In the wide field of observation which these means of diagnosis have already thrown open, there are already too numerous points of view, and too many topics for examination unfolded, to induce even a wish for new discoveries, until the value of those already made has been fully ascertained and fixed. These splendid additions of terra incognita to the empire of science, require alone years of investigation, and, deprived as in the United States he necessarily is, of any extensive opportunities of pathological examination, the physician here can only hope to follow, *haud passibus æquis*, the track of European genius.

The writer would fain believe, that the individual who can throw light on the question how far these new means of ascertaining the existence of disease,* and consequently as a general principle, the mode of combating it, are capable of benefiting the profession here *generally*, will have accomplished a task, which, however humble his labors as a compiler may be deemed, still of no ordinary value.

The study of these subjects has, in this country, been generally considered as too exalted, or too refined for the

* Medicus, sufficiens ad morbum cognoscendum, sufficiens est ad curandum.—*Hippocrates.*

every day purposes of practical utility. Their investigation has required a new language, and the cultivation, as it were, of a new sense. The discovery and verification of the facts, as well as their palpable appreciation, is confessedly difficult, and requiring the widest facilities which the wards of hospitals such as the Hotel Dieu, or La Charité could afford. Whilst this is readily admitted, still it will be demonstrated that there are some of the benefits of the new arts which are capable of addressing themselves to the common measure of capacity; of affording material assistance to those whose opportunity of pathological improvement is limited, and of being applied by such, to the common occasions of professional duty.

Intimately connected with these modes of ascertaining disease, is the subject of the manual exploration of the abdomen; a topic, fairly included within the subject propounded for our discussion, but of which our proposed limits necessarily forbid any thing more than a cursory examination. We deem this branch of the question too important to be omitted entirely, apart from the circumstance that it is in such knowledge more than in any other which can be specified, that our practitioners are behind those of Europe, and require especially to have their attention called to the study of topographical anatomy in its connection with disease. Whilst our general and superficial sketch which follows has no further aim than this, it would seem more properly to form a part of these introductory remarks, than an integral portion of the essay itself.

A moment's consideration of the great number and high importance of the organs contained within the cavity of the abdomen, will demonstrate the necessity and value of those means which serve to detect and discriminate their respective abnormal conditions. The maladies, again, to which the abdominal organs are subject, are numerous beyond those of either of the other great cavities; diverse, as might have been anticipated from the great number of tissues and

structures involved, making their distinction of the highest practical moment; and complex, requiring all the aids of an accurate and comprehensive investigation, and of a judicious, remediate management. The relation between the internal organs and the portions of external parietes by which they are respectively covered, or in other words, the topographical anatomy of the abdomen, is of the first importance in availing ourselves of the assistance of manual exploration. If this knowledge is inaccurate or incomplete, the aids which otherwise might be derived from this source may not only be beyond our reach, but calculated to misguide. The first step, then, which the student should take in this branch of semeiology, is to make himself perfectly acquainted with the relative positions of the organs to each other, and to the abdominal parietes, under the varied circumstances of distension and collapse.

In making the manual exploration of the abdomen for the purpose of discovering or discriminating disease, the patient should be placed in such a position as to relax as completely as possible, all the abdominal muscles. To accomplish this, he should lie upon his back, with the head and shoulders slightly raised, the thighs flexed upon the pelvis nearly at a right angle; and it is well that the bladder and rectum should be evacuated before proceeding to the examination. Subsequently to the exploration in the recumbent posture, it should be continued whilst the patient is in an upright position—a modification which we have found very essential to eliciting the signs of gastric affection.

Besides the obvious circumstances of altered general form, increased bulk, unnatural temperature, cutaneous moisture or dryness, increased exterior, sensibility, &c., the objects to be ascertained by manual exploration are :—

1. The development of painful sensation on pressure, its seat, degree, connections, &c.

2. The existence of unnatural enlargements or alterations of organs, accidental tumors, the presence of retained fœcal

matters, or of the undue accumulation of secretions in their natural reservoirs, &c.

3. The presence of effused liquids or emphysematous collections within the abdominal cavity, or contained in sacculated or hydatid reservoirs.

Each one of these subjects opens a wide field for profitable investigation, and we shall endeavor as far as our proposed limits will permit, to point out some peculiarities appertaining to each.

The degree of painful sensation attending various states of diseased action varies exceedingly, as it is influenced by the nature of the malady, and of the structures affected; having little reference to the extent of morbid alteration. Thus we see in the neuralgic and other nervous forms of disease in which the pain is of the most intense degree, no changes of structure are revealed post mortem to the knife of the dissector. Again, in some of the most fatal diseases, in which the organs affected are most essential to life, and exhibit the greatest morbid changes after death, there has been the slightest degree of pain experienced during life. In tubercular phthisis, for example, it is well known, that frequently nothing like pain is developed, from its incipient stage to its fatal termination. It is true there may be distress from functional derangement, but evidently no sensation of positive pain communicated to the sensorium. This fact is also noticeable in various other forms of marasmus or atrophic disease. The writer has made autopsic examinations of patients who have fallen victims to diabetes, in whom no pain had at any time existed, yet the kidneys unexpectedly presented marked disorganizations, and other instances of the same malady which terminated apparently without pain, and without morbid change. Indeed, it is no rare circumstance for the pathological anatomist to find almost every viscus of the abdominal cavity in a state of extensive disorganization, without any pain having existed sufficiently marked to lead physician or patient to refer the disease to its right seat.

Renauldin* observes that there have been found such grave maladies as hepatization or suppuration of the lungs, inflammation of the peritoneum; indurated, tuberculous, and hydatid liver; the gall-bladder filled with calculi, and the spleen and pancreas in a state of induration, and yet without marked suffering.

Even the substance of the brain and its membranes have been exhibited in a state of unrecognizable change, without preceding pain having been complained of. It is, however, unnecessary to introduce instances of this kind to illustrate a fact which must have been so often manifested to every acute observer, and which not unfrequently renders the diagnosis of diseases, and consequently their prognosis and treatment, obscure, uncertain, and difficult.

Another circumstance which often occurs to bewilder the practitioner in attempting to avail himself of this symptom, pain, in referring disease to its actual location, is the existence of sympathetic suffering. The existence of this, in some few instances, as for example, the painful titillation about the glans penis, inducing the patient to elongate the preputium, is so constant and uniform as to be a valuable index to the nature of the malady, but in the present state of our practical knowledge, the existence of sympathetic pains at a greater or less distance from the actual seat of the malady, serves rather to bewilder and misguide than to assist the physician.

These sympathetic pains may owe the peculiarity of their location, to the communication by the nerves between the actual place of disease and the spot to which the suffering is referred; to a continuity of the membranous tissues of such parts, or to an identity or even similarity of organization or function. Of the first mode of origin, that by some nervous connection of distant parts, perhaps obvious, perhaps inexplicable, a multitude of examples present themselves. Few derangements to any considerable extent occur without such developments.

* Dict. des Sciences Med.

Inflammation of the liver is frequently, perhaps generally, as is well known, attended with pain about the right shoulder ;—gastric derangements most commonly have some of their symptoms referred to the head, and in turn affections of the encephalon exert a reciprocal influence upon the digestive organs. Nephritis or inflammation of the kidneys, is usually attended with nausea and vomiting, painful retraction of the testicle, pain in the thigh, &c. ;—dentition in infants has frequently accompanying it pain and serious derangement of the bowels, which still further in the chain of causes, brings on arachnoid inflammation and effusion; and in the various forms of fever, inflammations, neuroses and cachetic diseases, pain is frequently referred to parts, where we have the best evidence deduced from other symptoms and explorations before and autopsic research after death, that no appreciable disease exists, or has existed.

Of the second mode of the conveyance of sympathetic pain, that is, through continuity of surface, the instance referred to in calculous formations is an example, or it may be witnessed in the irritation referred to the upper region of the larynx, by which coughing is provoked, when the real seat of the derangement is low down in the bronchial tubes.

The third mode, resulting from similarity of structure and identity of function, is illustrated by the affection of both eyes when one only has suffered injury ; and by the mutual sympathy evinced between the uterus and mammæ, which have a certain community of function. In a case of calculus within the kidney, cited by Baglivi, where all the pain was referred to the right organ, on examination after death that was found unaffected, and the calculus lodged in the left.

The existence of these sympathetic pains, after all, renders the method of manual exploration more valuable. It is certainly a comparatively rare circumstance for any considerable degree of morbid alteration to exist in a situation capable of being subjected to this test, without responding to its application. It is undoubtedly so in the inflammation attending on

certain stages of fever hereafter to be mentioned, in which the sensorium, does not appear to recognize pain at all, and probably may be so in certain low degrees or grades of scrofulous disease within the abdomen; but generally when we find an organ to exhibit tenderness on the application of moderate pressure, disease of some kind will be found developed within it. On the contrary, when a part which is the seat of sympathetic pain merely, is subjected to pressure, it will ordinarily in its early stages be rather found relieved than aggravated. In the progress of long continued disease, inflammation and consequently actual tenderness may, and do result at the location of sympathetic pain, and this complication may unavoidably mislead the practitioner who is not thoroughly advised of the history of his patient's case.

The pain which results from abdominal disease, with which alone we now have to do, is of two varieties; that which the patient feels himself when at rest and undisturbed, and that which is occasioned or revealed only by pressure. Pain may arise from spasm, fatigue, distension and irritation, besides from the sympathetic communication before alluded to, as well as from its most usual cause, inflammatory action; and it often becomes a point of high practical value to determine whether it results from the former causes or that last mentioned, and pressure may decide this point. For example, the *methodus medendi* of gastritis and spasmodic or gastralgic pain may be readily deduced from the extreme tenderness on pressure which exists in the former; so in colic and enteritis, this may form a pathognomonic symptom.

"The observer," remarks M. Martinet,* "should note with care the sort of pain caused by this pressure, as well as the region in which it is felt; thus if in the epigastrium, it indicates inflammation of the stomach or transverse colon according to the direction in which it is applied; if in the

* Manual of Pathology, p. 74.

umbilical region it marks that of the small intestines and mesenteric glands;—towards the loins, between the false ribs and the crest of the ilium, it indicates inflammation of the kidneys or ascending or descending colon according to the side at which it exists;—in the hypogastrium, it coincides with cystitis or metritis;—in the iliac regions, it induces a suspicion of inflammation of the cœcum at the one side, and the descending colon at the other."

We shall now attempt to pass in rapid review some of the forms of disease in which manual exploration of the abdomen forms a prominent and valuable means of diagnosis.

Fever, although, as we believe contrary to the modern physiological doctrines, in certain forms and instances a purely idiopathic disease, and a disease too of the entire system, is still in a vast proportion of instances complicated with local affection; and such local affection most generally some grade of inflammatory action. The prognosis of the ordinary continued and even typhous forms of fever depends almost wholly on the early detection and judicious combating of the local complication, and the pain elicited by pressure more frequently guides us to this, when its seat is in the abdominal viscera or their enveloping membranes, than the sensations of the patient or concomitant general symptoms. The extent of the disease and the organs involved will ordinarily be pointed out by the topographical relations of the parts, whilst the intensity of the pain, provided the susceptibility of the sensorium to impressions remains unimpaired, will be an index to the violence of its character. It must not however be forgotten that when the fever is also complicated with cerebral affection, the patient may not be conscious of abdominal pressure, and we are thus entirely prevented from availing ourselves of this important mean of judging of the extent and severity of the abdominal disease. And it not unfrequently happens in the advanced stages of fever, that the appreciation of tenderness on pressure of the bowels by the patient is in fact a favorable indication, as

evincing that he has become susceptible to a stimulus to which he was before insensible. In both forms of typhus, mitior and gravior, complicated with cerebral and abdominal affection, the existence of the latter must frequently be deduced from the state of the tongue, discharges, &c. on account of its being thus masked.

Dr. Southwood Smith in his Treatise on Fever, well illustrates the frequent occurrence in fever, of pain on pressure, when it is not complained of, unless thus excited. "Pain, though it may usher in the abdominal affection, and may even be severe for the first few days, diminishes after a certain time, and then ceases altogether; so that it is extremely rare after the tenth day of fever, for instance, for the patient to complain of pain of the abdomen, even when the abdominal affection is the most intense. Such an event may happen, perhaps, when the cerebral affection is more than commonly slight; but it is an exceedingly rare occurrence, and my attention has been particularly drawn to this circumstance from reflecting on the uniformity of answers which I have obtained from patients obviously laboring under abdominal affection, on my first visit to them in the wards of the hospital. Having commonly been ill from ten to fourteen days, the abdominal affection may by this time be fully developed. On asking them if they feel any pain in the abdomen, the answer almost invariably received is 'no.' Press gently on the abdomen, press especially on the epigastrium, often in these very cases not the slightest touch can be borne. After pressure has once been made, the patient will frequently do all he can with his hand to prevent its being made a second time. So acutely sensible is he of pain on the least pressure, though wholly unconscious of pain when left to himself. Even when there is not this degree of tenderness, pain can generally be produced by full pressure." A mere recapitulation of the acute inflammations of the various abdominal organs and structures will demonstrate to what extent we are dependent on manual pressure

for eliciting and locating the exact seat and intensity of the inflammation. In most of these, it is true, the general or constitutional symptoms are analogous, and the mode of treatment indicated is similar. The value and importance of being able to make out a specific and accurate diagnosis, is but slightly diminished from this circumstance in any case; and in certain habits and constitutions in which the extent to which curative means, especially those of the depletory kind, are to be carried, is all important, the exact organ and tissue in which the phlogistic action is going on, ought to be definitely ascertained. The peculiar functional derangements and the sensations of the sufferer may, in part, indicate this; but a pathognomonic sign must be found in abdominal pressure. To examine some cases, more in detail:

In *acute gastritis*, or inflammation of the stomach, manual pressure is essential in enabling a discrimination from certain intense spasmodic pains or cramps as they are called, in which the treatment demanded is very reverse. In the former the suffering is greatly augmented by pressure in the epigastric and left hypochondriac regions, whilst in gastralgic or gastrodyniac affections, pressure generally affords some relief. In gastritis, we almost always find the patient on his back, and he changes his position as little as he can possibly avoid, the weight of the organ itself and all tension and pressure being thus best prevented from giving pain. In cramp of the stomach, on the contrary, the sufferer will be found sitting up, perhaps throwing himself about in his agony, with his body bent forward and probably his hands pressed against the epigastrium, or solicits aid from hard and rapid friction over the stomach.

Acute enteritis is the most common, the most rapid, and the most fatal of the various forms of abdominal inflammation. In this, the pulse usually so palpable and valuable a guide in inflammations, may be found obscure and deceptive; not indicating to the inexperienced observer at least, the urgency and extent of the depletion required. The most

prominent complaint with which this may be counfounded is colic, and here the same means of discrimination exist as in the last named affections; pressure aggravating the inflammatory and alleviating the spasmodic suffering. The observant practitioner will not however in forming his opinion or in his remediate management, forget that the latter affection not infrequently runs into actual inflammation. Dr. Gregory remarks that he has seen enteritis confounded with affections of the kidney, probably from calculus; but here, in the latter, he observes that the pulse was slow, "and pressure on the belly did not aggravate the pain," and this will also form a criterion in cases of the severe symptoms originating from the presence and passage of gall-stones in the biliary ducts.

In acute enteritis, the patient will lie on his back, with his head and shoulders raised and his knees drawn up, so as to take off the tension of the abdominal muscles; the act of respiration will also be found to be performed almost entirely by the action of the intercostal muscles, the muscles of the abdomen, and the diaphragm in part, remaining nearly quiescent. This may serve to distinguish it from pleuritis, with which, when the inflammation was seated in the arch of the colon, it is said, it has been confounded. In pleurisy also, respiration will be accomplished by the abdominal muscles and diaphragm exclusively; in the intercostal spaces, tenderness will be found on pressure.

In *acute peritonitis*, pressure on the external surface of the abdomen occasions exquisite pain, so much so that the patient usually rests in such position as to remove all pressure, even the weight of the bed-clothes being sometimes insupportable. The pain, as felt by the patient when undisturbed, is frequently referred to a small spot only, especially about the umbilicus, which perhaps changes its seat repeatedly. According to Andral in some instances of a most aggravated character, a slight uneasiness only is felt by the patient within the abdomen, but the pain on pressure is always

present over any and every portion of the membrane which is inflamed.

In acute inflammation of the peritoneal surface of the liver, and to a less degree in the other tissues of that organ, the patient will be found *favoring* the affected part, by allowing the abdominal parietes to remain almost quiescent in respiration; the sufferer "leans a little to the right side, with the knees drawn up," (Eberle) and. the pain is almost always, but not universally, aggravated by an attempt to lie on the left side. But the seat of pain on pressure of the right hypochondrium, forms a very decided, distinguishing mark in this disease when the accidental symptoms, such as sympathetic pain of the shoulder, functional derangement, &c. too often mistakenly deemed pathognomonic, are obscure or absent. From certain forms and seats of pneumonic inflammation, this may be discriminated by the auscultatory and percussive measures adapted to the latter.

In the various acute inflammations of the other organs contained within the abdomen, as the spleen, pancreas, kidneys, bladder, uterus, ovaria, &c. &c., the value of this diagnostic is sufficiently manifest, as it is universally employed.

It is however in the chronic form of these inflammations, when the symptoms are not well developed and obscure; when every circumstance which can throw light upon the pathological character is so desirable, that the value of this measure of exploration becomes conspicuous. In the practice of medicine, it is such kinds of disease which form the great tests of the practitioner; in these are the results of sagacity, of tact, of experience, and of study principally to be developed. Most of the protracted, lingering forms of ill health which occur in practice and form the stumbling-block, and too often the opprobria of the physician, are connected with chronic inflammatory derangement of some of the abdominal structures. Modern research has proved that these in general are not merely functional, but actually

attended with more or less alteration of tissue. In some of these, the mode of examination on which we are treating is of the most indispensable value; in others again the change produced is too chronic in its character, its grade of diseased action too low for the symptom of pain to be thus produced, or of such peculiarity that its nervous tissue is not so affected as to convey its lesions to the sensorial centre, and we are left to deduce the extent and nature of the disease from the too often obscure and deceptive evidence exhibited by distant and indirect sympathies, by the uncertain test of functional derangement, or the still more equivocal evidence of the effects which have been consequent upon remediate agents.

Chronic gastritis, or chronic inflammation of the mucous membrane lining the stomach, is a very common form of disease as has been revealed by modern pathology. "The worst forms of dyspepsia and all that host of inveterate gastric and bilious disorders of which so much is heard, and the true nature of which is so often misunderstood, are in nine cases out of ten the consequence of a more or less phlogosed condition of the lining membrane of the stomach." The discrimination of this organic affection from the merely functional forms of dyspeptic derangement is an important step towards the therapeia of each. This diagnosis is not always so obvious as desirable, but it is believed that no considerable degree or extent of chronic inflammation of the mucous membrane of the stomach or intestinal canal exists in which pain on pressure of the hand is absent.*

Chronic peritoneal inflammation is a disease whose approach is generally of the most gradual and insidious character, rarely becoming evident until such structural alterations have occurred, as to render medical treatment hopeless; for experience has too painfully convinced us that a recent and judicious writer on the practice of physic, (Dr. Dewees,) is correct in considering this inflammation when it has ceased to exhibit an acute form, as beyond the reach of medication.

* M. Barras, (Rev. Med. 1825,) and other French writers.

The value of making out an accurate diagnosis is not, however, in the hopelessly incurable diseases diminished on this account; for next to knowing when to give medical aid, it is important to know when it will be useless or probably injurious.

In this affection, the abdominal pain as determined by the sensations of the patient, is rarely prominent; for the serous membranes in chronic inflammation rarely give rise to severe or acute suffering. But by any thing which occasions compression, whether it be pressure by the hand, sudden concussion from motion of the body, from cough, sneezing, or the effect of the abdominal muscles in the act of defecation, a feeling of tenderness ordinarily referred to the umbilical region is produced. Fatigue from bodily exertion will, too, occasion tenderness or soreness. Even the presence of the contents of the bowels occasions a painful sensation on the same principle as the pressure of the hand in exploration. Dr. Pemberton in his admirable treatise on the viscera, refers to this circumstance. "There is," he remarks, "no tension of the skin of the abdomen, as in the acute species; on the contrary, the skin and abdominal muscles often sit loosely upon the peritoneum, which gives a sensation to the touch, as of a slight bandage underneath, over which the skin and muscles may be felt as it were to slide. The patient always complains more of tightness than of pain, and as the tightness is much increased by any congestion of the bowels, the relief which he experiences from evacuating their contents leads him to attribute his sensations to an habitual costiveness."

The chronic forms of hepatitis, and other hepatic structural affections, are in many cases eminently obscure. Whilst a *liver complaint* is a general designation for various diseases in which autopsy reveals no hepatic changes, there doubtless are dreadful ravages produced in this organ, whose veritable symptoms are overlooked. In many of these cases the patient does not complain of pain in the hypochondriac re-

gion; indeed, the sympathetic dragging pain about the right shoulder is more commonly present, than any sensation at the seat of the disease, though this sympathetic connection is far from being so universally developed as is generally believed; it is in fact far from forming a pathognomonic sign. As far as personal experience has extended or reference to approved writers gives information, firm pressure on the region of the liver will rarely fail of being responded to, whenever its peritoneal or parenchymatous textures are in a state of inflammation.

In the various chronic inflammations of the other minor organs contained in the abdomen, pressure is no less of value than in their acute states. Nor is it alone in inflammations, that pain on pressure is a diagnostic mark. In small-pox, for example, epigastric tenderness is an almost universal concomitant during the eruptive stage of the disease, so that it is regarded by Wilson Philip, and other writers, as the most frequent characteristic phenomenon of this one of the exanthemata. Cullen also, in his nosology, lays this down as one of the distinctive symptoms. *Synocha——ex epigastrio presso dolore*, &c. An attendance on a great number of cases in several variolous epidemics, has verified to me the almost universal presence of this symptom.

The other phenomena to be elicited by manual exploration, such as tumors, enlargements, excretory accumulations, effusions, etc., are very numerous and important in the practice of medicine. There is, perhaps, no one of the internal abdominal organs which is not occasionally enlarged or hypertrophied in disease; the liver, stomach, mesentery, spleen pancreas, kidneys, uterus, ovaria, &c., are all subject to changes palpable to the investigation of the cultivated touch, when carefully explored. In detecting the affected organ, a minute knowledge of topographical anatomy is, if possible, more absolutely essential, than in searching for the evidence and peculiarity of disease by the painful sensation elicited by pressure; for organs are frequently so enlarged as

to be no longer contained in their usual limits, but encroach on those ordinarily occupied by others, which again in turn may be displaced, compressed or destroyed by this abnormal proximity. A train of symptoms, obscuring the original derangement beyond the discrimination of the most experienced tact, may supervene from this secondary effect. The heart, by empyema, has repeatedly been found pulsating to the right of the median line; the stomach compressed on its left by the enlargement of the spleen, and on its right, by the encroachment of the liver; the whole relative location of the intestines changed by enlarged uterus, or dropsical ovarium, &c. The influence of enlargements in destroying parts, is witnessed in the effects of aortic and other aneurisms.

The degree and accuracy of the information to be received from the hand alone, is very surprising. By it, a judgment can be formed of the situation of any morbid increase; its size, shape, degree of fixedness, or mobility; its connections with, and effects upon adjacent parts; the presence or absence of morbid sensibility; its consistence, whether dense or spongy, hard or soft, fluid or emphysematous, fluctuating or pulsatile, elastic or incompressible.

Our limits admonish us not to dwell longer on the minutiæ of manual exploration of the abdomen. The subject has been pursued thus far, in the hope to attract the attention of the American physician to a part of semeiology, which has, it is believed, been too little studied in this country. That it has been neglected, cannot but be evident to any one who contrasts the attentive, accurate, and systematic mode of exploration, employed by the French medical practitioner, with the off-hand, slovenly and indefinite process too common with us. The former goes to work slowly and cautiously, to discover obscure disease; the principal object to be gained by the latter, speaking generally, can be little more than to verify symptoms already obvious.

Percussion and Auscultation.

The extent of diagnostic application, which would be included in the phrase "the external means of exploring the condition of the internal organs," is evidently too comprehensive for a single treatise. We have selected for present examination, one division only, *Percussion* and *Auscultation;* and in order to complete our purpose with that degree of minuteness and detail which alone can render such researches of practical advantage, it is intended still more to confine the present essay, viz. to the application of these processes solely to the investigation of *Pulmonary Diseases*. A knowledge of their various other uses, especially in cardiac diseases, is indispensable in the education of the accomplished practitioner of the present day, but inasmuch as the former class of diseases is, in this country at least, incomparably the most frequent and most important, there seems no apology required for devoting to them our entire limits, which alone are but too narrow for their briefest consideration.

For the reasons referred to in the introduction, it is also unnecessary to make any apology for the copious compilations we shall make from the various authors who have treated on the exploration of the chest. This want of originality is inevitable, in order to do justice to the subject; for he who would present it as it is, must designedly and openly, or as a plagiarist, borrow no small amount of his facts and explanations, from the writings of that master spirit, to whom the science itself owes its origin, and of those who under his immediate teachings, have co-operated in elucidating, and more clearly conveying, the facts and doctrines received from him.

As a preliminary, we feel it necessary to advert to the anatomy of the organs which are immediately concerned;

and this merely for the purpose of refreshing the minds of those who like a great proportion of even our educated practitioners, in the duties and perplexities of an arduous profession, have allowed the once familiar technicalities of minute anatomy to escape their distinct recollection.

The lungs, it is hardly necessary to observe, like most of the other organs of organic life, do not compose a symmetrical apparatus. The two great lateral portions or lobes, are different in external conformation and capacity; that of the left side being much inferior in size, the heart and pericardium being as it were imbedded in it, and is divided into two great portions only, while the right has three. The two sides of the chest and their contained pulmonary organs, (duplicated for the twofold purpose of more extended function, and for security of life, to which their office is so essential, in case of disease,) do not communicate with each other except through the intervention of the trachea.

In the internal structure of these organs, as Magendie justly remarks, nature has resolved a mechanical problem of extreme difficulty, which is to establish an immense extent of surface upon which the contact of the air and the blood, could be made, at the same time only a small space be occupied with the parts. This desideratum is fully effected in their structure. The trachea, passing from the neck into the chest, behind the arch of the aorta, and opposite the second dorsal vertebra, bifurcates into two equal tubes, which branch off to the right and left, which are termed *bronchi* or *bronchiæ*. These bronchial tubes are subdivided and ramified like the branches of a tree, to an indefinite extent, within the substance of the lungs, the smallest final divisions, terminating in a peculiar, vesicular structure, denominated the *pulmonary vesicles*, or *bronchial*, or *air-cells*.

Various theories and discussions have been urged at different times in relation to the minute anatomy of these bronchial vesicles. The experiments of Professor Horner, of the University of Pennsylvania, are calculated to throw much

light on this subject. He filled with minute injection, the pulmonary artery and veins; the ramifications of the bronchi and air-cells, were then injected with melted tallow, forced in with a moderate degree of strength, so that their natural dimensions might not be altered. The preparation was suspended, and digested in spirits of turpentine, kept at a moderate heat for some days, which entirely removed the tallow. When dried, the parts presented their natural size and shape. The preparation demonstrates that the vesicles are of a spherical figure, and about one twelfth of a line in diameter, though varying somewhat in size. The substance of the lungs forms various subdivisions, separated from each other by partitions of common cellular structure, constituting distinct cavities, communicating only through their respective bronchial tubes, which are termed *lobules*. The partitions forming the various sized boundaries of these lobules, may be seen upon the surface of the lungs when inflated, crossing each other at various angles, leaving the shapes of different rectilinear figures, as lozenges, squares, irregular triangles, &c.

The experiment of Dr. Horner proves, contrary to the opinion of some former distinguished anatomists, but in accordance with that of others, that the air-vesicles do communicate freely with each other, by lateral openings like the cells of a fine piece of sponge. It also shows the fact before stated, which can also be easily demonstrated by common methods, and indeed is often sufficiently obvious in certain pulmonary diseases, as apoplexy or gangrene of the lungs, that the various lobules are independent cavities, having no direct apertures into each other.

With respect to the quantity of surface presented by the air-cells for atmospheric contact, the conjectures have been almost as numerous as the writers who have treated on the subject. Though from the very nature of the subject, an approximation by mathematical calculation, can hardly be expected, still no doubt can exist but that it is immense.

Monro (2ndus) calculated it equal to 440 square feet; or nearly thirty times greater than the whole cutaneous surface of the human body. Dr. Hales, who believed the air-cells to be of a polyhædral shape and $\frac{1}{100}$ of an inch in diameter, calculated the surface in them at 20,000 square inches, and in the air-tubes at 1,035 square inches. Reil estimated the number of cells to be 1,744,186,015, and their surface at 21,906 square inches; whilst another writer, Lieburkuhn, has fixed his estimate at the enormous amount of fifteen hundred square feet!

The bronchial tubes, which soon after their bifurcation begin to lose the appearance of the cartilaginous rings, which are so apparent throughout the trachea, in their last divisions no longer present the fibrous and muscular tissues of that tube, though from certain pathological considerations, it is probable that muscular fibres of extreme minuteness may accompany the bronchiæ to their ultimate ramifications. They are lined by a continuation of the mucous membrane, which is also considered by most authors to be spread over the surface of the air-cells, thus forming the immediate organization in which *hæmatosis*, or the peculiar change produced by the action of the air upon the venous, chyliferous and lymphatic fluids is effected. Magendie, however, arrives at the conclusion, that the vesicles are not lined by a prolongation of the mucous tissue, which he thinks stops short at the termination of the air-tubes. Professor Dunglison remarks, as if in corroboration of this opinion, that the most attentive examination has failed in detecting the presence of this tissue in the air-cells. It is however certain, that the air does have a ready access to the blood of the pulmonary artery within the vesicles.

Like the other mucous membranes, that lining the air passages, contains numerous mucous follicles, a watery perspiratory fluid constantly escapes, which renders the tissue moist, soft and flexible.

The substance of the lungs is formed, besides the ramifica-

tions of the bronchi and the pulmonary vesicles, of the ramifications of the pulmonary artery and veins, and that reticulated tissue of immense extent and fineness, the capillary system of the lungs, which connects the former system of vessels. Injections pass readily from the pulmonary artery into the pulmonary veins, and *vice versâ*, and at the same time they also exude into the air-passages and vesicles.

The entire formation, taking into consideration the permeable and spongy structure of the bronchial tubes and vesicles, and the infinitely subdivided reticulations of the capillary system, seems wonderfully adapted to present a large quantity of blood, and this, too, in a sheet of extreme expansion and tenuity to the air, as it were that the separate molecules may be acted upon, and that with rapidity.

Besides these peculiar textures, the lungs are composed of those organic elements common to every living structure. They are supplied for the usual purpose of nutrition, &c. with the bronchial arteries, arising from the aorta and veins terminating in the vena cava and azygos, and no doubt a distinct capillary system existing between them. Lymphatic vessels are spread over the external surface of the lungs, forming a complicated plexus, with meshes corresponding with the lobules; and they also arise from the deep seated parts, following the course of the pulmonary vessels and bronchial tubes. A number of lymphatic glands, of almost a black color, are found round the bronchi.

The lungs are supplied with nerves from the eighth pair or pneumo-gastric, which accounts for many of the sympathetic connections of these organs, and some few filaments from the great sympathetic;—these are confounded together in plexuses, from which nerves are distributed accompanying the bronchial ramifications. All these various elements are connected together, with cellular substance known also as interlobular texture, which does not vary from the same structure in other parts of the body.

The very interesting and important subject of the func-

tions of the lungs, belongs rather to the doctrines of physiology, than to the topic of our examination. A few remarks upon the capacity of these organs, and the performance of the respiratory office, are of pathological importance, and therefore cannot be considered as irrelevant to our treatise.

The lungs, it will be recollected, fill the entire cavity of the chest, which is not occupied with other organs; being in continual contact, alike in inspiration and expiration, with the walls of the thorax, the duplicature of the pleura alone intervening. Inspiration is a mechanical enlargement of the cavity of the chest, effected by a depression of the diaphragm, and a simultaneous elevation of the ribs. The pectoral cavity being thus enlarged, a tendency to a vacuum is produced; the circumambient atmosphere in obedience to its ordinary physical laws, rushes in, keeping the lungs in a state of distension and preserving the equilibrium. The compression or diminishment of the thoracic cavity, constituting the act of expiration, is now produced by the relaxation of the diaphragm and other accessary muscles of respiration, the ribs resume their former situation by the elasticity of their cartilages, expelling a certain amount of the contained air; this amount, it is evident, does not constitute the whole volume of air in the lungs, but merely that equal to their difference of capacity in expiration and inspiration. Whether the lungs are entirely passive in this last act, or whether they by their elasticity or resilience assist in the function, has been a controverted point; the presumption, however, seems to be that they are merely passive.

The quantity of air imbibed and ejected at each act of respiration, is of course indefinite, as the capacity of the lungs is very different in individuals. Various experimenters on this point, have varied in their results to a much greater degree than can be accounted for by the natural inequality of the organs. A majority of physiologists have considered about thirty-five to forty cubic inches, to be the average quantity. Upon a review of their results and modes of ex-

perimenting, it must be allowed, the former are too variant and uncertain, the latter too complex and inapplicable, ever to give any hopes of this measure of capacity being employed as a diagnostic mean. The modes of Mr. Abernethy, to measure the amount of air expired by the common pneumatic instrument for measuring gases, or that of others by examining the number of seconds which is required to evacuate the air from the chest, are ingenious, but useless.

The frequency of the respiratory act is evidently capable of being ascertained with nearly the exactness and facility of the pulse itself; and though from its natural want of uniformity in different persons, it does not form a symptom of the highest value, still it will not be overlooked by the discriminating practitioner. The probable average number of respirations in the healthy adult male subject, would seem to be about eighteen or twenty; in the female the number is somewhat augmented, and in the child the frequency is considerably accelerated.

The difficulty of discriminating the diseases of the lungs, has been proverbially great from the very first history of medicine; and until within a few years, the remark made by Baglivi long since, has remained true. "*O quantum est difficile dignoscere morbos pulmonum!*" The practitioner was always compelled in his attempt to establish a diagnosis of these affections, to regard little else than the healthy or abnormal performance of their functions; but it unfortunately happened, that the three circumstances upon which his judgment was to be founded, viz. the cough, the affection of the breathing, and the character of the expectorated matter, are erring guides, presenting no pathognomonic, and, indeed it must be said, little probable indication of the morbid changes effected or in progress, and least of all in the early stages, when diagnosis is important alone in the treatment. The more general symptoms, produced in the constitutional sympathies, such as the physiognomy, the appearance and condition of the sufferer, the pulse, fever, &c. &c., were all too

equivocal and too common to various affections, to form a basis on which suitable therapeutic indications could be safely grounded.

Attempts at more direct exploration of the thoracic organs were long since made. Hippocrates, himself, it is said, aludes to what is now called immediate auscultation, or the application of the ear to the walls of the chest. Succussion, or a mode of detecting fluctuations within the chest, manual examination, inspection of the movements and mensuration of the capacity and comparative dimensions of parts of the thorax, abdominal compression,* have all been in requisition at various periods to assist in this obscure subject, and if not generally or extensively useful, the assiduity with which even their minor aid has been cultivated, proves how difficult as well as how desirable, are the means of thoracic diagnosis.

The employment of percussion, or the eliciting sounds from the chest, by striking its walls, is by no means a modern discovery. It was proposed more than seventy years since by a German physician, Avenbrugger, who was born in Styria, in 1722, was educated at Vienna, and lived till 1809. He published his treatise,† detailing his discovery, in 1761; and a translation was made at Paris in 1770. His proposition, although slightly mentioned by Van Swieten and Stoll, made little impression in Germany, and still less in France, until about 1788, when it attracted the attention of the celebrated Corvisart, who after twenty years' employment of it, published the treatise of Avenbrugger with a copious com-

* I prefer thus translating the words "*pression abdominale*," employed by Bichat, to express the mode of pressing the contents of the abdomen against the diaphragm, to "*abdominal pressure*," as has been done by Forbes, Williams, and others. To say nothing of this translation expressing the idea more exactly, the other terms are as yet indispensable in treating of that mode of abdominal exploration, referred to in our introduction. For account of *Pression Abdom. vide Dict. des S. Med.* § *I.*

† Inventum Novum ex Percussione thoracis humani, ut signo, abstrusas interni pectoris morbos detegendi.

mentary, which at once placed the forgotten art on a certain foundation, rendering it throughout France and Germany, an essential and indispensable measure in the diagnosis of thoracic affections. In England, and in this country, it was hardly known, much less employed, as is manifested from the circumstance of its not being mentioned in our text-books or treatises, until the discoveries of Laennec. Since this date however, which is about sixteen years, the art has kept an equal pace with the auscultatory measures; indeed in this country, where cultivated at all, it supports a higher character than Laennec was disposed to accord to it. The two methods render a mutual and reciprocal aid, and reinforce the results of each other; in many instances conjointly affording definite and precise conclusions, when the single application of either, would have been comparatively unsatisfactory.

The mode of performing percussion recommended by Avenbrugger and Corvisart, and indeed by Laennec, is to strike the different regions of the thorax suddenly, with the points of the three middle fingers of the right hand, brought together so that their extremities rest in the same plane. They should be so employed, that in making the blow, the last phalanges should be perpendicular to the surface impinged. The force of the stroke should be such as to elicit the fullest sound possible. Young beginners in the art, I have generally noticed, percuss too slightly and timidly. If the patient do not complain, the blow may be increased gradually in force.

This mode of eliciting the sounds of the chest was found to be obnoxious to many objections, with a view to obviate which, M. Piorri, a physician at Paris, has suggested an improvement which consists in interposing some thin substance, as a plate of ivory, horn, wood, or leather over the point on which the blow is to be made. This mode he designates as mediate percussion, in contradistinction to direct or immediate, made directly on the surface of the chest. His mode which

has been much employed, (the plate of ivory or horn termed by him a *pleximeter*, on which he percusses, being attached to the end of the recently made stethoscopes,) and certainly possesses many advantages; direct percussion not being available to any extent when there is any considerable envelope of fat, muscles, œdematous infiltration, &c.; but when such structures are compressed with the pleximeter, a clear and distinct resonance may be obtained; it is more easily applied, and less liable to occasion the errors arising from imperfectly performed percussion; it does not require that exactly corresponding portions on each side should be subjected to examination, and is more minute in pointing out the exact limits of disease. It occasions less pain, and can be employed advantageously in cases where there is uncommon tenderness of the thoracic integuments, or in which vesication, pustulation, &c. are in use.

Within the last two or three years, the various forms of pleximeters have been much dispensed with, and their office happily replaced by the application of the fingers, one or more, or the thumb of the operator's left hand. This is the mode adopted by the most accomplished auscultator living, Louis, at the hospital of La Pitié, and has been approved wherever it has become known. The usual manner is to apply the back of the left index finger to the point to be percussed, and the blow is inflicted on its soft, fleshy surface. The advantages are various, such as its obvious convenience; the non-employment of any thing looking like apparatus or instruments, (no mean consideration in patients of a certain kind of temperament;) on acoustic principles the character of the sound is more clearly developed from there being so little change of vibratory media; a fold in the clothing is easily detected and prevented, and lastly the peculiar vibratory sensation recognizable rather by touch than by hearing, is appreciated by the operator. Laennec, at an early period of his studies, remarks that the perception of the various sounds elicited is always stronger to the percussor, than to a

by-stander. Every experienced auscultator must have been conscious that in the last mode of pleximetry, (if the term be allowable,) a peculiar vibratory sensation in certain morbid alterations of the chest is very palpable.

In examining by percussion, the points mainly to be attended to, are the following. The patient should be in a still, quiet apartment, and in a standing posture, or at least sitting up, as laying in contact with a yielding substance, such as a mattress or bed, or even a stuffed easy-chair, detracts essentially from the clearness and accuracy of the sounds. I have ever found the standing position, when the strength of the patient is such as to admit of it, to be that which is best suited to the object in view. In this position, I am persuaded that the muscles and integuments of the thorax are rendered more tense, and the subjacent organs are by their gravity thus prevented from being pressed against the diaphragm, and thus deadening the resonance. The patient, if the percussion is to be made immediately or directly, should have on a thin dress, certainly not more than a single thickness, to prevent a certain *clattering or clacking* sound, as it has been termed, which results from the contact of the patient's skin and the naked fingers. A glove on the operator's hand, effects the same result. As was before remarked, great caution should be taken that the blow should be made suddenly, by the motion of the wrist mainly, the fingers accurately ending in the same plane, the blow being made perpendicularly with the extremities, and not with the anterior pulpy points. It is also of no little moment in endeavoring to elicit the comparative sounds of the two sides of the chest, that they should be percussed with the same force, under the same angle, and on the same corresponding points, as nearly as possible. The integuments and muscles should always be brought as tense and thin as practicable. To accomplish this on the anterior face of the thorax, the patient must throw back the shoulders and elbows, and elevate the head; on the posterior surface, this result may be effected

by stooping the head and shoulders and crossing the arms in front; in the axillary and lateral regions, the hands may be crossed over the top of the head. The chest may be filled by active inspiration. The sound elicited from the healthy chest by percussion, resembles the stifled sound of a drum enveloped with a thick woollen cloth or covering. The clearness or fullness of the sound, depends upon the natural structure of the lungs being entirely filled with air, modified however, by two circumstances, viz. the nature and thickness of the enveloping parietes, and by the nature and contiguity of adjacent structures and organs. The grand principle is, that the presence of any substance or structure which increases the density of the contained parts, will occasion a deficiency of sound, whilst the unnatural presence of aeriform contents, as in pneumo-thorax, emphysema, &c., will give origin to an increased sensation of hollowness, or a morbid clearness of sound. It is then the power of discriminating the degree of influence or interference produced by natural difference of parts, which constitutes the groundwork for the study of percussion of the healthy chest; and the talent to separate and judge of the variations produced by disease in the natural sounds, which forms the value of percussion in disease. It is then self-evident, that the application of the last named class of facts is intimately connected with the former; that a knowledge of morbid sounds must be preceded by a full, thorough, practical or rather experimental acquaintance with those of the healthy subject. It is, I am convinced, by not realizing the all-importance of this initiatory acquirement, that so many persons have given up the study at its very commencement, attributing to a want of facility and certainty in the science, what was solely attributable to their own misconception.

It would be deemed the height of absurdity for the student of medicine to endeavor to acquire a knowledge of pathological anatomy, before he was versed in the common appearances of normal structure; how much more so, to

pretend to examine into the more delicate and difficult subject, (more difficult because its facts are addressed to the ear—an organ far less cultivated, perhaps far less exact, in communicating ideas to the sensorium than the eye,) that of recognizing and appreciating pathological sounds, before natural ones are well known. Let the student then commence his investigations on this subject in the full understanding and conviction, that his first and essential duty is to acquire a full, thorough and familiar knowledge of the sounds of the healthy thorax, and that he can acquire this only by diligent, repeated, reiterated experiment:

Vos exemplaria,
Nocturnâ versate manu, versate diurnâ.

He must examine the chests of similar subjects again and again, till the sounds of every region are as familiar and obvious to his ear, as those of a favorite air, or the particular notes of a bell or musical instrument. After he has acquired this knowledge completely, let him discover the modifications produced in individuals whose thoracic parietes are considerably enveloped by integuments, muscles, fat, &c.; let him contrast the sounds peculiar to childhood, to old age, and, if practicable, those of both sexes. When these preliminaries are accomplished, he may consider himself prepared to commence his studies on the diseased subject. And were I to recommend a course of study on this science, the first lesson should be taken upon a subject, in whom the extent of pulmonary disease should render the pathological peculiarities and changes of sound, evident and marked, and this for two reasons; first, because in this manner, the student will be more favorably impressed with the practical and unequivocal results of his pursuit; he will be satisfied, that to a certain degree at least, its benefits are within his grasp; and secondly, because his ear recognizing distinctly the contrast of the morbid sounds of a given disease, and the

healthy sounds of the individual's chest, upon which his first experiments have been tried, their respective peculiarities will be fixed in his mind, with all the firmness of a first impression.

There are some who have discarded the employment of percussion, or rather, I should say, have neglected its study, because its acquisition is so difficult. Such ought to give up the study of the pulse, of the physiognomy of disease, of abdominal pressure, in short of all those aids in detecting disease which are most valuable and certain; a knowledge of which marks the dividing line between the empiric and the man of science. It is an objection unworthy of being adduced, by any one devoted to the noble profession of medicine. I would not speak slightly or disparagingly of a subject of which I have little accurate knowledge, but facts I believe will authorize the assertion, that the same amount of zeal and application requisite to attain an acquaintance with the new science of Phrenology, would be amply adequate to acquire a full, practical, applicable knowledge of percussion and auscultation. Yet strange infatuation! at the present day, it must be confessed that two students of the former are found to one of the latter.

There is a second class, who allege the uncertainty of the results derived from percussion, as an objection to its study. If the fact be so, whence is this uncertainty of result but from imperfection in the knowledge? What aid in medicine for a long series of years is more indefinite, more uncertain, than the pulse? By a third class, an objection still more plausible is offered to the employment of these aids. This is, that the opportunity of verifying on the dead subject, the connection between the pathological changes and the morbid alterations of sounds observed, are too rare in this country to permit the practitioner to indulge any reasonable expectation of becoming *au fait* in this difficult mode of ascertaining disease. In the infancy of this science, this objection might have had some force; more certainly than

it is entitled to at the present day. For the language now employed to convey descriptions of morbid variations and peculiarities of sound, renders us as capable of appreciating many, indeed I may say, most of them, as definitely and as readily, as that used for the illustration of any other portion of pathological evidence. In regard to the subjects which are addressed to other senses, we are willing to take much upon trust; to depend upon the experience of others, without requiring a personal verification at every step; and however desirable such investigation may be, it is certainly far from being essential. It is true that the *public* opportunities for pathological anatomy are very limited in the United States; that the private means of study are so, is after all the fault of the practitioner himself. In New England, I have never known a practitioner who has been really desirous of making autopsic examinations, who was deprived of sufficient opportunities. There is a chord of curiosity in the human breast, (morbid curiosity truly, as far as an unprofessional public is concerned,) which skilfully touched, always responds and conquers the natural or rather habitual repugnance which exists. The writer speaks on this subject from long observation, when he says, that those who have complained most of the superstition and unwillingness of our citizens, standing in the way of pathological researches, have been those who from want of early initiation into anatomical studies, or from indolence and want of zeal, have not considered knowledge worth acquiring with so much labor and disgust, (inter tædia et labores, as Avenbrugger expresses it,) as is inevitable in such pursuits.

And it may be further remarked, that no man who has studied faithfully, laboriously, and candidly, the modern arts of percussion and auscultation, has been a contemner of them. These have been sneered at and despised only by those who are too indolent or too ignorant to be capable of judging of them. When such individuals speak of having "tried" these measures, and having found them useless or

unavailable, the just conclusion may be deduced, that the attempt was commenced in doubt, followed without interest, and relinquished in wisdom, for such minds ought not to venture far from that mill-horse round, which is the track designed by nature for them to move in. The triumph of these measures over legitimate philosophical doubt, has already been accomplished; their victory over the natural indolence of our profession is yet to be achieved.

The terms applied to express the different character of the sounds elicited by percussion, are *clear*, *dull*, *obscure*, *absent*, *&c.*, with some qualifying adjective. These terms are comparative only, and they explain themselves. The terms absent, and dead, or fleshy, are synonymous. They express the idea indicated by the French, as *un son mat*, such as results from the percussion of the fleshy portion of the thigh, *tanquam percussi femoris*. A healthy portion of the chest not much enveloped by integuments, produces a *clear* sound; if the parts are emphysematous, or overcharged with air, the resonance may be *preternaturally* or *morbidly clear;* a lung moderately engorged with blood or serum, will yield a *dull* sound, or in those portions where the lung is thin, as low on either side; the term *obscure* indicates a less degree of resonance than dull.

The nomenclature of percussion is simple and obvious. With a view to proceeding systematically in the investigation, as well as to produce that community of language so essential to the accurate reception or communication of ideas, the chest is divided into various regions. This topographical division, must be of course, to a great degree artificial. Various schemes and plans have been suggested for greater accuracy and convenience. We see however, no reason why the original division of Laennec should not be preferred, as his work must long be the standard authority, and therefore must serve to ground that common mode of expression so desirable. The division of M. Piorri and others, is not less artificial and far less generally received.

The following is a birds-eye view of the natural sounds of the different regions of the chest, which as before remarked, cannot be too much studied *practically*.

1. The *subclavian* region comprehends that portion of the chest covered by the clavicles. The percussion is made directly on the bone, and the sound over all the bone should be clear, except near its humoral extremity, where, for obvious causes, the sound will be obscure. The natural and morbid sounds of this region, are worthy of especial consideration for several reasons; the phenomena are usually little affected by any interference of integuments, and therefore may be relied on; the portion of the lungs comprised in this region, is that in which tubercular developments are first made, and the early alteration of sound is of course of the highest value; for it can be truly said in the language of Dr. Forbes, that in the defective resonance of this region, we too often hear the death-knell of our patient. Laennec and other writers give the caution, that when the clavicle is more distant from, or nearer to, the chest, than natural, in consequence of a more arched or straighter form of the bone, (especially the latter,) a less distinct resonance should be expected.

2. The *anterior-superior* is bounded by the clavicle above, and by the lower margin of the fourth rib below. The sound here is very clear, and the percussive response very important, for the same reasons which apply to the clavicles. Its clearness should be rather less than in the last.

3. The *mammary* region commences at the termination of the last named, and extends to the eighth rib. In the female, for obvious reasons, this region will not admit of percussion. In the male, the sound may be expected to be as much less clear than in the foregoing, as is accounted for by the thickness of the lower edge of the pectoralis major muscle.

4. The *sub-mammary* region extends from the inferior edge of the eighth rib, to the border of the cartilages of the

false ribs. On the right side, the proximity of the liver will deaden the sound; on the left side, the sound may be affected by the stomach, which if distended with gas, will occasion a preternatural clearness; if filled with food, or if the spleen be enlarged, it may render the sound dull or obscure. The sound obtained by percussion over the region of the heart, varies extremely in different individuals. "In those that are spare," remarks Dr. J. Johnson, "with a weak pulse, or where the heart is small, the sound is hardly altered in the region of that organ; whilst in others of an opposite temperament and habit, it is with difficulty perceived."

5. *Sternal* region. The sound over the entire sternum, ought to be very clear, except in fat persons, in whom the fat about the heart may deaden the resonance of the lower extremity.

6. In the *axillary* region, the integuments being thin, the natural sound will be clear.

7. The *lateral* region extends from the fourth to the eighth rib. On the right side, the sound is often remarkably less than on the left; occasioned by the liver rising higher than usual. In a healthy condition, this organ cannot be found higher than the sixth rib.

8. The *inferior lateral* region extends below this last to the false ribs or rather their cartilages. On the right side, the presence of the liver, and on the left, that of the stomach or spleen, serve to detract from any certainty in the signs produced by percussion.

On the posterior aspect of the thorax, the regions numbered and described by Laennec, as 9, acromion, 10, the *upper*, and 11, the *lower scapular* regions, from their situation &c., cannot be expected to yield any resonance.

12. In the *interscapular* region, when the parts are drawn tense, and the subject is thin, a tolerably distinct sound may be produced.

13. The *lower dorsal* region; the value of the sounds is

comparatively slight, owing to the factitious influences of the stomach, the liver, the muscles and integuments which cannot be well put upon the stretch in this region. At the superior part of the region and over the angles of the ribs, a good sound may be sometimes produced.

From this recapitulation, it will be apparent that these regions, the sound of which is most important, are those which are least affected by extraneous circumstances, as well as those which can be most readily reached by the practitioner.

The connection between the signs afforded by pathological sounds of percussion, with the pathological changes which produce those abnormal sounds, will naturally be explained in treating of some of the forms of thoracic disease, in which their true indications are of value.

In concluding this topic, we would remark that the true value of percussion has been underrated by Laennec, and by those who have copied him. Naturally engrossed with his own discovery, he lost sight of this no less important auxiliary.

The subject of *Auscultation* is so essentially and directly connected with that of percussion, that there is a peculiar propriety in treating of them without any line of disjunction or separation, other than is required by a methodic arrangement calculated to exhibit the entire facts.

The honor of originating the art of auscultation, is due solely to Laennec; and it is with no little surprise we have noticed that Dr. Copland in his Dictionary, has, relying on the shadow of a shade, attempted to detract some portion of the honor, and apply it to "our countryman Hook." The history of the discovery is briefly this. While examining at the hospital of Madame Necker, to which Laennec was physician, in 1816, a young woman supposed to labor under a cardiac affection, the ordinary means of percussion were

rendered unavailing, on account of the obesity of the patient. In this dilemma, he was induced to apply a well known fact in acoustics to his assistance. This fact is the quality possessed by hard and solid bodies of transmitting slight sounds through them, clear and unchanged, as is witnessed when one end of a long piece of timber is scratched with a pin, whilst the ear is applied to the other, or is illustrated in the instance suggested by Prof. Dunglison, in which one end of a common poker is applied to a vessel of water over the fire, to ascertain when simmering or boiling has taken place. His experiment, made by rolling up a quire of paper hard, was successful in clearly transmitting the pulsatory sounds of the heart; and by following up this hint in a course of untiring and persevering industry, and in a spirit of rigid and philosophical induction, he found that all the sounds made by the interior movements of the chest in health or in disease, were clearly and characteristically conveyed to the ear, forming a new science of diagnostics, to which he gave the term of mediate auscultation, from the Latin *ausculto*, to listen. This study he followed up with increased zeal and success, till his death in August, 1826. His first work was published in 1819, and from that date, his discovery made rapid progress over the continent, and in a few years over Great Britain. It has for many years been, in all the hospitals and public charities of Europe, as much a part of the examination of those suspected of thoracic disease, as the signs presented in the cough, pulse, sputa, &c.*

Though Laennec did not exhaust the discoveries of his subject, it must be confessed, that such was his zeal, his industry, his success, and withal his opportunities, that com-

* I have no means of knowing to what extent the practice of exploration of the chest has been adopted in the United States. In the larger towns and cities, I am aware, it has been considerably and successfully cultivated, but in the interior of New England, at least by the great body of practitioners, it has been neglected. It has unfortunately been deemed, and this I doubt not from the *Frenchified* aspect of the works in which it has been communicated, as a subject too abstruse and difficult for the common class of medical

paratively little is left for his successors. The mantle of his individual skill he surely left behind him; for in perusing the results of various writers on this subject in every portion of the globe, but especially of Andral and Louis in France, we are still convinced that it is yet true that "L'auscultation mediate fournit des signes propres à rendre le diagnostic de presque toutes les maladies des poumons, des plèvres et du cœur, plus certain et plus circonstancié peut-être que les diagnostics chirurgicaux établis à l'aide de la sonde ou de l'introduction du doigt."

The ordinary form, construction, and acoustic principles of the instrument invented by Laennec, and named by him the *stethoscope*, are so well known as to render unnecessary any formal description. The various forms of the instrument differ only in convenience of application and transportation, and as far as these are concerned, we should recommend that known as Piorri's, especially in private practice.

All that has been urged respecting a full and familiar acquaintance with the healthy sounds of the chest, is equally, perhaps more decidedly, applicable to the employment of auscultation than of percussion. It will then be the student's first lesson to acquire a full knowledge on the chest of a healthy subject; and for this purpose, that of a young person, say from six to ten years of age, offers the most prominent and marked peculiarities. The examinations should be made both with the ear itself and by the stethoscope.

To make use of the stethoscope, it should be held in the same manner as a pen in writing; the extremities of the fingers resting at once on the end of the instrument and the

men. As a single individual, laboring under all the disadvantages which have been brought forward in disparagement of these methods, except the favorable circumstance of having been faithfully indoctrinated in its principles by a private pupil of the illustrious inventor, I would accord my unqualified opinion of its high value to the ordinary physician, nor would I after more than a dozen years' experience, relinquish its aids, so soon as any other single mean of pulmonary diagnosis.

surface of the chest, in order to secure a perfect apposition. The end being flat and even, or rather slightly hollowed, the cylinder will be perpendicular to the thorax; one or two folds of cloth, taking care that these are not silk or any rigid texture which might similate or confuse the sounds produced internally, should be interposed, especially if the patient be considerably emaciated. The degree of pressure should be such as to preserve perfect contact without producing pain. The remarks respecting the position of the patient, stillness of the apartment, &c., for the examination by percussion, are to be also regarded in this application. The examiner should take care to avoid a stooping or constrained posture for obvious reasons. A little experience as to the relative position of himself and patient, will readily suggest the best and most convenient modes of accomplishing the result satisfactorily.

On applying the cylinder, with the plug or obturator removed, over most of the chest a slightly but very distinct murmuring sound will be perceived, marking the entrance of the air into, and exit from, the vesicles of the lungs. The sound of inspiration is much more marked than that of expiration. This sound is termed the *respiratory murmur* or *vesicular respiration*, and in character is not unlike the passage of the air through the nostrils, in a deep and calm sleep.

This sound is loud in proportion to the depth and frequency of the inspiration, and may be rendered louder by directing the person to fill his lungs by forced inspirations. The respiratory murmur is different in individuals from constitutional peculiarity; in the same individual at different times, Dr. Williams observing that eating and exercise both augment its distinctness. The age of the subject has a most decided influence. In the child, and until the age of puberty, the vesicular respiration is peculiarly palpable, distinct, and shrill. At this epoch a change occurs. So decided is its character in children, that an abnormal distinctness in the

adult, is known as the *puerile* respiration. In females this respiration is more marked than in the other sex.

The noise made by the air passing through the minuter bronchial ramifications and air-vesicles, is not the only one which may be heard through the stethoscope. Applied to the region of the windpipe, and about the upper extremity of the sternum, a more loud and very different sound is evinced, giving the idea of a considerable column of air passing through a tube of large calibre; compared by some to the noise produced by the air rushing from the nozzle of a pair of bellows. This is termed *tracheal respiration.*

Over the course of the larger bronchial ramifications, a still different sensation is produced, marking the passage of the air through tubes of less size than the last, and is denominated *bronchial respiration.* It may be heard in the middle portion of the sternum, and in the interscapulary and axillary regions. The character of the sound will be self-evident, after the other two described have been recognized.

Of the pathological deductions to be made from examination of the respiratory murmur, it may be observed, that as the perfect development of this sign gives evidence of a perfect entrance of air into the air-vesicles, when the lungs are uniformly healthy, we have the right to expect more or less distinctness of vesicular respiration in every portion. It may, however, from idiosyncracy, be very feeble uniformly, without disease. It is only when unequally developed, that morbid change of structure is to be presumed. If entirely suppressed in a particular spot, the inference is, that either the pulmonary tissue in that place does not allow the permeation of air, as in hepatization or even from tubercles thickly aggregated, or else the vesicular sound is prevented from reaching the ear by the presence of air or fluid within the two layers of pleura. Of course the sound elicited by percussion, will decide whether the lung is condensed by an obscure or dead resonance, or whether

there is a collection of air by the preternaturally clear sound.

In case an augmented respiratory murmur is perceived in a particular portion of the chest, amounting to what is denominated puerile respiration, the general inference is, that there is some other portion of the lungs so solidified or compressed, that the air does not pass into it, and the remainder of the organ is required to increase its activity of function to supply the deficiency. Hence this preternaturally increased murmur has also been termed *supplementary*. It is occasionally noticed throughout an entire lung, when the office of the other is destroyed, as I have several times noticed, when an entire lung has been compressed and crowded into an impervious mass by hydro-thoracic effusion.

In some instances, instead of the natural vesicular murmur in a portion of the chest, where it is naturally to be heard, we find the tubular blowing sound of the air passing through the larger bronchial tubes, or *bronchial respiration*. The common conclusion deducible from this phenomenon is, that the subjacent pulmonary structure is so condensed, that it, having become a better conductor, conveys the sound of the bronchial current of air. In certain examples, however, this peculiarity may originate from a morbid dilatation of the smaller or medium sized bronchi, and which then present the characters usually belonging to the first or larger divisions.

In a still different class of cases, we may find instead of the natural vesicular respiration of a part, a sound similar to that produced over the larynx or trachea. This is produced by the air passing into a considerable excavation, ordinarily the effect of evacuated tubercles, and known as *cavernous respiration;* a physical sign of decided, but unhappily, melancholy value, and is to be corroborated by another test, that of pectoriloquy, hereafter to be spoken of.

In addition to the natural or morbid sounds occasioned by the motion of the air in the lungs, other sounds are conveyed to the ear in certain morbid conditions of the pulmo-

nary organs. The first variety of these adventitious sounds, is produced by any cause which occasions a contraction of the natural calibre of an air-tube, as a tumefaction of its lining membrane, or the compression of its sides by some swelling or adjacent fluid; or the same effect may be produced by a spot or portion of thick mucus resting in and partially obstructing a bronchus.

A second variety of these sounds arises from the passage of the air through more or less fluid secretions in the larger or smaller bronchial tubes. These varieties of artificial sounds were denominated by Laennec, râles; this term has been uniformly employed on the continent; but in Great Britain, as if over-anxious to detract something from the just glory of its French origin, the writers on auscultation have undertaken to translate it by the words *rattle*, *rhonchus*, and even *wheeze!* (See Med.-Chir. review passim.) The original term râle, as being a simple term of art incapable of either synonym or translation, seems by far the most eligible designation.

These râles, varied by numerous slight circumstances, present a multitude of slight modifications, and fade into each other by insensible degrees. These variations have given occasion to writers to refine and divide and classify their peculiarities to a most unprofitable degree of minuteness. The sketch given by Dr. Copland, and evidently compiled by him from four or five of the best writers on this subject, seems so judicious, and comprehends all the most essential points, that no apology seems required for substituting it in this place in substance, without adhering rigidly to his language.

The *moist crepitous râle*, has its seat in the air-cells and minute bronchiæ. It resembles the sound produced by rubbing a lock of hair between the finger and thumb close to the ear, or the crepitation of a piece of lung distended with air when compressed. It is generally uniform and continues to the end of inspiration, and seems to arise from diminished

calibre of the minute bronchi, owing to interstitial effusion and the admixture of the respired air with the secreted or effused fluids in the air-cells and tubes. It is characteristic of incipient hepatization of the lungs from pneumonia, and of its resolution; of œdema and apoplexy of the organ; sometimes of early phthisis, of pulmonary catarrh and bronchitis. But it is only pathognomonic of the first stage of pneumonia, and the more viscid the mucus that is secreted, the more distinct is the crepitant character of the râle. In the other diseases in which it occurs, the crepitation is less perfect.

The *dry crepitous râle*, resembles the sound produced by blowing into a dried bladder, and conveys the impression of air distending lungs, that have been more or less dried, and whose cells have been unequally, but much dilated. It is only heard during inspiration, and occurs only in pulmonary emphysema.

The *dry bronchial râle*, is either *sibilous* or *sonorous*. The former is a low or loud, shrill or bass and prolonged whistle, such as may be produced by air passing through a small circular aperture, and is owing to some contraction or constriction of the bronchi. The latter is a dull, prolonged snoring sound, sometimes very loud. It occasionally resembles the bass note of a violincello or bassoon, or the buzzing of an insect. It seems to be produced by a flattened contraction in a bronchus of considerable size, leaving very little aperture, and arising from external pressure of the bronchial tube, from local thickening of its mucous lining, or from tenacious mucus within its canal.

In a modification of the râle, which Dr. Williams calls the *dry mucous râle*, the sound resembles that of a click wheel, and is produced by a portion of very adhesive mucus attached to the bronchial lining, which, yielding with a jerking resistance to the air, forcing its passage, thereby occasions a ticking sound.

The *mucous râle* takes place in the bronchial tubes, and is produced by the passage of air through a thickish fluid, giving rise to a kind of *bubbling* within the air tubes. It is

most frequent in bronchitis and pulmonary catarrh, accompanied with mucous secretions; in hæmoptysis, in phthisis, in pneumonia and in other diseases, which are attended at any period with expectoration. This râle is more gurgling, loud, irregular and coarse, the larger the bronchi in which it is seated, the bubbles being there larger and more unequal. In the trachea, these characters have been particularly marked, and have been denominated *tracheal*. In the smaller bronchi on the other hand, this râle is more equal, and its characters less remarkable, the bubbles being of much smaller size. The bubbles producing the mucous râle must necessarily vary in their characters with the varying fluidity of the secretion.

The *cavernous râle* occurs when a cavity exists in the lungs, more or less filled with fluid; it is to be heard over a small space, and consists of a coarse gurgling or bubbling sound. It may be expected in the advanced stages of phthisis, in which the cavity formed by the evacuation of tubercular matter exists, and in the cavity resulting from abscess or imposthume. It is obvious the symptom termed pectoriloquy, will co-exist with this sign.

There are one or two other morbid sounds to be detected with the stethoscope, worthy of examination. Of these, *metallic resonance* occurs when a quantity of air is accumulated in the space between the two layers of pleuræ, and has also been observed by very practised stethoscopists, in cases where very large excavations existed within the lungs. A still different modification is termed *amphoric resonance*, by Laennec, and also another obscure dull sound has been more recently described as the *rubbing* sound or *sound of friction*. It probably owes its origin to the motion of the pleural surfaces upon each other, and is a symptom of pleuritis, in which an exudation of an albuminious substance has been made.

In addition to these various respiratory sounds, there are others developed whilst the individual is speaking. In

making the stethoscopic examination of these phenomena of the voice, the funnel shaped plug of the cylinder should be replaced, making it a solid body, except being traversed by its tubular bore.

In the healthy chest, when a person speaks, a slight tremulous or vibratory feeling is conveyed through the tube to the examiner's ear, analogous to that perceived by laying the hand upon the thoracic parietes. This sensation exists only where the larger bronchial ramifications do not extend; for over these, as in the interscapulary or axillary regions, a distinct vocal resonance, even to the distinguishing of articulate sounds, may be expected. This class of sounds have received the name of *bronchophony*. If the *larynx* or *trachea* are examined in the same manner when the patient speaks, a loud, distinct and articulate expression of the words is brought to the ear, almost precisely similar to that produced by the person's applying his mouth to the end of the tube, and speaking through it into the ear. This is termed *laryngophony*, and the degree of resonance diminishes by insensible gradations from this, through the *broncho*-phonal resonances, losing its articulation and distinctness, till over the vesicular structure a slight, tremulous, vibratory thrill or fremitus can alone be heard.*

The sounds of the voice in their pathological relations, are divided into three classes. *Bronchophony* in unnatural places, which like the symptom of bronchial respiration, may originate from a condensation of the pulmonary structure, making it a better conductor of sound, or from morbid dilatation of the bronchi themselves. *Ægophony*, a peculiar bleating sound, occurring from some unnatural deposition of fluid, and that in very small quantity, only between

* It should be remarked that the extent of vocal resonance is constitutionally very different in individuals. It is loudest, most distinct, and over the greatest space, in those having a sharp treble intonation, especially if the thoracic integuments are thin, in females and in children. It is also most decided in the upper region of the chest. Under opposite circumstances, great indistinctness and obscurity exist.

the pleuræ, as in pleuritis and hydrothorax. The sound is of a shriller, sharper key than the patient's natural voice, rather resembling its echo.

The third symptom of the voice, is *pectoriloquy*, or *pectoriloquism;* * one of peculiar value, as being almost pathognomonic of a most common pathological condition of our most common disease; and still more worthy of attention, as a sign capable of being detected and appreciated without that exquisite degree of tact and extent of experience, essential to take advantage of some of the phenomena of auscultation. On these accounts, some writers having especially in view the situation of the American practitioner, have looked upon this symptom as the only useful application of the cylinder which can ever become generally employed.

When a cavity or excavation exists in the pulmonary substance, communicating as it naturally will, if not obstructed accidentally, with a bronchial tube, the voice of the patient will seem to proceed directly from that spot through the cylinder to the examiner's ear. This is pectoriloquy, or speaking from the chest; and as the symptom is more or less distinct and complete, the terms *perfect*, *imperfect*, and *doubtful*, are used.

In perfect pectoriloquy, the voice seems to be transmitted from a circumscribed spot in the chest, and reaches the ear of the observer as if it were totally distinct from the voice issuing from the mouth. It appears as if some person were speaking into the end of the tube, the articulation not being

* In the very few remarks on this topic in Dr. Copland's popular work, he gives the name *pectorilogy*, and states that it is so termed by Laennec. In the writer's edition of Laennec's original treatise, it is not so denominated, nor is it so translated or distinguished by Dr. Forbes, Laennec, Louis, &c. From this, I apprehend that the alteration has been made solely in consequence of the often observable propensity of Dr. Copland, to give an *anglicised* tone to all foreign improvements; nor is the alteration (always to be deprecated in terms of art or science) defensible on the ground of euphonious sound or correct derivation.

however so distinct as natural; its natural tone is unchanged, even being perhaps more decided, and in cases of aphonia or loss of voice, the patient's conversation can be much more distinctly understood through the cylinder.

Perfect and uncomplicated pectoriloquy unfortunately, is not a very common symptom; its value as a sign of disease, like most of those derived from auscultation, will depend much upon the part of the chest in which it is developed, and on its being wanting on one side whilst present on the opposite or corresponding point; for it is only by attention to these circumstances that it can be discriminated from the natural or exaggerated bronchophony. Its importance is of course diminished, when it is heard over those parts beneath which the larger bronchi extend, though by no means entirely destroyed; as in natural bronchophony, the sound will not pass or traverse the tube, nor will its spot be so circumscribed as in pectoriloquy.

The caution should be had to make due allowance and receive with great distrust this symptom, when occurring in the sternal, interscapular or axillary regions, and also in making the examination near the apices of the lungs, that the resonance from the trachea, or laryngophony, is not mistaken for pectoriloquy; towards the acromion, little danger of this will occur, if care be taken to keep the cylinder perpendicular to the surface of the chest. Some considerations will be hereafter brought forward when considering particular diseases, with reference to discriminating certain cavities from bronchial dilatation and tubercular excavation.

The degree of perfection and certainty will also depend on a variety of circumstances connected with the cavity itself. It will be most distinct when the excavation is of a moderate size and regular shape, spheroid or ovoid; when it has a considerable opening into a bronchial tube, especially into a large one; when it is near the external surface of the lung; when from a condensation of the lungs or tubercular induration, the acoustic conduction is augmented.

When the cavity is very large, the pectoriloquy will have a very full and grave character, as if the voice was increased by speaking through a hollow conical tube. When it is very small, and the parts of the surrounding lung little changed, it may present no appreciable sign. Laennec however, has detected and verified pectoriloquy in an excavation, and that the only one in the lungs, not larger than a prune-stone.

The symptom will be most readily appreciable when the cavity is near the surface of the lungs, especially if the adjacent pleural layers are adherent. When this last circumstance has not taken place, the pectoriloquy is sometimes prevented by the collapse of the outer-wall, which takes place in the expiration of articulating; this collapse closes the cavity or rather destroys it. Laennec states that even small cavities, an inch within sound lung, are capable of rendering pectoriloquy.

When the morbid excavations exist in a chain opening into each other, forming a long and tortuous channel, the pectoriloquial sound will be rendered confused and indistinct; if this channel should be regular, long, and without anfractuosities, so that pectoriloquy may be traced along the course of it, it may mislead by presenting sounds analogous to those of natural or enlarged bronchial tubes. Here the presence or absence of the same sounds on opposite corresponding points will determine the question.

Pectoriloquy will be most evident when the cavity is free from fluid, which may partially or wholly close up its communication with the bronchial tube. In this case, a natural or forced impulse of coughing may at once, by clearing away the obstructing purulent or tuberculous matter, render the pectoriloquy again evident. "It sometimes happens," observes Martinet, "that we can find scarcely a single individual with pectoriloquy, in the wards of a hospital, though at a previous visit there had been several. In such cases, we observe that in the greater number of the patients, the

expectoration had been very much diminished or entirely suppressed."* In such instances the cavernous râle which would be produced, would render the morbid alteration no less palpable. The determination that the symptom of pectoriloquy is absent, should not be made till after repeated examinations of the patient at various intervals and times of the day, and it is generally expedient to instruct him in the course of the examination to clear his lungs by forced cough.

The natural intonation of the voice should be carefully taken into consideration. The more acute it is, the more evident will the pectoriloquy be; hence, it deserves to be repeated, that in women and children, especially if emaciated, natural bronchophony may extend to the middle of the interscapular, subclavian, and the mammary regions, whilst natural laryngophony which precisely resembles pectoriloquy, may be detected in these regions which ordinarily present only bronchophonal sounds. In men with deep and grave voices, even when a cavity is present, the natural thrilling of the walls of the thorax may be sufficient to mask and render it doubtful. "In such persons," remarks Laennec, "the voice tremulous and agitated, seems unable to penetrate the tube, but resounds at its extremity twice or thrice as loud as when heard by the naked ear. The patient seems as if he spoke through a speaking-trumpet quite close to us, and not through a tube into our ear." If, however, this peculiarity is confined to one side alone, its pectoriloquial character will be sufficiently characteristic.

Some of the circumstances of the degree of pectoriloquy termed *imperfect* have just been referred to. The voice thrills strongly under the end of the cylinder, seems to approach or to be directed toward the ear of the observer, but does not pass through the entire tube. There is also a want of circumscribed limits to the suspected spot, rendering it liable to be confounded with natural or morbid bronchophony.

* Manual of Pathology, p. 48.

It may depend on several circumstances, as the smallness of the cavity, the imperfect communication between it and the air-passages, its depth from the surface of the lungs, the irregularity or anfractuosities of its inner surface, or perhaps from its cavity being partially filled with softened and tattered pulmonary substance. Its value as a sign will depend upon its occurring in parts where it cannot be confounded with the natural resonance, and on its being developed on corresponding points in one side only.

The term *doubtful*, as applied to pectoriloquy, explains itself as a diagnostic of disease; from its seat and its character, it is hardly necessary to remark its want of value. It may be remarked generally in regard to pectoriloquy, that the grades and degrees of distinctness and certainty are so blended and run into each other, that the attempt rigidly to classify each particular case as belonging to one or the other of these divisions, is useless. They are so distributed only for convenience in medical technicology.

Before leaving this branch of our subject, it seems proper to recapitulate some other phenomena modifying or accompanying pectoriloquy, in addition to those which have been referred to in their places.

The voice is sometimes interrupted, as it were, in its passage; not traversing uniformly through the cylinder, but only the more acute tones reaching the ear. This is owing to the small size of the openings between the bronchi and the cavities, or their partial closure by the secretions. The value of the sign, of course, is not affected by this circumstance.

The sound of the voice may be more or less changed when heard through the stethoscope. It generally is more acute in tone and the articulation particularly of certain words more indistinct than natural.

The pectoriloquy is sometimes accompanied by a kind of gurgling sound, produced by the motion of softened tuberculous matter, rendering the articulation indistinct, some words

being heard much plainer than others. Or the voice may be conjoined with mucous and other râles. When no foreign sounds are intermingled, it may be regarded as evidence of the cavity being empty.

When in the progress of disease the cavity has become very extensive, pectoriloquy may cease. In such cases, there will be found *cavernous* respiration; or if the cavity contains a small quantity of fluid, or is lined with the fibro-cartilaginous membrane of tubercular excavations, metallic tinkling will be observed.

Pectoriloquy may cease the moment a cavity opens into the pleural space. This rare occurrence will be rendered sufficiently obvious by the pleuritic inflammation which will supervene, as well as by the stethoscopic signs peculiar to the presence of fluid in this space, such as ægophony if the quantity of fluid be small, or by percussion if much fluid or air should be extravasated.

When the openings between the air-tubes and a cavity are several in number, pectoriloquy becomes less marked, or cannot at all be detected.

Exploration of Diseases of the Lungs.

In proceeding in the attempt to decide the question how far the stethoscope and percussion are available in detecting and discriminating diseases of a pulmonary kind, the first point to be considered is, What are the derangements of structure or function, or both, which in common practice peculiarly require any other aids than the usually presented symptoms? No such necessity absolutely obtains, it is evident, in the acute inflammations of the pulmonary organs or their appendages, although no additional means to those ordinarily employed are to be despised or neglected. It is in the chronic forms of disease, that the proverbial difficulty of making out a diagnosis applies;—those which from time immemorial have been grouped together under the general,

though sufficiently indefinite appellation of Consumptive Diseases, comprising under this sweeping term alterations of tissues, and varieties of alterations numerous and diversified. For prior to the researches of the French pathologists, every disease in which cough and emaciation were prominent features, was in actual practice, however it might be in nosological arrangement, styled consumptive. Modern investigations sufficiently demonstrate that besides the existence of a peculiar morbid production called tubercles and their subsequent alterations, these forms of externally somewhat analogous disease, may consist of several whose more accurate and physical diagnosis, treatment and probable result, are widely divergent; such for example as the chronic inflammation of the mucous membrane lining the air-passages, or chronic bronchitis; chronic inflammation and ulceration of the larynx or trachea; chronic inflammation of the pleura; inflammation of the common or phlegmonous kind in the parenchymatous substances of the lungs, ending in ulceration and the formation of vomicæ or abscesses; the ulceration of hepatized portions of the lungs; some rare and accidental disorganization of the pulmonary organs, as melanosis, gangrene, &c., together with maladies in which the cough and emaciation occur sympathetically and independent of any disease in themselves.

Tubercular Phthisis. Some of these diseases will be examined in relation to the application of the external means of exploration to them, commencing with that one which forms and has from the first ages of medicine formed the grand outlet through which from one fourth to one fifth of all human life has escaped, viz., Tubercular Phthisis. For the veritable pathology of this disease, medical science is principally indebted to the extended, laborious, and philosophical researches of Bayle, Andral, Laennec and Louis. It has been mainly ascribable to them that the subject has been stripped of its obscurity, and that the nature, progress and phenomena of tubercle, now universally admitted as the

foundation or rather the essence of this malady, have been fully and satisfactorily illuminated. If indeed in this the therapeutical success of the practitioner has not, in conformity to the general principle, kept pace with the progress of pathological knowledge, the latter has at least proved of adequate value in enabling us to form a diagnosis in other forms of pulmonary disease, which are capable of successful medication.

The morbid appearances presented in examining the lungs of those who have fallen victims to true tubercular consumption are pretty uniformly the same, consisting of the results of tubercle in various stages of growth and change. The matter of pulmonary tubercle is found deposited or formed in the lungs in three separate kinds or stages; miliary tubercle or grey semi-transparent granulations, caseous or crude tubercle, and tuberculous infiltration.

The first of these forms consists of small globular bodies of a greyish color, and semi-transparent or even transparent and colorless structure, varying in size from that of a millet seed, whence their name miliary, to that of a large pea. Their consistence is somewhat less hard and incompressible than cartilage, and they are very adherent to the structure in which they rest. They are dispersed throughout the lungs of the phthisical subject in very various degrees of aggregation, sometimes existing almost alone, and again conglomerated in myriads. When few in number, their size may increase to a considerable extent, even according to the statement of Laennec, to the dimensions of an almond. This has usually been deemed the quiescent or natural state of tubercle. In progress, they increase in size and coalesce together, and a small opaque yellowish spot or speck presents itself in the centre of each, according to the opinion of Laennec and Louis, although Andral and Dr. Carswell believe that this incipient change does not uniformly commence as a central nucleus, but also on the side or surface. This speck gradually enlarges and involves the whole mass in a change of

structure, marked by its yellowish white color and soft caseous or cheesy consistence which is *crude tubercle.*

In other portions of such lungs, tuberculous matter presents itself as infiltrated into the cellular texture of the organ. The peculiar spongy texture can no longer be seen where this morbid change has occurred. The specific yellowish white specks noticed in the other form of tubercle are also presented in this, and their progress to an entire change of the mass is identical. The whole portion thus invaded becomes altered to an opaque yellowish white mass, gradually diminishing in consistency till it has the caseous form; at length it becomes more fluid, till it possesses the viscidity and fluidity of pus. This process of softening commences at the interior of the tubercular formation, and proceeds outward till the whole is involved.* When the tubercular

* The preceding views of the formation and subsequent alterations of tubercular structure, which are those of Bayle, Laennec, Louis, Clark and others, have not been wholly unobjected to. Andral believes that former observers mistook the granular appearance of the pulmonary tissue resulting from partial pneumonia, and developed by the retraction of the healthy air-cells after an incision for the greyish semi-transparent granulation or the primary stage of tubercle. Other continental writers have attempted to show that the first stage of tubercle is, in fact, the formation of a fluid differing from the pus of common inflammation, being probably a modification of lymph; a morbid secretion resulting from an irritation in the lymphatic vessels and tissues in which the white fluids circulate. This is the hypothesis of M. Broussais, who places their seat in the white capillaries and lymphatic ganglia.

In this view of the subject, the tubercles are supposed to increase from a centre or nucleus by successive depositions, and become solidified from the centre outward, the middle continuing throughout in a softened state. The mode by which, in this case, their final softening before they can be evacuated by expectoration, is supposed to be effected by Dr. Jackson of Philadelphia, (Principles of Med. p. 542,) (who, in common with many others of his *fellow citizens*, follows Broussaim with an *ultraism* of devotion, truly ludicrous to any one aware how much Broussais' views on this topic were owing to personal enmity to Laennec,) in a manner analogous to that by which the softening of the coagula of blood effused into the brain in apoplexy is accomplished. A sanguine irritation or inflammation is occasioned by the presence of the tubercle, which results in the secretion of a serous or sero-purulent matter, in which they are dissolved and then evacuated.

matter, whether in the form of amorphous masses or separate granulations, is sufficiently softened, it is evacuated from the lungs by expectoration, and a vacant cavity or excavation is left from which the matter was discharged. This may be of all sizes, and of as many shapes as the original tubercular degeneration. Sometimes the ulcerous cavity is so minute as to be nearly imperceptible, and again the ravages of successive tuberculous evacuations may leave the whole extent of lung a cavity bounded only by the pleura and a thin condensed layer of pulmonary tissue; the ulcerative process extending not only to tuberculous portions, but to the healthy structure.

The larger cavities are formed by the union of the smaller ones, which are successively added as the tubercular matter is evacuated. This coalescing of the cavities will explain the presence of bands of parenchymatous substance, running through the excavations, (a common occurrence,) which at first sight might be mistaken for blood-vessels, that in fact have been very rarely seen thus to permeate a cavity. The extremities of the blood-vessels, become blocked up by coagulable lymph and contracted, and they are absorbed or are degenerated and evacuated like the remaining structures. The cavities may be of very intricate and irregular figures; round, or sinuous, or composed of successive ones communicating by smaller openings. Besides being traversed with bands of pulmonary tissue, detached or loosened portions may be present; all which circumstances may modify the phenomena elicited by the cylinder, as we have noticed when treating on the symptom of pectoriloquy.

The walls of these cavities may be lined or bounded in various ways, depending perhaps on the greater or less recency or activity of the inflammatory process, sometimes by merely the substance of the lungs exhibiting redness and marks of inflammation; again, the pulmonary substance may be condensed and take on a secretion of a purulent kind, or of coagulable lymph, forming a species of false membrane

extending throughout the cavity, of a thin, smooth, opaquely white and friable nature. A secondary membrane of a firmer, tougher description, is sometimes noticed, which is formed beneath the other, which last then becomes loose, torn and detached, and is discharged by expectoration. The lining of coagulable lymph is also in certain cases converted into a fibro-cartilaginous membrane, of varying degrees of thickness and firmness.

The excavations after the discharge of their tubercular matter, have a secretion more or less purulent, or of a colored grumous liquid. That from the fibro-cartilaginous lining is serous or sero-mucous.

In the examination of a phthisical lung, the various conditions or stages and results of tubercle, are usually to be witnessed at the same time, as the quiescent semi-transparent grey granulation; the tubercle increased in size and marked with the yellowish white spot at its centre, or throughout its extent softened and changed; masses of tubercle collected together, or tuberculous infiltration into the pulmonary substance, with softening and excavation; and the different states of this last result as surrounded by inflamed lung, by a false one of coagulated lymph, or a firm one of fibro-cartilage.

It rarely happens that one solitary cavity is found, and the rest of the lungs sound. Laennec says, that there are usually presented marks of two or three successive eruptions of tubercles in the same lung; a new crop appearing about the time when a former one has become softened; those of oldest date occupying the summit of the lung and have been evacuated; a second crop situated around and below these, exhibiting the characters of crude tubercle, whilst the basis and inferior portions of the organs, present the unchanged semi-transparent granulation.

Beside the forms of tubercle referred to, a colorless jelly-like matter, called by Laennec "*infiltration tuberculeuse gelatiniforme*," is frequently deposited in tubercular con-

sumption and "in no other disease." There seems to be no reason to doubt that this is of true tubercular character, as Laennec and Dr. Clark accord their opinion that "it is only a more liquid state of tubercular matter poured into the parenchyma of the lungs."

Such are the ordinary morbid changes produced by this disease. It remains to investigate the connection which exists, 1st, between these changes and the accompanying and corresponding constitutional or general evidences or symptoms, and 2d, the corresponding phenomena which they offer through the stethoscope and percussion. We would again press upon those who are seeking for the truth on this subject, and who are desirous of ascertaining and employing the just measure of value in these methods, that the whole evidences of a case are to be used in conjunction, like testimony in juridical procedure; no one set or series of evidences or symptoms is to be thrown aside, or their weight unjustly appreciated or degraded, but the whole aggregately are to form the basis of an opinion.

In consumption the ordinary chain of general symptoms is not infrequently broken; we find it sometimes latent, sometimes masked by other affections, sometimes wanting in what would, *primâ facie*, be deemed essential constitutional signs. "We shall also find," remarks Dr. Clark, "that there is scarcely one, even of the leading symptoms, which may not be absent; and it has been stated that instances have occurred in which tuberculous disease has proved fatal, almost without any local symptoms. This, however, is by no means in accordance with my own experience; certainly I have never met with such a case, nor can I easily believe that tuberculous disease of the lungs should run its course without affording sufficient indications of its existence. If cough and expectoration be wanting, we shall find hurried breathing; and if regular hectic be absent, there will still be the rapid pulse or the frequent chills, the night perspiration or diarrhœa and emaciation: more or fewer of these symp-

toms are always present, and together with the peculiar cachectic character of the countenance, enable us to detect the real nature and seat of the disease. There will at least be found enough, I believe, in the most obscure cases, to excite the suspicions of the observing practitioner; and when these are once aroused, the *physical signs*, which diseases of the lungs always afford, will soon satisfy him respecting the real nature of the malady."

There is a convenience in the usual division of tubercular phthisis into three stages, viz.: the first which comprehends all those signs of disease prior to a peculiar state of the expectoration, which is usually known as purulent, but which in fact occurs when the matter of tubercle has become so softened as to be evacuated; here is the intermediate or second stage which *always*, (some truly rare exceptions only strengthening the general rule,) sooner or later, eventuates in the colliquative or last stage, including the period from the copious night sweats and diarrhœa to the end of life.

There is, it is true, a stage of consumption anterior to either of these changes, and of vastly higher moment in a practical point of view. It is the abnormal vital, or physiological change, which gives the origin or perhaps the tendency to action, to the tubercle; a subject which, as founding the only hope in its development, of ever consumption being successfully treated, or rather prevented, has been for centuries too much neglected. The recent turn of medical science in Europe, as evinced in the writings of Louis, Clark, Carswell, and the British and continental journalists, seems to be directed towards this subject. Humanity and science may alike breathe the aspiration, God speed them!

The first stage, or appreciable stage, of phthisis, undoubtedly consists in the enlargement of tubercle, or the augmentation of the tubercular mass, which in germ, however so little evolved, may be present in the pulmonary structure. This development occasions a derangement of the function of the organ. The irritation produces cough,

usually the earliest evidence of change, especially in the morning, which in time is accompanied with an augmented secretion from the fauces. Some degree of oppression of the respiration on making exertion is perceptible. The tendency towards a febrile action may be early detected in the quickened pulse, more or less distinctly marked heats and chills, burning of the soles and palms, night perspirations, &c. Some emaciation, debility, and cachectic aspect, are also usually present. Now what are the pathological changes present or in progress? The gradual augmentation and softening of tuberculous matter. What indications ought we, according to the principles before elucidated, to expect on external exploration? To the extent to which the delicacy of our organs are so cultivated as to appreciate them, we find precisely the results to which theory would, a priori, direct us, subject however to some modifying and occasionally deceptive circumstances.

When the tubercular substance is very small in quantity, or very generally diffused throughout the lung, or exists in nearly the same quantity and corresponding situations on each side, probably no tact or delicacy of touch or ear can determine its existence. In the very early stages of the development, it must be admitted that the physical signs are obscure or inappreciable. But the deceptive circumstances above referred to do not long or ordinarily obtain. Tubercles are usually most abundant towards the apices or summits of the lung and on one side only, or most extensively. Which side it is that most frequently is their seat, is a point on which the best writers do not agree. Laennec speaks of the right lung as that which is generally first and most extensively affected. Louis has found this true of the left, and probably the truth is that there is no great difference.

Percussion should be made delicately and carefully, with attention to the precautions and circumstances formerly alluded to, on each clavicle. A very slight morbid change will produce a difference of resonance; one being evidently

less clear than the other. Dr. Forbes remarks in a note to his translation of Laennec, thus elegantly on this circumstance; "In no case is the importance of *percussion* so frequently and strikingly evinced, as in the early stages of phthisis. A single blow on the clavicle will often afford the means of a more certain diagnosis and prognosis, than weeks or even months of observation of the general symptoms. How often have I heard in this ominous sound, the death-knell of my patients!"

The portions of the chest where defect of resonance is available as a sign are limited. Besides the clavicular region, the thorax may be examined on the upper and anterior part as low as the fourth rib, and in the interscapular space.

In the early stage of tubercle, the stethoscope will detect a diminished softness of the vesicular respiration, and an augmented resonance of the voice, and a diffused bronchophony, in parts in which it naturally does not exist. This indicates that the condensation of substance made by the tubercular addition, renders it a better conductor of sound. It should however be not overlooked, that the sound of the air passing in the bronchi, can be heard about the upper and inner angle of the scapulæ to a greater extent as the patient is more or less emaciated, even when no disease exists. The bronchophony indicating disease may be very imperfect, amounting to little more than an increased fremitus or jar in speaking. The respiratory murmur will be diminished, if the extent of the tubercular change is so great as to hinder the natural entrance and exit of the air to and from the air-cells, or its natural character changed. The value of the signs will depend much whether they are heard alike on both sides, or differ in corresponding points.

The presence of inflammation, mucus, and hæmoptysis, giving origin to the various râles, will, it is obvious, obscure the symptoms. Nor is it unusual, when the extent of tubercles is so great as to interfere with the function of the

lung, to find more or less supplementary respiration on the diseased side of the chest, evincing the abnormal amount of duty or office now thrown upon the undiseased portions.

In progress as the tubercular matter becomes softened, a new series of symptoms are presented, keeping pace with, and corresponding to, the formation of a more liquid substance. A kind of gurgling is produced, especially when a natural or forced cough is examined. A râle is produced, which varies according to obvious circumstances. If the matter is thick and tenacious, it will be a slight but peculiar sound, which we have described as the crepitant; if more liquid, some form of mucous râle will be produced. As the matter is discharged by expectoration, a new and very important series of signs are palpable to the ear through the cylinder, all indicating the cavity which is left. These may be *cavernous* respiration, presenting the same general characters as the bronchial, except in the former the impression is as if the entrance and egress of air was rather into a large cavity than a bronchial tube, and will be less equivocal when heard in parts where the larger bronchial ramifications do not traverse. Dr. Williams says "it may be perfectly imitated by blowing into shells of different sizes." As a general rule, the deeper and more hollow the sound is, the larger the cavity. The *cavernous* râle will be formed under two circumstances in an excavation, viz.: before the softened matter is entirely evacuated, and also when a sufficient secretion is made from the walls of the cavity, through which the passage of the air can develop this râle. Hence it must not always be expected, even when we know by pectoriloquy that a cavity is present. It may appear and disappear. A forced cough will frequently render it distinct, when it will not be produced by simple respiration. The general character of this râle will be that of the *mucous*, but greater in degree. It in fact so closely resembles that form as heard in the trachea or large bronchi, as to lose all its certainty and value when detected over the situation of such

tubes, as near the upper portion of the sternum, in the axilla, and upper interscapulary region.

In this stage of pulmonary alteration, a degree of metallic tinkling is occasionally present, especially on cough being made, and the books say that even on percussion, especially in lean and emaciated subjects, a sound will be produced like that of a cracked earthern vessel gently struck. This, it is evident, could be expected only when the excavation is near the surface. This symptom of metallic tinkling or resonance, resembles the sound produced by gently striking a cup of glass or metal with a pin. It depends on the existence of a cavity partly filled with fluid and partly with air. It may be detected during respiration, coughing and speaking, but especially the two last. It is also produced in any liquid effusion, as of pus or serum in the pleural cavity conjoined with air, provided a communication exists between the cavity and the bronchial tubes, though Dr. Williams has shown that even this is not always essential.

Throughout the whole of the two latter stages of phthisis, in which the excavation of course exists, the symptom of pectoriloquy will be developed. The degree and value of this symptom, which are contingent on several circumstances, have been before referred to.

To say that the physical symptoms in phthisis can always be satisfactorily appreciated is not in the present state of our knowledge to be expected. Nor is it denied but that in the early beginnings of the morbid action of tubercle, that much uncertainty will hang over our external exploration, but it is none the less true that in many cases the results at the very origin of disease are clear and certain.

To the common reproach that the auscultatory aids only serve to verify the existence of an extent of morbid change hopelessly irreparable and incurable, it seems almost a work of supererogation to reply. Surely the absence of these symptoms in cases where the uncertain constitutional signs make us fear disease, is a negative kind of testimony whose

value is not to be contemned. Even an early detection of irremediable mischief will save the sufferer from much ill-judged treatment, and especially from active remedial agents, which we too well know but accelerate and aggravate the progress of consumption.

In fine, were the use of percussion and the stethoscope confined to tuberculous consumption alone, we are confident that these would be well worth the unremitted study and persevering application of the humblest as well as the highest practitioner.

To pretend that the physical signs are always pathognomonic, would be contradicted by the candid acknowledgments of a Laennec and a Louis. For example, in cases in which the bronchial tubes have long been affected by inflammation, they may be dilated into cavities of considerable size, and of such figure as to render distinct pectoriloquy; and the râle and respiration both may assume that cavernous character usually presented in the excavation left by tubercular discharge, or the substance of lung being hepatized, may so convey the sound of the natural passage of the air in the bronchi as to give the impression of morbid bronchophony. There are also various other possibilities of mistake very properly, though perhaps too prominently, urged by the objectors to auscultation, but these, it must not be forgotten, are exceptions to a common rule. We find even well marked hectic sometimes undeveloped in phthisis;—shall we repudiate it as a symptom on this account? If the entire aggregate of the symptoms is considered, mistake will not be apt to arise from these occasional correspondences of physical signs in diseases of an opposite character.

We have gone into the consideration of tubercular consumption, at some length, in order to illustrate the general principles of the application of the science of exploration. The organic changes in the various other forms of thoracic disease, are no less marked and available; less important it is true, only inasmuch as the maladies are less common and

less serious. They have been so fully detailed in the works now within the reach of every American practitioner, that it is superfluous to examine them in detail. The principle on which the auscultatory phenomena are based, once fully understood, the application in the various diseases, however complex and modified, cannot but be intelligible and useful.

DISSERTATION,

BY

ROBERT W. HAXALL, M. D.

Je n' enseigne pas, je raconte.

Montaigne.

DISSERTATION.

The multiform mutations which have attached to medical practice, even since it has justly assumed for itself the appellation of a science, have no doubt contributed in a great measure to lessen the confidence of many an enlightened mind in its utility and benefit. When we consider, however, the exceeding difficulty which attends our examination into the true and infallible causes of disease, and the just and rightful appreciation of remedial agents; and when we reflect upon the absurd and even yet unconquered aversion to post mortem examinations, we should cease to wonder at the various changes which mere theoretical opinion has hitherto advanced. Physiology, too, from a correct and proper knowledge of which we can alone arrive at sure deductions in our pathological investigations, had not, until at a comparatively recent date, established upon immutable foundations many of its present and universally received principles; and it may without exaggeration be said that the study of disease as cognizable by its functional signs or symptoms, was the only mode adopted until very recently,

by every medical observer. As diseases were consequently viewed in different ways by differently educated and original intellects, we have an additional explanation for the many and diversified systems which have shared the common fate of a short-lived reputation. The man who wishes to bestow a lasting benefit upon the science, must enter upon the examination of disease with a determination to doubt every thing which cannot be *proved*;—hypothesis must cease to be the groundwork upon which medicine is to rear her shrine, and the deductions which ought to be esteemed legitimate, should be those only which can be drawn from incontrovertible analysis. We are constrained to admire, it is true, the graphically descriptive histories of Sydenham, and to yield an assent to the inductive reasoning which he instituted in opposition to the authoritative dogmas of the schools. Considering the condition of medicine at that period, it undoubtedly became indebted to him for a greater usefulness and extension of its resources; and in questioning Nature, as he seems most diligently to have done, had he passed beyond the threshold of her temple and found his way into its more secret and intricate recesses, he would have remained a prominent example of one of the greatest reformers in medical opinion.

Although the close observation of general symptoms, or those of deranged function, (we mean such as may be considered apart from the physical signs hereafter to be noticed,) is a work of much practical importance to the physician, yet do they lose much of their real value if they cannot be ultimately referred to the pathological condition or lesion from which they proceed. The simple phenomenon of fever for example, may belong to an inflammatory state of various organs, and were there not other signs existing to locate the diseased viscus, the probability that a correct diagnosis would be made, or a successful treatment instituted, would be slender indeed. Were it the case, however, on the other hand, that this same phenomenon of fever was always and

only observed in the morbid derangement of one particular organ, the physician who by repeated autopsies should demonstrate its invariable location, would at once afford all the information that could be requisite. Now, although the supposition we have here made is not true, and although many symptoms are developed in every disease, yet does it sometimes happen from the similarity of general symptoms in affections totally different, that the most discriminating intellects are occasionally embarrassed; and it need not be told that to a faulty diagnosis must succeed a practice, useless to say the least, if not positively injurious.

Of all the diseases which affect the human body, the foregoing remark is more certainly true of affections of the thoracic than any other cavity; in almost every instance, serious derangements of the brain are marked by symptoms which belong to no other malady, and the yielding walls of the abdomen will allow the necessary means to be used in discovering an enlarged viscus, or the true seat of pain. The knowledge too of symptoms differing from those of a general character, in the numerous diseases of the chest, derives an additional importance from the fact, that the gravest complications are attended by functional symptoms of nearly the same import with those of a far less alarming nature. In chronic bronchitis, for example, we have cough and purulent expectoration and hectic, nor do we always have more from the ulcerated cavity of phthisis;—yet the one is a disease curable in its nature, while the other bids defiance to the best directed resources of the art; and in all the diversified and numerous affections of the thoracic organs, we constantly notice a certain train of nearly similar symptoms, such as cough, and dyspnœa, and expectoration,—nor does it always happen that their frequency or intensity invariably corresponds to the extent of the organic lesion to which they are to be referred. And how unfortunately true has it now been made to appear, that in very many protracted diseases of other organs, death hurries its victim to

his final home, not so much in consequence of *their* ravages, as from an accession of pulmonic or bronchial inflammation? And if it be asked, whence the importance of this information, it may be replied that without it your patient certainly dies, while with it, it is possible to save; and even were it not so, it cannot surely be unsatisfactory to know what lesion had supervened sufficient to arrest the wheels of life.

The value attached to general symptoms not being always such as to leave the observer entirely without doubt as to the nature of the disease with which he is called to contend, presents a difficulty oftentimes harassing to the sensitive mind, and invariably perplexing to the diligent inquirer after truth; and he who should dispel this doubt, by the discovery of a certain set of signs which could belong exclusively to but one disease and to no other, would, and ought to be hailed as one of the greatest benefactors to the human race. This discovery has been made in relation at least to one important class of diseases; to those, namely, which appertain to all the thoracic organs; and to Laennec belongs the honor of having first promulgated this most beautiful system.

It is true that something had been done in relation to the diagnosis of disease by its physical signs, anterior to the time of this celebrated professor, by both Avenbrugger and Corvisart; but the plan of the former was necessarily imperfect, inasmuch as it was confined exclusively to percussion, and therefore not always perfectly free from obscurity; and that of the latter, although it might be denominated the method by auscultation, was yet entirely too limited in its application, and too defective in its manner. Had he survived a few years longer, he might have gone hand in hand with his able pupil, and have contributed to rear a system which leaves now but little to desire; that he would not alone have carried it out into all its details is more than probable, inasmuch as he seems never to have advanced beyond a certain point; and if Laennec may not be considered the pioneer in

this department of medicine, we must at least yield to him the palm of subsequent and more important discoveries.

These discoveries may not probably be considered altogether accidental, for he was governed in his first essay by the knowledge of a fact which may be traced even to the remote period of Hippocrates. We allude to the fact that the action of the heart may be heard by the observer placing his ear upon, or even approximating without touching the prœcordial region. All that Laennec has since done, may be regarded as an extension of this long acknowledged circumstance; for he very justly concluded that if it were easy to appreciate one set of sounds within the hidden recesses of the thorax, it might not be impossible to detect others even of less intensity. In 1816, a female patient presented herself with the general symptoms of an affection of the heart, in whom, on account of her embonpoint, percussion alone gave but very uncertain signs. Delicacy forbade the employment of immediate auscultation, and the well known principle of the transmission of sounds by means of solid bodies, paved the way to those splendid results which have done so much towards establishing an almost faultless diagnosis in diseases of the chest; and hence originated the instrument called the stethoscope.

From the improvements which have shed such new and unexpected light upon the diagnosis of disease within the last few years, may we not be permitted to argue much in favor of the future? And perhaps it may not be transcending very far the bounds of rational expectation, should we predict that at some future time this department of the science will stand upon the basis of a demonstration almost mathematical. What Laennec has so triumphantly done for affections of the chest, Andral and Louis and Ribes have nearly completed for another class of diseases, the pathology of which has been, and is now by the many, so imperfectly understood. We have reference to typhus and typhoid fevers, and to those which have received the name of essen-

tial or idiopathic. Nor should we act justly did we not add to the category of distinguished names just mentioned, that of Abercrombie, who has effected not a little towards a just elucidation of other diseases of the abdominal organs.

If the committee had propounded their question in a different form, and instead of asking, How far are the external means of exploring the condition of the internal organs useful and important?—had they made the inquiry, Are not those means oftentimes *necessary* to the formation of a correct diagnosis?—we think that even under this aspect it might have received an affirmative response. And if this assertion be substantiated by what will be said hereafter, what a weight of responsibility must attach to those who attempt to pursue the practice of their profession, while yet ignorant of *any* of the means by which they may be enlightened; and if we are enabled to employ them, what a consolatory reflection must it not afford us, to know, that every circumstance by which we could have availed ourselves had been put in requisition, although our best efforts had proved but impotent!

In entering upon the discussion of this interesting subject, the only course which it seems to us can be advantageously pursued, will be to show the uncertainty which frequently rests upon a diagnosis derived from general or functional symptoms, and the surer dependence which may be placed upon those which are called physical. To accomplish this task in its *full* extent, would require a volume of some considerable size, which we have not the leisure nor the ability to produce. Our chief end shall therefore be to include such diseases only as are of commonly recognized occurrence, and some few others which, although often misunderstood, we have reason to believe are not by any means rare. Our remarks too will be confined to affections of the thoracic and abdominal cavities, while on account of the bony casement which surrounds the brain and its membranes, no observations arising from an external examination in their diseases can probably result; with the exception perhaps of a few instances

strictly surgical. And if we occasionally wander from the prescribed limits of the question, and enter upon the field of pathological inquiry, it will only be with a hope of giving an additional interest and a clearer elucidation to the subject.

It may be observed before we proceed farther, that all the different organs of the abdomen, including the several portions of the intestinal tube, afford a sound peculiar to themselves upon percussion. It hence follows that the abdominal surface may be divided into various regions, to each of which and to none other, belongs a peculiarity of resonance. Individual organs may thus be exactly circumscribed in extent, and the deviations in sound mark to the experienced ear their abnormal conditions. To the exceeding nicety however requisite in these examinations, we can lay but a slender claim, and he who would be desirous of following them out into all their details, will derive ample information from the work of M. Piorri, published in 1828. That he has not raised a theory without abundant facts to support it, we have evidence enough from the little experience which we ourselves possess.

Abdominal Diseases.

The Liver.—We should not probably deviate far from the truth in making the assertion, that a greater obscurity attends the various diseases of this viscus, than of any other abdominal organ, except perhaps the spleen. That a knowledge however, of its functional symptoms can avail us nothing, we not only do not say, but admit that it is frequently necessary in conjunction with the physical signs, to the formation of a clear diagnosis. Nay, we will even go further, and say that the union of the two cannot always enlighten us as to the exact affection which may exist.

For several years we have entertained the opinion founded upon the observation of many cases, that there was in the whole range of functional symptoms but one which had an

invariable and permanent existence;—we mean the appearance of jaundice, which is only *constant* where there exists some obstruction in the ducts. In all the other presumed affections we have noticed, it has by no means been a diagnostic or even a permanent symptom, for we have seen active and chronic congestion with it and without it; and the same remark may be made in relation to hypertrophy and atrophy, hydatids, cancerous and fatty degenerations, induration and abscess. It is certainly impossible to offer a positive explanation of the existence or non-existence of jaundice in these different affections, in the present state of the science; and a similar position may be advanced in reference to the discoloration of the fæces and the yellow appearance of the urine. Much yet remains to be accomplished by patient and repeated observation both during life and after death.

Nor can we always speak positively as to the location of *pain* which sometimes exists and at others does not; and when it does, we cannot be entirely certain that some partial peritonitis in the immediate neighborhood of the liver, or inflammation of the diaphragmatic pleura, or rheumatic affection of the abdominal muscles, may not exist as the true lesion. In inflammation of the pleura lining the diaphragm we are in truth subjected to a still farther deception, for cases have occurred where jaundice has been added to the train of symptoms, arising beyond doubt from sympathetic irritation. Misapprehension may also arise by referring the seat of pain to the liver, when in reality it has its existence in an inflamed pylorus or duodenum.

Having thus stated the ambiguity which attends the two most prominent functional symptoms in the diseases of the liver, we shall proceed to designate a few, and endeavor to point out that combination of general and physical signs which may lead to a clearer diagnosis than could be derived from a separate consideration of the one or the other.

In simple inflammatory engorgement whether active or

passive (chronic), we may or we may not have all the functional symptoms, as pain, jaundice, discoloration of the feces, and coloration of the urine ; (I make no mention of a coated tongue and fever, inasmuch as they are common to nearly every disease to which the human frame is liable.)— And should every one of these symptoms supervene, a combination which does not always happen, how do we certainly know that this particular disease exists, when each one has been observed in some different affection? We must resort then to some other sign, and we find it in the abnormal peculiarity which both percussion and palpation presents. This peculiarity takes place in consequence of the distended viscus passing beyond its accustomed limit into portions of the abdomen where it does not naturally belong, and by the sensation which we are able to recognize by the touch. It is astonishing to notice the extent to which this enlargement may occasionally proceed. Andral relates a case where the liver was found occupying not only the epigastric, but a portion of the left hypochondriac region, and extending to within a short distance of the crest of the right iliac bone.

The tumor formed in simple active or passive engorgement is found to be smooth, without prominence or depression, and in consequence of its affording a dull or flat sound on percussion, we may thus measure the extent to which it has attained. We know the regions occupied by the stomach and the ascending colon ; and we know too that as they are hollow organs, percussion will elicit a certain resonance peculiar to each one ; now, if this resonance is replaced by a dull and flat sound, and we are enabled by the touch to trace a continuous enlargement beneath the cartilages of the ribs, we have every reason to ascribe it to an altered condition of the liver. Whenever too the tumor exists to any considerable degree, there is an evident alteration in the *form* of the abdomen ; the ribs are rendered more prominent, as well as that portion of the abdominal surface situated to the left and below them.

A general enlargement of this organ is not uniformly the result of those causes which produce hepatitis; for numerous autopsies have demonstrated the fact that one or the other lobe may be separately engorged, and so far as the left lobe is implicated, the local signs which have been enumerated will suffice. The right lobe may be alone engorged and distended to such a degree as considerably to impinge against the diaphragm, and thereby cause an interference with the free action of the lung; and from this source we derive one of our diagnostic signs, for the application of the stethoscope will reveal to us an absence of respiration in that portion of the chest where it ought to exist; and percussion will furnish another proof in the presence of a dull and flat sound where it ought not to be. It may perhaps be objected to each of these positions that a similar result might be produced by a different complication, as for example by a pleuritic effusion; but a little attention it seems to us will cause the difficulty to vanish. When effusion has taken place, there is it is true, a dull sound upon percussion and an absence of respiration; but we have other symptoms, as will be shown when we come to speak of diseases of the chest; and we ought not to lose sight also of the fact, that the primary symptoms of pleurisy could hardly have been mistaken by the physician or forgotten by the patient. Besides, the dullness of sound produced by effusion will be found by no means so intense, as that occasioned by the presence of an engorged liver.

There is another condition where the liver forms a considerable prominence, not only in the epigastrium, but even in the left hypochondrium, and yet it may not be in the least diseased. This deceptive form of enlargement results either from a very copious effusion into the cavity of the right pleura, or from the growth of some abdominal tumor pushing it beyond its proper limits. In addition to the physical signs developed upon percussion and auscultation, of a pleuritic effusion, there is an absence of any functional symptom which might mark a disease belonging properly to the liver itself;

and we are thus enabled, from a union of these two considerations, to arrive at a conclusion approaching to certainty in our diagnosis. Should the hepatic prominence be the effect of the second cause we have just mentioned, much more difficulty we admit may arise, and thus render the case a doubtful one; but yet not invariably, for there are instances where the tumor may be distinctly traced beneath the protruded liver, while the epigastric border of this organ may be felt reposing upon it, and not reaching to the entire extent of the tumor itself.

Another variety of hepatic engorgement is occasionally met with, which upon its first occurrence at least, or even when often repeated, is the result of a purely mechanical cause; it arises from an obstruction to the equable flow of the blood through the hepatic veins, in consequence of disease of the right side of the heart. In its inception, as we have said, this engorgement acknowledges only a mechanical cause, and so long as the vital actions remain undisturbed, we notice no sympathetic febrile affection; and an additional peculiarity may be remarked, which if it be not pathognomonic, will at least lead us to examine into the heart's functions. We allude to the *intermission* so frequently noticed in this form of congestion. For a day or two, or longer, the liver remains more or less enlarged, exhibiting none, or a scarcely appreciable deviation in the healthy play of its functions, and then unexpectedly returns to its normal dimensions. From the frequency however with which this occurs, its vital actions may become implicated, irritation supervenes, is prolonged by the engorgement continuing longer than usual, and finally inflammation with all its characteristics forms the last link in the chain. Patients have died from the complication just described, and without a knowledge of the heart's disease, the wonder has been what *miasmatic* influence, or what sudden impression of cold when every care had been so assiduously taken to guard against it, could have produced a hepatitis. Although somewhat foreign

to our subject, we may here be allowed to remark, that hepatic congestion in one or the other of its forms, is very often consecutive to an acute or chronic duodenitis. Many autopsies have demonstrated this fact, and unless we very carefully analyze and understand the symptoms peculiar to each, we may be led into a double error; the one an error of diagnosis, and the other of treatment. The uncertainty as to the proper location of pain even when augmented upon pressure, and the early appearance of icterus and whitish evacuations lead us to locate the lesion solely in the hepatic organ; and dose after dose of some drastic cathartic, while it fails to cure the consequent, cannot do otherwise than augment the antecedent disease. Ere long the nervous centres become involved, the pulse is hurried and compressible, the teeth are fuliginous; the tongue is hard and blackened or shining and furrowed; stimulant after stimulant is poured down upon viscera which *cannot* react in consequence of the overwhelming inflammation which these very remedies have produced, and death finally comes to the relief of the unfortunate patient. Is this an overwrought picture? By no means. How many have been taught to see in this catenation of symptoms the true evidences of *debility*, and how many will not bear witness to the mournful truth that they have seen their patients sink time after time in despite of bark, and wine, and brandy. That they do not always sink, is owing to the gratifying circumstance that nature will sometimes conquer both the disease and the physician.

If we expect to draw an indication as to the positive nature of many other affections of the liver from its functional aberrations, we shall find ourselves exposed to uncertainties, similar to those already cited. We will therefore endeavor to point out a few local signs which may assist us to form a proper opinion.

The liver consists in its general structure of two distinct formations; the one a whitish substance of considerable density, inclosing and supporting blood-vessels of various

diameters, but without permitting their indefinite and diversified ramifications; the other substance is a red and highly vascular parenchyma, situated within the interstices of the first, and eminently capable of undergoing a change either in the diminution or augmentation of its volume. When we make a section of the organ in a state of health, the peculiar structure we have indicated may be recognized, but much more clearly however in a diseased condition. Either one of these formations may be separately affected; in the one we may discover hypertrophy of its tissue, while that of the other remains undisturbed, and vice versa; or the one may be subjected to an increase in its nutrition, while the other suffers a diminution, or both may be simultaneously diseased in whole or in part.

We have recurred to this feature in the structure of this viscus, for the purpose of explaining more satisfactorily, the peculiarity which its hypertrophy gives to palpation, when carried to an extent sufficient to produce a tumor. The touch then recognizes a tumor of greater or less size, presenting manifest *inequalities*, in consequence of every portion of the organ not being similarly hypertrophied; the white or red substance being alone altered, or both in unequal degrees. Hypertrophy is rarely or never met with as an idiopathic affection, but may be considered the result of an inflammation primitively chronic. From this circumstance we can scarcely confound it with active engorgement, leaving out of the question the assistance we are enabled to derive from local signs; for there is an absence of those sympathetic disturbances which almost invariably characterize that affection.

The morbid increase of the nutritive function expressed by the term hypertrophy, being the result of primitive chronic engorgements, may exist as such for a longer or shorter period; but it is frequently noticed as the second link in that chain which ultimately terminates in disorganization, and autopsy reveals the existence of fatty substances,

tubercular excavations, and cancerous degenerations, depending doubtless upon constitutional idiosyncracy. If we have had an opportunity of following the case from its commencement, and if we have noticed the inequalities upon the surface of the tumor, we shall by and by find that they have gradually disappeared, wholly or partially, and been substituted by well-marked depressions; and from this local sign we draw the conclusion that softening or ulceration has supervened, the final step in the process of disorganization. That a cancerous affection of the liver may be primitive, there is abundant evidence to believe; and when it forms a perceptible enlargement, its surface will present to the touch numerous corrugations or small prominences which finally terminate in ramollissement. Here then the physical signs present a similarity in this disease and tuberculous degenerescence, and tend very much to obscure the diagnosis; and although it may often be impossible to speak assuredly, yet may we derive some assistance from the character of the *pain* which accompanies the two affections; in the former it is acute and lancinating, while in the latter it is rather a sense of indescribable uneasiness, amounting but seldom to positive pain.

Abscess of the liver may be the result of external violence, of injuries inflicted upon the head, or of active inflammation produced by some other cause. We recognize this condition by the various signs heretofore mentioned; and should shivering sensations be experienced towards the close of the acute stage of hepatitis, observation authorizes the conclusion that an abscess has formed. If it be deeply seated, there may be no perceptibly circumscribed tumor, and the general enlargement may present to the touch all the characters of simple engorgement. When, however, it becomes more superficial, the tact of the skilful experimenter will, if he cannot detect a fluctuation, very clearly discover a *yielding* surface beneath his fingers, surrounding which he will mark the hard, and dense, and unaltered substance of the liver.

Besides this, percussion will here come in to our aid, and the difference in the resonance will denote the extent of the purulent collection; the sound being duller over the healthy portions of the viscus, in consequence of its greater density.

From numerous autopsies made at La Pitié under the direction of M. Andral, in hepatic diseases, where dropsy has been the result, the fact has been ascertained, that effusion much more frequently succeeds to a diminution or atrophy of the organ than to any other affection. The diagnosis is rendered much more obscure in consequence of the very frequent absence of functional symptoms. A local examination, when the abdomen is not excessively distended, may lead us to suspect the true lesion, by observing that the liver does not reach its normal dimensions; and if the patient be placed in an erect position, we can discover an unnatural increase of resonance upon percussion. We may also be assisted in our efforts at a correct opinion, by questioning the functions and physical condition of other organs, the lesions of which may result in effusion. Has the ascites been produced by disease of the heart? We recognize by means of the stethoscope its healthy condition; and we know too that when effusion has followed as a sequence to its disease, its very first appearance is discoverable around the malleoli; and it is not until some time has elapsed, that upper portions of the inferior members and the abdomen become implicated; or, has it been the effect of peritonitis in either of its forms? Neither the patient or his attendant could have mistaken the earlier symptoms which so well characterize the inflammation of this serous membrane. By thus excluding all other organs which may be found in a state of health, or upon the morbid condition of which, such and such symptoms could *not* depend, we may be enabled to locate the lesion by inference at least, and address our remedies to the proper point. It may not be unimportant to state, that a similar method of investigation will frequently avail much in other affections.

The various tunics which enter into the composition of the gall-bladder, the cystic and hepatic ducts, and the choledochus common to the two, are liable to the same morbid alterations that are discoverable in other organs; and these tissues may be separately or simultaneously diseased. The functional symptoms of icterus and discoloration of the feces, are constant in some of these lesions, but yet are incapable in themselves alone, of indicating the exact affection; some of their diseases too, with the aid both of general and local symptoms are recognizable only after death. Whatever cause, operating mechanically, produces an obliteration or offers an obstruction to the free course of the ductus choledochus, will give rise to the two symptoms. With respect to those causes which are *purely* mechanical, and which act in no other way than by obstructing the canal, may be classed the different varieties of calculus, whether primitive in their formation, or the result of the inspissation of the ingredients which enter into the composition of the bile. The general and functional symptoms dependent upon this condition are known to all; the pain is frequently exquisite, and as the biliary fluid can find no exit, and its secretion still goes on, a reflux into the gall-bladder takes place, causing its distention and thus forming a tumor. In inflammation of the mucous lining of this duct, the cystic, and the gall-bladder itself, we also are enabled to discover a tumor by the touch, which will afford indications of increasing pain or pressure; while in the case of a mere mechanical obstruction, this will not be observed at least in so great a degree. The reason here is obvious; in their diseased conditions the vital actions are exalted, sensibility is increased, and pain is the consequence.

The situation of the tumor formed by the distended gall-bladder, will generally be found immediately under the cartilaginous border of the ribs, in the position which it naturally occupies; but when the augmentation is great, it may be felt lower down in the right hypochondrium; and

some cases are on record, where it has occupied a portion of the epigastric region, or reached to within a short distance of the iliac crest. Where the swelling is very perceptible, independently of the aid to be derived from the occurrence of jaundice and whitish stools, we may be much assisted in the diagnosis, by ascertaining that the liver itself does not pass beyond its proper limits; and percussion too, yielding a sound not so flat as it would do, were this organ the point upon which it was made, offers an additional ground upon which to form an opinion. A circumstance peculiarly characteristic, of an enlargement of the gall-bladder, ought not here to be overlooked, and it is in respect to its *form;* the tumor in the two cases which we have ourselves observed, and in several which we have seen reported, is always *pear-formed*, whatever may have been its state of distention. In one case where the gall-bladder was itself the point of lesion, it was exceedingly sensible to pressure; while in the other, depending upon a temporary obliteration or obstruction of the common, and possibly of the cystic duct, it was movable and indolent.

We shall not in this place attempt to point out all the alterations of texture which the various ducts, as well as the receptacle of the bile itself may undergo; as we have said above, some are not clearly discernible until after death; and it is only by inference that we can form an opinion during life. It may be remarked, however, that the inflammation of the mucous tunic of the ducts and gall-bladder, may terminate in ramollissement, ulceration, and finally perforation. This last complication, should an adhesion not have been formed with some portion of the intestine, is probably always productive of a fatal peritonitis.

This part of our subject we cannot dismiss without saying a word or two relative to the treatment in hepatic affections; and what is it? Why, in this country and in England, the moment a yellow sclerotic and whitish evacuations are observed, all the changes are rung upon the various combina-

tions of *mercury* and its different modes of administration. The bowels must be purged, for they are slow to act, and they require the stimulus of the bile which nature has provided for them; and as a substitute we throw in twenty grain doses of calomel, and proportionate quantities of jalap, and rhubarb, and colocynth; with these remedies we fail, and we resort to muriatic acid internally, to nitro-muriatic baths, and to dandelion, and still we fail; and finally we arrive at the conclusion, that to the incurability of the disease must we attribute our ill-success. True, the disease is incurable; but have not these very remedies rendered it so? They have in our opinion contributed to excite still further the already actively inflamed mucous membrane of the ducts, the gall-bladder, or the parenchyma of the liver itself; and thus they tend to increase and prolong the affection they were expected to alleviate. But let us act rationally upon this subject, the true principle of which is to remove by agents purely anti-phlogistic, and not attempt it by exciting cathartics, the stage of active inflammation. By these means we shall proceed with greater security, and when once the inflammation is subdued, the bowels return to their proper condition, and the selerotic to its natural whiteness. The first case of inflamed gall-bladder which we witnessed, was characterized by both functional and local symptoms, and how speedily did it yield to moderate venesection, to leeches to the anus, and to cataplasms! We do not mean by what we have said, entirely to proscribe the use of mercury; but the state of acute phlogosis to which we have alluded, is not the one wherein it can be beneficial.

Spleen.—We have not a great deal to say with respect to the diseases of this organ; that but little aid is to be derived from functional symptoms, is not by any means surprising, when we reflect that we are probably altogether ignorant what those functions are. Who has not seen its enlargement to a very great extent, exist for years, and yet witnessed no material derangement if any, in the healthy economy of

the system? We have at this moment under our care, a little patient from the country, about twelve or thirteen years of age, in whom there has existed for the last seven or eight years, one of the most extensive swellings of this viscus we ever recollect to have encountered; the functions of every other organ in the body seem to have remained undisturbed, growth has progressed as rapidly as customary, and were it not for the unusual protuberance of the abdomen, none would ever suppose that disease had made the slightest advance in any of its forms.

When we ask ourselves why so few sympathetic derangements accrue from disorders of the spleen, may we not find an answer to the question in the isolated situation which it occupies? It is every where surrounded by hollow viscera, it is true, but continuous with none, and confined loosely to its position by a fold of the peritoneum, its vessels and its nerves. Hence its relations of sympathy must be limited in their extent, although, as an organ enjoying the properties of vitality, it must necessarily be subjected in itself to disease; and its various disorders have generally been found to be those of a chronic, rather than an acute character.

It is more by the physical than by any other signs, for the reasons already given, that we are enabled to judge of the chronic enlargement of this organ. Situated deeply within the abdomen, and consequently not in contact with its anterior wall, it is not until the disease has made considerable advances, that the patient's attention is drawn to his situation. If in its commencement there were symptoms sufficient to rouse his notice, percussion would afford some data to guide us in the line of conduct we ought to pursue. With the left posterior wall of the abdominal cavity, immediately below the diaphragm, the spleen occupies so close a connection, that we find a dullness of sound on percussion, owing to the density of its structure; and the space over which this dullness is discovered, will correspond to the dimensions of the organ, which in the adult generally meas-

ures about four inches in length and three in breadth. In chronic inflammation and swelling, the sound on percussion will not only be duller than in a healthy condition, but in proportion as the viscus enlarges, so will also the extent of surface over which the dull sound is perceptible. But as was before observed, it is rarely, until the enlargement has made considerable progress, that we are called upon to notice it; the tumor will then be found hard to the touch, the abdomen more or less distended, and percussion will afford the peculiar sound to which allusion has just been made.

The state of tumefaction however, does not always indicate inflammation of the spleen; and should it exist without pain and febrile disturbance, we might reasonably ascribe it to a mere stasis of the blood, or the development of hydatids. Should the last be the true lesion, both percussion and palpation will throw some light upon the diagnosis; the one affording a sound not so dull as in the engorged or inflammatory condition of the organ, and the other giving the sensation of tension and elasticity. Many of the morbid degenerations to which the viscus is liable, can probably be detected only after death; we will therefore merely state that ulceration, osseous and calcareous concretions, tubercle and ramollissement, have been detected among the number of its lesions.

Uterus.—Inflammation of the womb has been detected at almost every period of life, and may be referred to the causes which commonly produce this result. It more frequently, however, follows as a consequence upon difficult labor, or some violence done to the organ by unskilful manipulation during the process of accouchement. Although at this juncture particularly, there are direct functional signs sufficient to form an almost correct diagnosis, yet are we enabled to render it positively certain from the physical condition of the viscus. If this condition be not observed, it is very possible indeed to commit some error; for should

partial peritonitis supervene, similar direct and indirect functional derangements would undoubtedly follow; the lochia in either case would be arrested in its flow, the pain might occupy the same region, the tumefaction of the mammæ would subside, and an equal disturbance in the circulation might be observed. If we resort to percussion and palpation, we are relieved at once from all embarrassment; a round hard tumor, exquisitely sensible upon pressure, will be found occupying the hypogastrium, and when percussed giving a dull sound. When the inflammation is limited to the body and fundus of the uterus, these are the sole local signs with which we meet. This limitation very certainly often exists; but the entire organ is occasionally involved, and when it is so, an examination per vaginam reveals to the touch a greater or less distention of its neck; the os tincæ is closed, and the tumor is hard, and smooth, and painful.

Without going into an enumeration of the local signs which belong to *all* the different affections, by which the neck of the womb and ultimately its whole structure may be invaded, we will content ourselves with the simple expression of the opinion founded upon some experience, that without the aid of these, as furnished both by the touch and the *speculum*, our diagnosis would seldom or never be correct. In simple inflammatory engorgement of the neck, for instance, a curable disease, and in cancer of the same part an incurable one, except by the knife and not always then, do we not have particularly in their first stages the same functional symptoms? Unquestionably; and if these be the only guides we are enabled to call to our assistance, the relief of the individual could scarcely be expected.

It would carry us too far, as we have just hinted, to take up the various affections which belong to the organ and trace minutely the difference in their local, or show the similarity in their functional symptoms; but as the best treatise we have ever perused we would point the inquirer to the work

of Duparcque upon the "alterations organiques de la Matrice." It may not however be uninteresting, succinctly to relate the history of a case which we witnessed at La Pitié in one of the wards of M. Louis. In this female the disease had existed for many months, and commenced by the development of a tumor in the abdomen, which although somewhat painful and giving rise to other disagreeable sensations, yet did not incommode her to such a degree as to induce her to abandon her occupation. By and by symptoms referable to some lesion of the brain were observed, such as rigidity of the muscles of the arm, loss of sensibility, and diminution of the intellectual faculties; and in this situation she applied for admission into the hospital. The tumor appeared to be circumscribed to the touch, very *movable*, not very painful when handled, and larger than a child's head at birth. As many details as possible were obtained from the patient, and after a minute examination into all the symptoms belonging to the two affections, the opinion was given that the enlargement existed in the omentum, the true nature of which it was difficult, if not impossible, to establish. The pathological condition of the brain was pronounced to be that of ramollissement, and the autopsy verified the diagnosis. Upon opening the abdomen, what was our astonishment to find that the tumor was formed by the uterus in a state of excessive hypertrophy. Nothing had transpired in the derangement of its functions (she had passed the menstruating period of life) to lead to a supposition that it was diseased, or an examination per vaginam would have been instituted beyond a doubt, and the difficulty at once solved; for upon passing the finger into this canal, not only was the uterus discovered to be enlarged by the touch, but the whole mass could be elevated by pressing forcibly against it.

Ovary.—When the inflammation of this organ is of the acute character, and its tumefaction so slight as not to be observable to the touch, it is often impossible to arrive at a sure diagnosis; the functional symptoms for obvious reasons

cannot offer a clear elucidation, and the local signs may still leave us in doubt, inasmuch as they may be referred to another lesion. The existence of pain is discovered in the inferior lateral portion of the abdomen, which increases on pressure a peculiar feeling of tension and elasticity, the idea of which may be better expressed by the single term *renitence*, and a torpid sensation in the thigh corresponding to the affected side. But none of these are truly pathognomonic; the pain and renitence may belong to partial peritonitis, and the numbness may be created by a disease foreign to this organ. Its active stage of inflammation occasionally ends in suppuration, which may seek an outlet for itself into the cavity of the peritoneum; or by a more happy direction the consequence of adhesion, into the fallopian tube, vagina, or intestine. The more frequent termination is probably that of chronic engorgement. Here, the tumor speedily becomes perceptible, is hard to the touch and sometimes moveable, often adherent, and its situation corresponds of course to that of the ovary. We may say, en passant, that its adhesion to surrounding organs has been regarded as an obstacle to conception, and also the cause of abortion. (Madame Boivin.)

In *dropsy* of the ovary, it is easy to detect fluctuation; and should the sac have nearly filled the whole abdominal cavity, as it sometimes does, we must be guided in our diagnosis by inquiring at what point the distention commenced.

Kidney.—The diseases of this organ are not very numerous, and it is frequently impossible to arrive at a positive knowledge of their nature during life. We have no experience in their physical signs.

Bladder.—The symptoms in many diseases of the bladder are so peculiar in themselves, and the different modes of examination so well known and so generally practised, that much need not be said upon this subject. We will content ourselves by observing that it would be at least unwise to trust an opinion, when the functional signs of stone in this

viscus exist, without resorting to the sound; or pronounce that retention of urine, (it differs from suppression,) and consequent distention were present without feeling for the tumor in the hypogastric region. The causes of retention may be various, such as stricture in the urethra, paralysis, or inflammation of the organ, and the means of diagnosis which belong to each are too well understood to require enumeration here. The tumor formed in consequence of distention may also be felt through the rectum, and percussion gives a sound similar to that obtained from the liver.

Incontinence of urine is frequently the result of a gradual diminution of the capacity of the bladder, from long continued sub-acute inflammation and consequent thickening of its parietes. It is generally in old subjects that the disease is met with, and particularly when they have led an irregular course of life. When the dimensions of the organ are very much reduced, it is difficult even when distended to its utmost (which may be done by the injection of a fluid into its cavity) to recognize a tumor, unless the abdominal walls are thin and we are careful to relax them by position. In this situation, if the bit of gum-elastic which we use in making percussion be pressed forcibly upon the hypogastrium, we do obtain a dull sound, and the diminished extent which furnishes it will mark the degree of contraction which the bladder has undergone. When too it is not at all distended, and its coats have been subjected to a considerable degree of thickening, it has ceased to collapse as it were, and a tumor may be discovered beyond the prostate gland by passing the finger into the rectum, even although it may not contain a drop of urine. We are in possession of a case which fully establishes the foregoing remarks, and which dissection enabled us to verify.

Stomach.—Nothing is hazarded, we conceive, in the expression of the belief, that it is impossible to distinguish scirrhus of the pylorus except by one sign, and that a physical one, from chronic gastritis; and this allusion refers to

the existence of *tumor*, which is always present in the first affection. In both diseases heat and pain in the epigastrium exist, increased upon pressure, vomiting occurs, and the peculiar red appearance of the tongue, with its elongated papilla, is sometimes though not *always* remarked; so frequently is it wanting that it should cease to be regarded as necessary to gastritis, as some seem disposed to admit. Indeed if the whole train of functional symptoms direct and indirect be examined, we shall find a striking similarity; nor could less be expected, as in the disease of the pylorus there always supervenes chronic inflammation of a part or the whole of the mucous lining of the stomach.

It need not be remarked that upon no isolated symptom of either acute or chronic gastritis, ought we to found an opinion as to the existence of one or the other disease; pain seated in the border of the left lobe of the liver for example, might impose upon us the idea of a diseased stomach; heat in the epigastrium is sometimes as strongly marked in hepatitis as in gastric phlegmasia, and nausea, vomiting, and anorexia, may be symptomatic of both, or of other affections. We admit certainly, that when all the functional symptoms are present, we would be acting unwisely not to receive them as sure guides for our practice; and in the absence of any enlargement of the pylorus, we are of course to infer the existence of chronic phlegmasia of the organ. In acute gastritis particularly, we are enabled to add to the number of functional, the physical signs of slight tumefaction and renitence of the epigastrium.

Distention of the stomach to an enormous extent has been occasionally observed, and by M. Andral the cause has been referred to paralysis of its muscular tunic. In emaciated subjects especially, when a little fluid has been taken, not only its outline but its whole form, becomes distinctly discoverable through the abdominal parietes. We have had an opportunity of examining a case of the kind, in which the larger curvature of the organ extended considerably below

the umbilicus, and on either side into the iliac regions. That Andral is correct as to the fact of paralysis being the cause of distention, cannot be questioned, for he is too accurate an observer and too cautious in the expression of his opinions, to speak without sufficient evidence; but that it is to be referred universally to this cause can scarcely be true, nor do we know that he regards it as invariable. The case to which we have just alluded was one of scirrhous pylorus. Although emesis often occurred, as it must do, yet were the ingesta allowed to remain a sufficient length of time, frequently but little altered too by the unhealthy gastric juices, to produce *mechanically* a distention of the organ. If we are not able to adduce the act of vomiting as sufficient reason for the belief that no paralysis existed, (for the experiments of Magendie would lead one to suppose that the stomach is nearly if not altogether, passive,) we can at least say that nothing occurred during the progress of the case to warrant the suspicion. The muscular membrane was very much hypertrophied.

Tumors, of a character different from that of scirrhus, sometimes form upon either wall of the stomach; and although it may be beyond the power of art to relieve, yet may it be not uninteresting to know the exact position they occupy. When percussion is made over the epigastrium, and the organ is undistended by either solid or fluid ingesta, there is perceptible a resonance to which we have already adverted. Now should the tumor be situated upon its anterior parietes, however lightly the piece of gum-elastic may be pressed upon it, and however empty the stomach may happen to be, a dullness or flatness of sound will be the result of percussion. On the other hand, should the enlargement be situated upon the posterior wall, and we are careful to avoid *pressure* in making the percussion, we shall still obtain the natural resonance of the viscus, provided it contains neither fluid or solid; but if we use force sufficient to approximate the two parietes, the gum-elastic is thus brought to bear against the

tumor, and the dull or flat sound is immediately produced. An error of diagnosis might probably arise, if the tumor were situated behind the stomach and entirely unconnected with it except by contiguity; in such a case much assistance would be derived from the probable absence of its functional symptoms. We speak problematically, for we have met with no example, nor do we now recollect to have seen any one on record. In other lesions of the viscus, as ulceration and ramollissement for instance, we are acquainted with no symptom either functional or physical, which can lead to an unerring knowledge of the affection. Should the ulceration however proceed until perforation had resulted, the sudden accession of peritonitis, when considered in connection with anterior symptoms, would contribute to confirm the suspicion. Death must almost certainly follow.

Intestines.—The symptoms which accompany the inflammatory derangements of these viscera are generally so well marked, that we shall not detain ourselves with an enumeration of them all; nor indeed do the terms of the question render it obligatory upon us to do so;—a few observations relative to their physical signs is all that will be attempted.

Inflammation of their mucous membrane can scarcely exist without liquid or dysenteric dejections, although the local symptom of pain may be altogether absent, or felt only upon pressure. When discoverable by this means, its locality will of course point out the portion of diseased intestine; and in pure dysentery this is perhaps the only local sign we can adduce, except where it may terminate in gangrene, when meteorism or tympanites to a greater or less extent will supervene. Enteritis may of course exist alone, but it is not unfrequently complicated with the foregoing affection; the sub-mucous cellular tissue becomes first involved, and ultimately the two exterior tunics of the intestine. It has also been noticed to supervene upon ileus and peritonitis. To the functional symptoms in enteritis, we may annex the

physical signs of meteorism and renitence; and to an experienced touch, the exeitation of pain on pressure will tend still further to elucidate the true character of the disease. The slightest pressure for example in acute peritonitis, even the weight of a blanket, will augment the patient's distress, while it will require something more than the mere application of the hand in enteritis to increase his suffering; the abdominal parietes must be brought more intimately in contact with the inflamed viscera, and *then* some little force exerted in order to arrive at the true amount of pain;—and for an obvious reason must an increase of pressure be used to exalt the painful sensations in dysentery.

Stercoral accumulations occasionally occur, and produce very serious derangement of the functions, as constipation, frequency of pulse, tension of the abdomen, and pain sometimes sufficiently acute to warrant a belief in the existence of peritonitis; these tumors have also been mistaken for a scirrhus of the epiploon. Percussion and palpation will here be found eminently useful; the former will notify the existence of some foreign body, while the latter means may throw some light upon its nature. The mass is generally movable, unequal upon its surface, and smaller accumulations bearing the same characters, may also be detected along the presumed course of the colon.

Calculous concretions may also be developed in various portions of the intestine, and are sometimes on account of their location, beyond the resources of the art. When seated in the rectum they may be recognized by the touch, and if not very high up, by the sight, when we employ the speculum. These methods of exploration should never be omitted, for an error in the diagnosis might otherwise easily happen. In the very excellent work of M. Jobert, on "Les Maladies chirurgicales du canal intestinal," a case is reported which for a length of time was mistaken for a cancer of the rectum; and as it affords an interesting example of the subject, we will give its translation entire. "The woman

who was the subject of this case, came to consult M. Richerand for a pretended cancerous affection of the rectum; at least such was the light in which it was viewed by the medical men whom the patient had consulted in her own province. It was impossible to misunderstand the statement of the patient, for a long written consultation of her advisers perfectly indicated all the symptoms which she experienced, and closed with this Latin phrase: '*carcynoma; nostra est sententia.*' The professor whom I have named, made the patient relate to him the history of her sensations. The recital of the woman caused him to doubt if the nature of her disease was truly cancerous; she said she experienced a feeling of weight about the arms, very often felt expulsive contractions which were not followed by the evacuation of fecal matters, and that the pain extended to the thighs, accompanied by a feeling of numbness which indicated a compression, and not a cancerous affection, which is denoted by lancinating and intermittent pains. She suffered from want of sleep, had a frequent disposition to vomit, and an utter disgust to all kinds of nourishment, so much so that she had become much emaciated, and her whole exterior presented a yellowish cast which may have been regarded as the effect of cancer, but which offered to M. Richerand no other indication than the absorption of the bile. The unhappy woman would probably have succumbed from inanition or inflammation of some one of the abdominal organs, if a skilful hand had not come to her relief. M. Richerand, after having given a serious attention to the recital of his patient, in order to be more certain introduced his finger into the anus, explored this cavity, and soon pronounced the existence of an intestinal calculus. He then substituted in place of the medicaments employed by her former physicians, an energetic surgical treatment. The patient being placed upon the border of a bed, and the thigh flexed upon the pelvis, he commenced the incision with a blunt-pointed bistomy, at the posterior part of the anus,

directing it towards the coccyx; after which he was enabled to introduce a species of scoop smeared with oil, between the sides of the rectum and the calculus, which he then extracted;—but he was unable to withdraw it except by piecemeal, for it had a considerable volume. He prescribed oily potions and enemas. The borders of the incision were brought into contact and soon cicatrized; the appetite returned, the exterior of the body assumed its natural color, her sleep became quiet and refreshing, and she was soon completely cured. Thus, a certain diagnosis and a rational treatment, relieved the patient of an affection which had existed for six or seven months."

It must have been remarked by all, that the symptoms attributed to worms in the intestinal canal, are occasionally so very obscure as to leave us in some doubt as to their existence until they have been expelled. Cases unquestionably occur where all the indications are prominent; or it may happen that but one single symptom may be present, and that in its turn by no means conclusive, as it may belong to some other affection. During the winter of 1834–5, we visited a patient attacked with measles a day or two prior to the eruption; the usual precursory symptoms were observed, by no means of an intense character, and as the disease was then epidemic among us, it was very easy to anticipate its speedy appearance. The eruption exhibited itself at the proper time, and every thing proposed after the usual mode until the evening of the second day, when it entirely disappeared. The *cough* which before had not been troublesome, became aggravated to such a degree as to render the enjoyment of sleep utterly impossible; throughout the day it continued to distress the little sufferer, but not with such violence. The idea which first flashed across our mind was, that the catarrhal affection (which *always* takes place in measles) had been exceedingly increased by some unaccountable cause, or possibly that pneumonia itself had supervened. The application of the stethoscope however could

detect none other than the slight mucous râle which had previously existed, nor did it furnish one solitary sign of inflammation of the pulmonary parenchyma. We were entirely at a loss to account for the sudden and extreme violence of the cough, and as considerable fever existed, resort was had to venesection, and to the treatment which we thought the case demanded; but nothing appeared to offer even a partial relief, not even the exhibition of opiates. The symptoms remained as we have described them for three or four days, when a large lumbricus was found upon inspecting the child's evacuations. We immediately attributed to the irritation produced by worms the excitation of the cough, and also the repercussion of the eruption. The spigelia marylandica was ordered in suitable doses, some eighteen or twenty worms were passed, and the patient speedily recovered. A week or two after the occurrence of this case, we encountered another very similar in its history, with the exception that no worm had been observed to pass from the intestines; but with the other fresh in our recollection, we again had recourse to our favorite remedy, (the spigelia,) and it produced a termination of the case alike speedy and happy.

The question now arises, how far we should be guided in our opinion of the presence of worms, where cough may be noticed as the most prominent if not the sole symptom, and the stethoscope afford no evidence of a pulmonary lesion sufficient for its production. We must confess our disposition to regard it as an important means of diagnosis, for we are acquainted with no other intestinal complication which could produce similar results. Two cases not very dissimilar to our own, may be found related by Dr. Stokes in the May number of the American Journal of the Medical Sciences for the year 1835, and we are happy in being able to bring forward so distinguished an authority in corroboration of our opinions.

Typhoid or Typhus Fever.—The pathology of fever has been for a long time a fruitful subject of discussion with the

profession. They who style themselves solidists, regard the lesion of some one organ or other as necessary and antecedent to the occurrence of febrile symptoms. The humorist looks to some inexplicable morbid alteration of the fluids as requisite to the same result, and the advocate of the essential or idiopathic doctrine may perhaps draw his conclusions within the recesses of his closet, uninfluenced by the aid of autoptical research. It is not intended to enter upon a lengthened defence of one or the other of these theories, for we have already denied the practice of establishing any medical opinion upon hypothetical reasoning; and we have not enjoyed the opportunity for so general a dissection as to be in possession of a mass of facts taken from the various forms of febrile affections which it would be necessary to discuss; and the task of collating from the numerous authorities upon the subject, would be a work of supererogation. We may be allowed however to say, that in those cases of fever hitherto called essential, the researches of M. M. Ribes and Bouillaud have done much to demonstrate as *symptomatic* of abdominal phlebitis; and the unrivalled work of M. Louis, entitled "Recherches Anatomiques, Pathologiques et Therapeutiques sur la maladie connue sous les noms de Gastro-enterite, Fièvre putride, adynamique, ataxique, typhoide, &c.," has incontestably proved the true lesion of typhus to reside in an organic alteration of the glands of Peyer.

In making this remark, we are to be understood to refer to this disease as existing originally and primarily as typhus. It is common enough to hear the remark made, that bilious fever, or pneumonia, or dysentery, or indeed almost any other disease, has assumed a "typhoid type" towards its close; and if we are to regard the word *typhoid* as expressive of a low or *debilitated* state of action, the assertion may be esteemed a correct one. But still it is neither pure typhoid or typhus fever, and perhaps the position may be tenable that no disease can run into another and totally different affection, the symptoms of the first altogether disappearing, and those

of the second becoming so prominent as entirely to mask them. It is well known, to be sure, that in very many cases of protracted disease particularly, symptoms indicative of secondary lesions do occur, and the point will be yielded that to *them* the loss of life may sometimes be attributed; yet there is still a sufficient indication of the continued existence of the primary disease. When ataxic symptoms do take place in other than the pure typhoid affections, the *union* of those which are noted by Louis as pathognomonic of the disease he has so well described does not occur, and we must look to some other source to account for their appearance.

That the typhus fever referred to exists in our own country is not at all doubtful, for we have seen it, and we well recollect to have heard M. Louis observe that the late and lamented Dr. Jackson, Jr. of Boston, had informed him, in a letter written some little time after his return, that he had recognized the same disease he had so often seen at La Pitié. Why is it then that it is not more generally known among us? Perhaps, because we have not yet known *how* to observe, or because too many of us are satisfied with a superficial examination of the cases we are called to treat. That it has been mistaken for *bilious* fever we feel well satisfied, and when a few days before death lays his iron grasp upon the patient, the extended ulceration ruptures some intestinal vessel, and hæmorrhage is the consequence, it is *conjectured* that it proceeds from the liver, for that it is said must be the diseased organ in all bilious fevers. We have thought proper to introduce the history of this disease among the number we shall discuss, because, for the reasons assigned, we believe it to be not a very uncommon one in our country, and because its chief *diagnostic* signs are physical and external. As it may not have been generally noticed by the profession, we shall be excused for giving a somewhat minute description of *all* its symptoms, and we cannot offer from any other source so good an one as that of M. Louis himself. The remarkable accuracy of this physician induced him to

compare the symptoms exhibited in those cases that died, with those which were cured, and they were found to be the same, except that in the recovered cases they were generally less intense, *throughout* the continuance of the disease. His description will sufficiently repay the trouble of its perusal.

"The disease commenced at different periods of the day, before breakfast, after or during the time of a meal, ordinarily with a certain violence, by chills accompanied with trembling, cephalalgia, universal lassitude, thirst, anorexia, pains in the abdomen; and in the majority of the cases (his description is founded upon the observation of 138 cases, 50 of which died) liquid stools were added to these symptoms during the first twenty-four hours. Heat succeeded to the chills; these recurred for several successive days in almost all the subjects, generally in the evening, or when the patients retired to bed. After this the heat became permanent, more or less intense, and almost always dry.

"These symptoms which had in them nothing characteristic, and only indicated that the disease had its seat in the abdomen, acquired successively more intensity. A little sooner or later, at varying epochs from the commencement, other symptoms were noticed which gave to the affection its peculiar physiognomy. These symptoms were relative to the cerebral functions, to the organs of the senses, to those of the abdomen, and presented themselves in the following manner—

"The patients experienced a debility by no means proportioned to the other symptoms, and to the apparent gravity of the affections;—dimness of sight when they walked, stood erect, or sat up in bed. They had somnolence, at first in a feeble degree, but soon so intense that they relapsed into a sleepy state the moment we had ceased to interrogate them. Their memory was slow, although generally sure; they were averse to the exercise of their intellectual faculties; indifferent to every thing passing around them; almost

always so to their own situation; and many who had involuntary discharges did not even desire to be cleansed. Although continually drowsy they complained of not having slept, the sleep being disturbed by dreams which they in vain attempted to resist. Delirium was added to the somnolence in many instances, rarely preceded it, but occurred at intervals of two, three, five or six days and even a longer time after it; sometimes slight, taking place only during the night; sometimes better marked and almost continuous; sometimes agitated, furious, so much so that it was necessary to make use of the strait-jacket;—and like the somnolence this symptom persisted until the fatal term, except in some individuals in whom the disease lasted for a considerable length of time.

"Buzzing of the ears took place in a large number of individuals, sometimes united to a certain degree of deafness. This generally occurred a little later in the disease, augmented by degrees, and became so intense in some that it was impossible to make them hear. The eyes were injected, burned more or less, sometimes of a uniform rose color, but rarely so at the commencement; some patients saw surrounding objects as through a thick cloud, or confusedly, even when in bed. A slight strabismus occurred in one case; many bled from the nose, but experienced no relief; a large majority presented upon the surface of the body an eruption of lenticular, rose colored *spots*, generally about the tenth day, rarely on the seventh, and never before; and this eruption did not vary less in relation to its duration than its abundance; sudamina (little vesicles), very frequently occurred.

"At the same time that these three orders of symptoms, all more or less characteristic, developed themselves, the diarrhœa generally made progress; the stools became involuntary when the delirium was considerable, and in some individuals, the fecal matters were mixed with a considerable quantity of blood. The tongue, which hitherto presented

nothing remarkable in a large number of cases, now became generally dry and sticky (collaute); sometimes brown or red;—in some cases, furred—in others, furrowed or chafed (feudillée), black, and more or less thick in others. Many thrust it from the mouth with difficulty, tremblingly; permitting it to remain between the teeth, and forgetting to withdraw it. Deglutition was sometimes difficult, the posterior part of the mouth being more or less inflamed; some had pains of the stomach and nausea; a few vomited, which ordinarily happened towards the close of the disease. The debility became each day more marked, the patients trembled as they stood, and walked as if they were drunk; it soon became difficult for them to satisfy their necessities;—soon they became incapable for the most part, and remained the whole or the greater part of the day in the same position, generally upon the back, permitting themselves to be moved as if they were inert bodies. Then the integuments which covered the sacrum became red, excoriated, and were more or less promptly seized with gangrene; the blistered surfaces were covered with pus of a bad quality, presented a livid aspect; in some cases, ulcerations, or even a complete destruction of the skin to a greater or less extent. The heat was dry and generally exalted; chills rarely occurred at this stage of the disease, and when they did, they marked the debut of some secondary lesion, as for example, erysipelas. The pulse was much accelerated, beat an hundred times or more per minute, and rarely less; lost the volume which in a large number of patients it had at the commencement, and became small, weak, contracted and irregular; yet in some subjects it preserved a certain volume until death occurred. The cough which existed in the majority of those attacked was not often inconvenient, and was almost always accompanied with a universal sonorous râle, to which, in some individuals, the crepitant râle was added during the last days of the affection; the only sign of inflammation of the pulmonary parenchyma, generally not very extensive.

"The successive changes which took place in the physiognomy were remarkable. Puffed and livid in the commencement, in a large number of patients, the face lost by little and little this character, and became as it were, without expression, and sunken; stupor or indifference, and in some instances a profound preoccupation was observed; sometimes they became furious or wandering, according to the peculiarity of the delirium. In some cases, also, the expression of pain was manifested by the countenance; in others, spasmodic twitchings of the muscles of the lips, the zygomatics or those of the inferior jaw were observed, or a permanent contraction of the eyelids. These spasms were sometimes of considerable duration, and were also noted in other regions of the body; occasionally starting of the tendons, and well-marked spasmodic movements of the superior members were observed, and sometimes a permanent contraction of the same parts and of the muscles of the neck.

"Finally, death supervened either in the midst of delirium, or during a sort of calm, the patients having lost all consciousness some hours before; sometimes it occurred in an unexpected manner. Occasionally it was owing to the perforation of the small intestine, which almost constantly gave rise to symptoms of intense peritonitis."

Such is the account given of the history of typhus fever, as observed by the author from whom we have quoted, and the attentive physician will at once recognize in the long catenation of symptoms, many which belong to all the febrile affections; and this may account, in addition to an examination not sufficiently rigid, why the disease has so long remained unknown among us. It is not of course to be expected that each individual symptom enumerated is to be met with in every case, and this remark is applicable to all diseases; they are found to vary, too, in different individuals in their intensity; but whenever the affection is typhus, there is always a union of a sufficient number to characterize very

distinctly the nature of the disease. The symptoms which are regarded as *diagnostic* of this affection have been seen in other diseases, but so rarely as not to warrant the idea that they are phenomena properly belonging to them; while on the other hand they occur in so very large a proportion of typhus cases, that we are constrained to yield them an important office in the elucidation of their history. Besides, whenever they have been remarked in other diseases, it has been singly or nearly so, and we do not recollect an instance as given by Louis, where a union of a majority of the diagnostic signs existed, and the peculiar lesion to which he refers was not found after death.

Contenting ourselves with referring the reader again to the description we have borrowed, we will merely mention the symptoms that are to be esteemed pathognomonic, and then submit a few remarks in relation to some of them. The signs to be regarded as particularly applicable to this affection, are the following:—epistaxis, lenticular rose-colored spots upon the surface, succeeded by sudamina, meteorism, coma, great debility in the *earliest* stages of the disease, destruction of the surface upon which blisters have been placed, spasmodic movements or contraction of muscles, and buzzing of the ears. When these are united in any particular case, we have every reason to pronounce the lesion to be in the little glands of Peyer; and indeed in the absence of several of these, if we are still enabled to discover the lenticular spots, the sudamina and meteorism (physical signs), we should scarcely utter a false diagnosis in adhering to the same opinion.

Inasmuch as secondary lesions frequently occur in this disease, (the result probably of protracted excitation in the organism,) the question has been asked by Abercrombie we think, Why may not the alterations of the glands of Peyer be the effect rather than the cause of typhus fever? That it is not the effect, we possess presumptive evidence at least in the fact, that in a very large proportion of cases, *diarrhœa*

unattended with febrile excitement exists for a longer or shorter space of time as the only symptom, and consequently before any sympathetic disturbance is observed. To produce so serious a lesion as inflammation and ulceration of any organ, we might reasonably expect that the febrile agitation should be both violent and long continued; yet without this, we notice as has been said the occurrence of diarrhœa, and dissection discovers in no exception (in Louis' 50 autopsies) the alteration in Peyer's glands to be constant and invariable; and in the many which have fallen under our inspection the same result was observed.

Diarrhœa.—As diarrhœa shows itself to be the primary symptom in a very large number of instances, we have just reason to regard the increased peristaltic action of the intestines as consequent upon the alteration of Peyer's glands. But this increase of the evacuations not being uniform and constant, and the peculiar type of fever existing beyond all reasonable doubt, would lead us to inquire into this apparent contradiction to the theory. The explanation is to be found in the *form* of alteration in the diseased glands; when diarrhœa is absent they have been observed to be simply swelled, of a pale or slight rose color, and the mucous membrane covering them entirely healthy. When however they have proceeded to other forms of alteration, involving largely the lining membrane which intervenes and covers them, the occurrence of diarrhœa is inevitable. We shall notice in a cursory manner the most common modes of alteration before we close with the subject.

Spots.—The frequency with which the red lenticular spots make their appearance, authorizes the opinion that they are of the number of those symptoms which properly belong to this disease. They are observed generally upon the chest and abdomen, and occasionally also upon the extremities and posterior portions of the trunk. From the sixth to the ninth day of the disease they begin to show themselves, and appear for four or five days successively;

after this time they gradually disappear by growing paler and paler day after day.

Sudamina.—These vesicles are observed in rather more than two thirds of the cases of typhus fever, and are as frequent in the intense as in the milder forms of the disease. They are rarely seen before the twelfth or fourteenth day, and may be consequently regarded as succeeding to the lenticular eruption; their duration continues from three to ten days, and they are more numerous about the neck, the neighborhood of the armpits and the groins than on other portions of the body;—the form and dimensions vary, being generally round when small, or oblong and sometimes flattened when of larger size.

Meteorism.—The tympanitic condition of the colon expressed by this term is exceedingly frequent, appearing in more than three fourths of the patients. The period of its debut varies; for the most part it continues throughout the whole course of the disease in those who die, gradually augmenting although sometimes decreasing after it has reached a certain point. The amount of distention is occasionally enormous, so much so as to conceal the stomach and press upon other viscera of the abdomen, thereby interfering with their actions as well as the function of respiration, and thus causing much distress to the patient. The seat of meteorism is almost uniformly observed to be the large intestine, and its cause is still enveloped in the greatest obscurity. In a few instances the mucous membrane of the colon has been found slightly inflamed, softened or ulcerated, but in a very large number on the other hand not the least disease can be detected; and if it were the result of any of the lesions of the internal coat, observation would constantly have recognized it in the small intestine, for that is without an exception the seat of disease. Hypertrophy of the muscular coat of the colon is universal in a greater or less degree, in consequence of the reaction of the tunics upon the gaz which they contain. In distention of all the hollow organs the

same pathological fact is observable. Percussion of course furnishes the means of detecting the extent to which the distention is carried.

The glands of Peyer are found more or less altered in every case of typhus fever, the gravest alterations being those which exist nearest the cœcum; as we advance towards the upper portions of the intestine the morbid appearances are evidently less. These alterations seem then to take place in a progressive manner from the cœcum towards the duodenum, and they often exhibit different degrees of intensity in the same subject. When death happens in a few days after the commencement of the disease, the affected glands are observed to be much more numerous than when it occurs at a later period; and the destructive process of ulceration is very generally more extensive in the neighborhood of the cœcum than in other parts of the intestine. When it is not so, the case is one which has lasted a considerable time, and cicatrices are occasionally noticed showing that the primary ulcerations had healed. The disease is still prolonged however, in consequence of other glands in their turn becoming affected, and secondary lesion of some important organ or organs supervening, adds an additional impediment to the happy termination of the case.

The first form of altered structure is simple swelling of the gland; as it progresses the superincumbent mucous membrane inflames and often becomes softened, and the sub-mucous cellular tissue being also implicated is found to be more or less thickened, thus offering a double cause for the projection of the gland interiorly. As the disease proceeds, the whole mass (including the gland, sub-mucous cellular and the mucous tunic) becomes larger and softer, and the ulcerations commence. Soon these tunics are destroyed to a greater or less degree, and the muscular coat participating in the morbid alteration is inflamed, softened and ulcerated; the peritoneal now yields in its turn, and perforation, the last and

fatal link in the destructive chain of disorganization, hurries the patient to his grave, the victim of the most atrocious agony. The occurrence of perforation of the intestine varies in different individuals; rarely happening before the twelfth day, it is often protracted to a very late period. The pain is sudden, *tearing* and intense, followed by decomposition of the features, nausea and vomiting, chills, and all the symptoms of acute peritonitis.

Peritonæum.—In acute inflammation of this membrane, the symptoms are generally sufficiently intense and well marked to furnish a clear diagnosis. The pulse however, is not uniformly small and hard, nor the fever great, as we would be led to believe by almost all who have written upon the subject. To the general, may be added the local and physical signs, which consist of pain upon pressure, often extreme, tension and renitence of the abdominal walls, and in many instances meteorism is developed to a great extent. In the more chronic forms of the disease especially, the pain is slight or may not even exist at all, and the same remark may be made in relation to the febrile excitement; but the *form* of the abdominal parietes is sometimes observed to differ from its normal condition, in consequence of the peculiar dispositions which the false membranes may assume. Many of the intestinal convolutions being glued together by false membranes, present to the touch the sensation of a *single* mass; and we have on some occasions heard that peculiar sound termed by the French the *bruit de frottement*, caused by the friction of the intestinal surfaces alone, or of the parietal peritonæum with these last, when both may have been covered by the extraneous false tissue.

Dropsical effusion is perhaps the most frequent termination of general peritonitis; sometimes it is purulent, or flocculent masses are observed floating in a thinner liquid. Whatever the effusion may be, the methods of detecting it are too well known to need enumeration here.

Partial peritonitis is by no means an uncommon form of

this affection, and as its result tumors arise, which when superficial, are easily appreciated both by the sight and touch. These tumors vary considerably in their form, volume, situation and relations with surrounding parts, and in giving them their just value we are often at fault when aided by both the local and general signs; the latter indeed are frequently so very obscure as to furnish little or no assistance. Neighboring organs may become irritated, compressed, or even displaced by these peritoneal tumefactions, from whence arises a disturbance in their functions; and being thus thrown from their proper situations, the idea of their own organic derangement may be imposed upon the most observing. In this way jaundice may be produced from sympathetic irritation of the liver, and an enlargement of the left portion of the epiploon may be mistaken for disease of the spleen. In the pelvis, the functions of the bladder and rectum become deranged, and purulent collections circumscribed by false membranes are observed. These are frequently discovered by the touch and percussion, although it may now and then be difficult, if not impossible, to establish the exact lesion. When existing for a long time, the function of nutrition is impeded; gradual wasting of all the tissues is superinduced; the pus being absorbed by the veins, and then eliminated from the mass of blood, forms collections in other and distant organs; or secondary lesions of the lungs or intestines taking place, diminish the prospects of recovery.

There is a most singular and deceptive appearance of peritonitis of which I do not recollect ever to have seen a description, and which might be termed the nervous or neuralgic. It is possible that Mr. Teale, in his work upon spinal irritation, may have alluded to it; but not having the book in our possession, we cannot now make the reference. We have seen but one case, and regret that minute notes were not taken at the time; the main points however, are sufficiently distinct in our memory. The pain, symptomatic of the lesion, is of course seated in the muscles. A gentle-

man from Connecticut, was attacked early in May last, with dysenteric symptoms, and was seen by us a few days afterwards, in consultation with the attending physician. The symptoms of dysentery were unquestionable, mucous and bloody stools often taking place; these however, soon yielded to appropriate treatment, and the abdomen, which before the subsidence of the intestinal disease, was very tender upon pressure, became so much so as scarcely to allow the weight of a light blanket. The idea occurred to us, from the exquisite pain induced by the mere contact of the hand, that we had now a case of peritonitis to deal with, and leeches and cataplasms were applied without any melioration to the pain. This fact, in connection with the absence of the most prominent symptoms of the disease, caused us now to hesitate; for example, the pulse was undisturbed, the countenance was calm except when any thing was brought in contact with the abdomen, which preserved in every respect its healthy appearance, nor was either renitence or meteorism detected. For several days we were kept completely at fault, and of course our patient suffered. Many anomalous diseases depending upon spinal irritation, had been met with in our practice; and it was at length suggested, that this might probably be of the same character. An examination was accordingly made, and several of the dorsal vertebræ were found sensible to the touch; the tartar emetic ointment was applied, and the patient's sufferings were soon at an end.

Thoracic Diseases.

As was observed in the early part of this essay, it is in the various affections of the thoracic cavity, that the external means of exploration are more decidedly and beneficially applicable. By the appreciation of physical signs, we are enabled, it is true, to demonstrate a lesion of the abdominal

organs, where without them we might be ignorant even of the particular viscus affected; but by the aid of all the symptoms, it is occasionally impossible to state the true and exact disease which may exist. It is not so, however, in relation to diseases of the chest; and in addition to percussion, the still more available mean of auscultation assists us to form a correct diagnosis. From the very nature of the physical agencies, it must result, that in these affections the diagnosis must, with very few exceptions indeed, be clear and precise. Depending upon a certain condition of the pulmonary apparatus, the respiration must inevitably, when that apparatus is in a normal state, exhibit itself to the ear in an invariable and constant manner, although modified in its degree of intensity, by circumstances connected with the individual. Yet the general character of healthy respiration is such, that it can never be mistaken when once heard, and to be properly appreciated it must be heard; we shall therefore attempt no description by words.

Whenever the condition of the apparatus becomes deranged however, it follows as a necessary consequence, that there must be a corresponding departure from the healthy function of respiration; and these varied and numerous differences all serve as the true exponents of the peculiar malady which supervenes; and the reason why the diagnosis is so much more certain here than in any other class of diseases, is that a peculiarity of respiration and of resonance of the voice, belongs only, in almost all cases, to each individual lesion.

We shall not impose upon ourselves the task of giving a detailed and formal exposé of the various terms used in explanation of abnormal respiration or any other physical sign, because the Committee are no doubt themselves masters of the subject; it will however become necessary, in order to trace the true and legitimate value of these signs, to give an explanation of the manner in which they are produced; and such instances will of course frequently occur. Nor will

the attempt be made to embrace within the limits of a short essay, the whole class of diseases appertaining to the thoracic organs.

Pleura.—Although the general and rational signs of pleurisy may lead us in a great many instances to recognize the true character of the lesion, yet are there cases of pneumonic inflammation, particularly in their inception, in which without the aid of physical signs, we may mistake the one for the other. We have encountered cases of pneumonia, where for the first few hours there was little or no expectoration; or if any, not of that peculiar kind which belongs to this disease, and in which the pain also, was as sharp and as acute as that of pleurisy. The face, too, has been seen to be without that flush of vivid redness, which has been given as one of the characteristics of pulmonary inflammation; and it must be admitted by all who have had much experience in the two diseases, that it would be impossible to look for a pathognomonic sign in the condition of the pulse. Varying as this must do by so many circumstances connected with the individual, founded upon idiosyncracy and the different susceptibilities in the chain of sympathies, it would be vain to draw a comparison so well founded as to serve as a sure and invariable guide. Nor is this all; pleurisy occurs as a secondary lesion in some diseases, and may really become the efficient cause of death; and that too, under circumstances where its rational symptoms would rarely, if ever, point out its existence; besides, it is only by the physical signs that we can distinctly trace the various changes which supervene during its progress, and mark unerringly the amount of effusion and its gradual diminution. And it is within the experience of those who have had the amplest opportunities for observation, that all the local symptoms, as pain, dyspnœa, &c. may fail, while yet the physical signs may exist in their fullest extent. Latent pneumonia, too, giving rise as it does to but feeble functional indications, yet sufficiently so to authorize a belief in

some thoracic lesion, will almost always leave the uninitiated in physical signs in doubt and uncertainty.

As we have done in relation to all the diseases hitherto investigated, so shall we still refrain from entering upon a full history of the general and functional symptoms of those yet to be discussed. Indeed, they will only be mentioned when it becomes necessary to state their insufficiency towards the formation of a clear diagnosis, comparatively with the physical signs; and as the remarks which have just been made relative to inflammation of the pleura and the pulmonary parenchyma, may induce at least some little doubt as to the value of the functional signs in *all* cases, we will proceed to enumerate those, which from their nature cannot leave us in error.

Were the physician called to a case of pleurisy during the first moments of its invasion, he might probably be at a loss in his diagnosis, except he were to reason upon the principle of exclusion; the signs of all other affections of the lungs or pleura being absent, he might reasonably infer the existence of this. But he would not long remain in doubt; for it is often surprising with what rapidity effusion takes place into the cavity of the pleura, while the inflammatory orgasm in its highest degree may yet remain unsubdued. Laennec tells us that he has occasionally discovered effusion within one hour after the commencement of the disease, oftentimes within the space of three or four hours, and that it is never doubtful after the second day.

As soon as the effusion does take place, there can be no further room for doubt. The lung crowded towards the spinal column by the pressure of the fluid, permits the respiration to be heard only along a portion of its course, and that to the extent of some two or three fingers' breadth; above the spine of the scapula, unless the effusion be very great, and beneath the clavicle, it may also be discovered. This absence of respiration is owing of course to the temporary obliteration of the air-cells and minute bronchial

ramifications, in consequence of the pressure exerted upon them; and it is only because these last are sufficiently firm and large at their root or origin to offer the necessary resistance, that the respiration there remains audible. The lung of the diseased side being thus deprived of its power of receiving air, the opposite lung, in order to make amends as it were for the deficiency of its fellow, appears to undergo an increase of action, and the respiration assumes the character denominated *puerile*. This when very loud and well marked, as it sometimes is, may lead the inexperienced into error; for it may be heard when the instrument or ear is applied to the diseased side, the effusion not being excessive, and thus impose the belief that the lung is here still permeable to the air. The diagnosis might then be called in question; and unless the difference between puerile and bronchial respiration was very clearly understood and appreciated, it might even be imagined that inflammation of the pulmonary parenchyma existed; the dullness of sound upon percussion would also aid such a supposition, and if ægophony be at the same time mistaken for bronchophony, as is not unfrequently the case, persistence in the error would be still more certain. But he who has once heard the full, hard, and noisy sound of bronchial respiration in pneumonia, and that too passing immediately *beneath* his ear, can hardly mistake it for the loud though soft vesicular murmur of infancy; an attentive examination in the case before us, will give the sensation too of the sound coming from a distance, which as has just been intimated, is not the case when the pulmonary tissue in inflamed. It is not pretended that this state of things is of frequent occurrence; on the contrary it is very rare; the respiration being in a large majority of instances, nearly if not quite inaudible on the affected side, except at the root of the lung.

When the condition of the thoracic cavity is unaffected by disease, the application of the hand upon its sides, during the process of respiration, and more particularly the act of

speaking, imparts to it a peculiar trembling sensation; and if we use percussion over any of its regions, a well marked resonance, greater in some situations than in others, for obvious reasons, is uniformly elicited. The mechanism of both phenomana is easy of explanation; the permeable parenchyma, dilating and distending itself under the influence of the introduction of the air, comes closely into contact with the sides of the chest, and the voice reverberating throughout the narrowest recesses of the pulmonary apparatus, thus causes the motatory and trembling feeling which is appreciated by the touch;—and the same anatomical character of the lungs to which allusion has just been made, viz. their permeability, although not rendering them hollow organs in the strict acceptation of the term, even when conjoined with the fact that numerous canals pass in every direction, yet makes them enough so to produce a clear resonance on percussion. When effusion has resulted, a denser medium being thus substituted for the air, which no longer finds admission into its appropriate cells in consequence of compression of the lung, the thorax loses the resonance which belongs to it in its natural state, and becomes dull when percussed.

Another physical sign, which is only observed while effusion is present, is ægophony; nor is it then heard, unless the effused fluid be moderate in quantity. From this fact we are therefore always enabled to tell, if no other symptom existed, whether the effusion be excessive or not; if it be so, this sign, as we have remarked, will not be heard, and should it afterwards be recognized, an affirmative and positive indication of its diminution is established. In order to appreciate the reasons upon which these remarks are founded, it will be necessary to enter into an explanation of the production of ægophony. This sign bears some resemblance to bronchophony, and it does so, because a similar condition of the lung in part, is required to produce both. This condition is its greater density. When it has become

more dense than natural, its pathological condition it is true is not the same, although its effect upon the development of the two signs alluded to, may be alike. In the one case, (that of bronchophony) the parenchyma is engorged, overloaded and impacted with blood, and the molecular or ultimate order of the tissue, is obviously deranged. In the other, the density is merely the result of compression, and no other change takes place in the organic structure, than a closer approximation of its parts. This dense or compact state of the lung being established, and the result of either the one or the other cause, prevents that diffused resonance of the voice which is noted in its healthy condition, as to the part affected we mean; and as all more solid bodies are better conductors of sound than those less so, the voice is heard within the chest with a distinctness proportioned to the solidity. Were there no effusion, the increased density of the lung, or a portion of it, as the case might be, from whatever cause it might arise, would produce pure bronchophony; but while it exists, if moderate, the resonance of the voice is so modified by the medium through which it is heard, (the effused fluid,) that a certain trembling sensation, a sort of saccade, is distinguished, which imparts to the sign of ægophony its characteristic peculiarity. And from this explanation we at once see why it requires but a moderate quantity of fluid to allow of its detection; if it be excessive, the medium through which the resonance would have to pass, opposes an insurmountable barrier to its appreciation.

Ægophony is one of the physical signs to which we may look with very great certainty in almost all cases of pleurisy, and from what has been said it may be inferred that the stage of the disease in which it is most generally heard, is that wherein absorption of the fluid has taken place to a considerable extent. But it occasionally happens, though rarely, that it is heard throughout its whole continuance; and this is owing, as dissection has proved, to the lung being held near the sides of the chest, by adhesions which

had formed in consequence of some former attack. During the early part of the disease, ægophony is sometimes met with, before the effusion has made sufficient progress to impede its occurrence.

Another sign, the consequence of effusion, is dilatation of the affected side, and this is frequently observable a few hours after the fluid is secreted; because there are cases in which it at once becomes very considerable. The ribs appear to be elevated, the intercostal spaces are augmented in breadth, and in proportion to the excess of the fluid after it has reached a certain point, is the diaphragm depressed; and hence it is that very often a deceptive appearance of enlargement of either the spleen or liver is observed, and more particularly the latter, on account of its superior volume. It is undoubtedly the chronic form of the disease, in which dilatation is more uniformly perceptible, and the phenomena to which we have alluded are more distinctly marked. Although always commencing early, it may not be clearly distinguishable for some little time, yet it ultimately increases to such a degree as no longer to be mistaken. All the physical signs hitherto mentioned, except ægophony, are eminently developed, and this for the reason already given. The lung, in consequence of protracted compression, appears to be nearly destroyed; its tissue is pale and exsanguineous, and its vessels and bronchial tubes are flattened. The character of the effusion is also found to vary; it is often purulent and is of a green or yellowish color. In this state the disease is denominated empyema.

Should life continue sufficiently long, and the absorption of the fluid take place, the affected side becomes contracted in its dimensions. This is the result of the slow and gradual manner in which adhesions are developed; and did it belong to us in this place to enter minutely into the mode of their formation, we might offer an interesting history of the process. It is sufficient for us to say here, that they ultimately assume a fibro-cartilaginous structure, and thus tend

to bind down and constrict the sides of the chest. In the meantime, the lung itself remains compressed and flaccid. The signs of this complication are either a total absence of respiration, or it is but slightly heard and that near the root of the lung or in its superior portion. The thickness of the accidental developments does not cause this indistinctness or absence of the respiratory murmur, as the case may be, and which might readily be inferred from a hasty examination. Dissection reveals the true cause, by exhibiting the lung in a compressed condition, and thus inhibiting the ingress of the air into its cells; and the same pathological feature will abundantly account for the dullness of sound on percussion, which presents itself as another sign.

Before effusion takes place, or even while it is yet progressing, and we refer now to the more acute form of pleurisy, a thick, tenacious and plastic exudation lines that portion of the pleura which is in a state of inflammation. This is the first form of false membrane, or accidental tissue as it is called, and it is a curious circumstance in the history of this affection, that the hitherto unaffected portion of the pleura opposite to the diseased part speedily itself becomes inflamed; false membrane is here also produced, and we refer to this condition more particularly for the purpose of explaining another physical sign which is not very uncommon. In a state of health, the serous surfaces of the pleura, bedewed with a thin and slightly viscous fluid, glide easily and imperceptibly over each other. But so soon as this false membrane is exuded, the situation of things becomes altered, and in proportion to the degree of consistency which it assumes, by so much is the free and easy movement of the opposite surfaces, the one upon the other, impeded. Rough surfaces are opposed where before they were perfectly smooth, and if the ear or the instrument be applied, the sound elicited by their friction is easily distinguished. This has been termed the ascending and descending friction sound, —the former being produced during inspiration, and the

latter during expiration. We need scarcely remark that this sign is only appreciable either before the existence of the secreted serosity, or after it has been absorbed.

There is such a disease as partial or circumscribed pleurisy, and its modus formationis will very succinctly be detailed. It is not of very frequent occurrence, because experience has proved the fact that in a pleura already adherent, inflammation supervenes more rarely than where this is not the case. Partial pleurisies are those circumscribed by former adhesions, and rarely if ever exist under other circumstances, except in two cases which will be mentioned under the heads of pleuro-pneumonia and phthisis. They are generally found in the fissures located between the lobes; between the base of the lung and diaphragm,—upon that part of the pleura covering the posterior and inferior portions of the lung, and between it and the mediastinum. The physical signs are absence of respiration in the part affected, occasionally ægophony is manifested, and where the situation of the diseased part will admit of percussion, a flat or dull sound results.

Pleuro-Pneumonia.—This is not a very frequent affection, if the term be adopted in its fullest acceptation;—where the totality of the lung namely and of the pleura also becomes inflamed. And where the disease exists even under this form, both reason and experience teach us, very contrary indeed to what might be imagined at the first blush, that the patient runs less risk of his life than where the one or the other occurred alone. We shall not now relate all the physical signs of pneumonia and the pathological condition upon which they depend, as this will be done in its appropriate place; enough however will be said, in order to afford a comprehensive view of the present disease, and it need scarcely be remarked that the most complete combination of general and functional symptoms could avail nothing towards establishing the true character of the lesion.

The reason why the complication of the two is less dan-

gerous than either the one or the other singly, is derived from the fact that the pneumonia (is not the preposition *peri*, which is often prefixed to the word pneumonia, worse than useless, as it may cause confusion where there is no difference?) is lessened in degree, in consequence of compression of the lung by the effused fluid. Thus pressed upon, its vessels are not subjected to the extensive engorgement which would otherwise happen, and inflammation of the tissue is very much moderated. But it is not of course prevented, and this operates in its turn upon the inflamed pleura. The lung swelled and engorged, although to a moderate extent, as has been said, prevents an excessive effusion from the pleuritic surface, and the facility of absorption being thus increased, a reciprocity of good is established between the two diseases. As might well be anticipated, a dullness of sound is observed when percussion is used; and we have two causes for its production, the engorged condition of the lung, thus preventing to a greater or less degree the entrance of the air—and secondly the existence of effusion. This not being so great as in simple pleurisy, does not prevent us from observing the sounds peculiar to pneumonia; the crepitant râle, bronchial respiration, and bronchophony, are all heard, and ægophony in connection with the other signs of effusion already named, leads us to know that inflammation of the pleura is present.

A much more common form of pleuro-pneumonia is produced by the extension of the inflammation of the parenchymatous tissue towards the surface, the pleura becoming consecutively implicated. If a portion only of the pulmonary mass be inflamed, the corresponding part of the pleura is alone found to be involved at first; but the costal surface to the same extent which is contiguous, soon itself takes on an inflammatory action; and here the pleurisy is partial. One is led sometimes to suspect this state of things without resorting even to physical signs, from the sharp and acute character of the pleuritic pain. The pneumonia has

continued for days, and if a proper treatment has been pursued, the pain, although it may have been severe at first, is very much moderated; and were we not aware that the pleura may become consecutively diseased, we should be surprised at this fresh accession of pain when the pneumonic symptoms themselves might be not at all aggravated.

When but a portion of the lung with its corresponding pleura is thus affected, the latter is clothed with a layer of false membrane as well as its contiguous and opposite surface; and in addition the serous or sero-purulent secretion of pleurisy supervenes. In this condition of things it is easy to establish the two lesions by their physical signs; the crepitant râle of pneumonia is of course no longer heard in this stage of the disease, but bronchial respiration and bronchophony indicate its presence; and we have already given the signs of pleurisy. If the totality of the lung and pleura be inflamed, there is rarely if ever effusion by reason of the distended condition of the former, as hitherto explained; but both surfaces of the latter are coated throughout with false membrane. The thoracic resonance becomes as dull as it is found to be in pleurisy with effusion; but in the case of which we now speak, there is always bronchophony, and that so exceedingly well marked, as to bear a resemblance to pectoriloquy. Did effusion exist, this would not be the case.

A third form of pleuro-pneumonia results from the extension of the pleuritic inflammation to the pulmonary tissue, and the physical signs necessarily follow an inverse order to those of the last. Should the effused fluid become suddenly great, as it occasionally happens, the probability of the complication is lessened, and the reason is understood from what has heretofore been said. It is then while the secretion is yet moderate, that we are to look for the signs of this form of the disease. To those of pleurisy, is added the râle crepitant, which establishes the existence of pneumonia. It is discoverable towards the root of the lung, under the arm-

pit, and beneath the clavicle; inasmuch as these are the points less easily pressed upon by the effusion.

The inflamed pulmonary tissue assumes a peculiar modification from the compression which it undergoes. The inflammation is much more limited in extent than it otherwise would be, and is oftentimes confined to a few lobes, consequent upon the diminution of the inflammatory orgasm; and its resolution does not take place with the same facility as does that of simple pneumonia. Its pathological character differs also from that of uncomplicated pneumonia; the induration has not the granulated appearance of hepatization, possesses less firmness and more flaccidity, and when a portion of it is incised, no traces of the air-cells are discoverable, although the bronchial ramifications and blood-vessels are easily recognized.

It is unnecessary to observe that pleurisy is sometimes double; that is to say, the pleuræ of both sides are inflamed at one and the same time.

Hydrothorax.—Dropsy of the chest is both symptomatic and idiopathic. The former is found to complicate both acute and chronic affections, such as fevers, and more particularly diseases of the heart and liver. Its aggression is generally sudden, making its appearance but a few hours, or at most a few days before death, and may in many cases be considered the proximate cause of the cessation of life. The latter owes its origin to those causes which induce dropsy of other cavities, and is both sthenic and asthenic in its type. More frequently perhaps it is the last, and its victims are those whose constitutions have been broken down by too long continued a gratification of their animal appetites.

The physical signs which accompany this disease are precisely those of pleurisy with effusion. The side is dilated, respiration is more or less inaudible, except towards the root of the lung, and flatness of sound on percussion and ægophony exist. The lung is crowded and pressed against the spine,

is flaccid, and no longer has the crepitating feel which belongs to it in a state of health.

The most prominent functional symptom, is an exceeding difficulty of respiration. In chronic pleurisy, with a large amount of effusion even, we have never seen the difficulty of breathing so distressing as in hydrothorax; besides this, it is often paroxysmal in its character. The patient starts from his sleep as if immediate suffocation was about to terminate his life; the doors and windows of his apartment are opened that he may gasp for air, and his agony is intense. Although the employment of the physical signs places the fact of effusion beyond a doubt, and enables us to measure its extent, yet are we free to admit that it is from the functional and local symptoms, that we are to obtain the distinctive characters between this disease and chronic pleurisy. The physical signs will indeed aid us in another point of view, for upon the functional we could not *alone* depend, inasmuch as the most important one (difficult breathing) is frequently an attendant upon other diseases; as for instance hypertrophy of the heart, and aneurism of the aorta. The former teach us that there is effusion, while to the latter we must look for the nature of that effusion; although it must be confessed that with every aid, it is in some cases impossible clearly to discriminate. As has been said, the function of respiration is carried on with more difficulty, generally, in hydrothorax, and the peculiar and pungent pain of pleurisy is absent. Dropsy of other cavities, and of the cellular tissue of the extremities, are frequent attendants.

That hydrothorax is often an inflammatory disease, is unquestionable; and that it is occasionally the result of pure debility, is equally beyond a doubt; but it would be foreign to our subject to enter into the general pathology of dropsy. Certain it is, that it differs from pleurisy most essentially; for upon an examination after death, important discrepancies in the anatomical character of the two affections are revealed. In the disease of which we are speaking, no false membranes

or accidental formations are discovered. The lung, it is true, is compressed as in pleurisy, by an accumulated secretion, which is almost always a limpid serosity, never purulent, but containing occasionally flocculent albuminous particles.

Pneumo-thorax.—There are three distinct varieties of this affection, which some of the French authorities appear to think is of no very uncommon occurrence. It escaped, however, the penetrating glance of the indefatigable Bayle, and its true pathology has only within the few last years been correctly known. The complication is generally met with during the closing scene of life, induced by other diseases; and in truth, one of its forms at least may be regarded as the last link in the chain of pleuritic lesions.

Pneumo-thorax is sometimes simple; that is, the cavity of the pleura contains nothing more than an accumulation of air, and no portion of this membrane is found upon dissection to be in a state of disease. The lung is compressed in the direction of its root, in the same manner as it would, were the accumulation a liquid one; and this arrangement gives rise to a physical sign common to both. Respiration becomes more or less inaudible, in proportion to the quantity of the æriform secretion, (is it a secretion?) and is not heard except towards the spinal attachment of the lung. This it will be remembered, is one of the characters of pleurisy with effusion; but a mistake can scarcely arise, inasmuch as in pleurisy the breathing is often perceptible, unless the effusion be excessive, in other parts of the chest than the one just named. The air being a worse conductor of sounds than liquids, offers a sufficient explanation.

Percussion upon the thoracic parietes, affords a loud, clear and hollow sound, and distention is observed as in liquid effusion. If the accumulation be not considerable, the sound although louder than natural, may lead the inexperienced into some doubt as to which is really the affected side; for the healthy one giving out a duller resonance than the other,

may from this circumstance alone, be regarded as the seat of lesion. Besides, the distention of the diseased side, unless so great as to leave no possible doubt upon the mind of any, may be thought to be natural; while it may be supposed that the other although normal, is somewhat contracted in consequence of an ancient pleurisy. But these discordant circumstances will all be reconciled by resorting to auscultation; we have explained above the true condition of respiration in simple pneumo-thorax. It is hardly necessary to observe that the functional symptoms are exceedingly obscure, and the reasons are obvious. Difficulty of breathing is the most prominent; but it is not pathognomonic as it belongs to other affections.

The form of the disease just mentioned is certainly not a frequent one; the two last now to be described are oftener encountered. Pleurisy, latent or well marked, idiopathic or consecutive, forms the primary pathological feature; a serous or sero-purulent effusion results, and the development of air supposed to proceed, and probably with reason from the decomposition of the secreted fluid, forms the last link in the chain of cause and effect. The original disease is known to have existed by its appropriate physical signs which have been related. When the gas is evolved, these are varied, and an addition of others is made to them. The sound on percussion, which before the evolution of the gaseous fluid was dull, becomes changed into a clear resonance, at least in the superior portion of the thorax, and the respiration which may have been audible to a greater or less extent, depending upon causes already explained, is no longer heard. The resonance however varies, it must be acknowledged, according to circumstances; it may even be less on the affected side than the other, and yet the disease may exist, for the liquid effusion may be so abundant, as to prevent any decided resonance. But by resorting to auscultation, little or no difficulty will remain in establishing a proper diagnosis.

Another mean by which we are enabled to judge of the

presence of hydro-pneumo-thorax, is that which has been denominated the hippocratic succussion. In simple liquid effusion into the thoracic cavity it is absent; but when the two secretions exist at one and the same time, it is very distinctly noticed; we mean merely to state the fact without entering upon the reasons. The mode of procedure is simple; the patient is placed in a sitting posture, and while the body is quickly though moderately shaken by applying the hands upon his shoulders, the agitation of the fluid which is thus produced, is very clearly heard through the stethoscope; and indeed the application of the naked ear will sometimes detect it.

The metallic tinkling is also one of the physical signs in this variety of the disease; but it occurs more frequently in the last, which will be presently mentioned. In order to produce it, the patient must first occupy a recumbent position; the fluid is thus made to diffuse itself more or less over the surface of the affected side; and if the individual be then requested to rise, some drops of the effusion which may have adhered to the upper portion of the thorax, will be heard to fall into the general mass of fluid which is now situated below. The sound produced, is similar to that elicited from the sudden contact of two bits of metal; and hence is its name derived.

The last variety of hydro-pneumo-thorax, is that wherein a communication exists between the cavity of the pleura and one or more of the bronchial ramifications, in consequence of an opening made in that portion of the membrane which covers the lung. The air which then finds access is of course atmospheric, and its presence alone, independent of any prior lesion, is sufficient to excite pleurisy; and this, as in those cases of the disease idiopathically formed, results in effusion. The lesions which may induce the communications referred to, also vary; sometimes a rupture of the pleura is produced by external violence; occasionally a gangrenous eschar interrupts its integrity, and more fre-

quently still, the solution of continuity is the product of a softened and suppurating tubercle. Hence the disease is often met with, during the last stage of phthisis pulmonalis, and this is by far the most common form. When we come to speak of phthisis, we shall again refer to this point, first brought to the notice of the profession, we believe, by the accurate observation of M. Louis.

Besides the various physical signs which belong to this disease, and which have been related, another is revealed which appertains solely to the form now under consideration; this is the bottle-buzzing or amphoric sound, and results from the passage of air through the fistulous opening; the noise is similar to that made by blowing into an empty bottle. The metallic tinkling too, is of more common occurrence in this than in the other form of the affection, and is produced when the patient speaks, coughs, or forcibly inspires, by thus agitating the air situated above the liquid effusion; and where it does appear, after having established by other signs the existence of hydro-pneumo-thorax, it may be regarded as a pretty sure evidence of a triple lesion. When heard in connection with the amphoric sound, all doubt must at once yield to the most entire certainty.

Catarrh.—Inflammation of the bronchial mucous surface, has been divided into several kinds, depending rather upon the character of the expuition than upon the variation of their physical signs, and with all the nicety which we are enabled to exercise, it is sometimes a little difficult very clearly to discriminate. This remark is referable to the two first varieties of which we shall speak, viz.: the simple and pituitary, and is applicable perhaps to the chronic rather than to the acute stage. We make this observation from what we have more than once witnessed; the cases to which we refer, exhibited for some time, very decidedly, the peculiar sputa of simple chronic catarrh; there then appeared to be an intermixture of this with the pituitary, which

last continued throughout the disease in a much larger proportion than the former.

Catarrh or bronchitis, is both idiopathic and symptomatic; it is observed to complicate several forms of fever, and in such instances is generally latent; that is, it can be recognized only by its physical signs. In many affections of the lungs, it is met with as a secondary disease, in pneumonia and pleurisy for example; and where it has existed originally in its idiopathic form for a considerable length of time, it may, in its turn, induce emphysema or dilatation of the bronchiæ.

The opinion has been a common one, nor is it yet perhaps entirely discarded, that inflammation of the bronchial mucous tissue, might extend to the pulmonary parenchyma, and thus produce pneumonia. The uncertainty of the diagnosis, when based solely upon functional symptoms, has hitherto been insufficient to correct, or we might rather say, has tended to propagate the error. But those best acquainted with the physical signs belonging to the two diseases, tell us they have never seen such a complication. It is only in the acute form, however, that the idea could for a moment be entertained, for we must all have witnessed numerous cases of chronic catarrh, without a solitary symptom of pneumonia, either physical or functional; and from the very fact that the disease is thus known to exist for months and even years, ought we still farther to argue the improbability of the inflammation extending beyond its primary location.

Phthisis pulmonalis has also been thought to be the result of catarrh, or to use the common phrase, a "neglected cold." It would carry us too far from our original purpose, to enter upon the extended discussion to which this subject would give rise. All that will now be said, is that the investigations of pathology have taught a different doctrine in these latter days. We now know that the stethoscope reveals the existence of phthisis, without one sign of catarrh, and dissection verifies the diagnosis; the reverse of

the proposition when tested in the same way is no less true, and in how small a proportion of cases is it, that tubercle is ever found in any other portion of the lung than its parenchymatous tissue! We have seen numerous dissections of phthisical subjects, in some of whom the pleura, to a greater or less extent, was found studded with tubercles; in *one* instance only, have we observed them seated in the mucous surface, and that to a very small extent.

Simple acute catarrh, and the same may be said of the other varieties, may occupy the whole or a portion only of the mucous surface of one or both lungs, and the functional symptoms will generally be in proportion to the extent of the inflammation. These will not all be mentioned, for they are sufficiently well known; and if the diagnosis may pretty clearly be established by their aid alone, a knowledge of the physical signs will not only render it certain, but will clear up all doubt as to any complication.

Every part of the thorax resounds well upon percussion, for there is no pleuritic effusion or indurated or engorged parenchyma to produce a different result. Respiration is sometimes suspended, and very frequently it is diminished. This may be attributable to one of two causes, or to both at the same time; the tumefaction of the mucous membrane, and the secretion which lines the bronchial tubes, may prevent partially or wholly the ingress of the air; and not even in the latter case should a dullness of sound be discovered on percussion, and experiment proves that it is not; for the air, although it may not freely enter, is still found incarcerated in the numerous air-cells, in sufficient quantity to produce a resonance. It also happens, that where the respiration may have been suspended or diminished, it is again distinctly heard a few moments after in its full intensity; the secretion which choked up the bronchial tubes has been removed by the process of expectoration.

The tumefaction of the membrane, consequent upon its inflammation, narrows and restricts the ramifications of the

bronchiæ in proportion to its violence, and in the early stage of the disease, before secretion takes place, this anatomical feature gives rise to a peculiar modification of respiration. The air rushing into the narrowed tubes, produces a *sonorous* noise which is easily appreciated by the instrument or the unassisted ear; it is called the sonorous râle; sometimes it resembles the distant cooing of the dove, or the slow movement of the bow over the larger string of the bass-viol. To this is frequently conjoined the *sibilant* râle, or a sort of whistling, which varying in intensity, preserves sufficiently well its characteristic sound; it arises from the difficulty with which the air penetrates the smaller bronchial tubes, in consequence of the distention of their lining membrane; and it may also proceed from the partial obstruction of branches of the same calibre by viscid mucous. Occasionally it resembles the chirping of small birds, or the clicking of a minute valve.

When an abundant secretion is poured into the bronchial tubes, the signs which we have just mentioned in a great measure cease, for the conditions on which they depended no longer exist. The air now traverses a fluid of greater or less consistency, and as the secretion augments, so does the mucous râle predominate and the others diminish. The greater the consistence of the fluid, the *larger* will be the rattle, although it may not be more clearly heard than where the bubbles are smaller. The expectoration is at first serous, ropy, and pearl-colored; it soon assumes a thicker consistence, becomes demi-opaque, whitish or pale yellow, and is mixed with minute bubbles of air.

In the chronic form of simple catarrh the respiration is often difficult when even moderate exercise is taken, and should the disease exist in a considerable portion of the lungs, many of the symptoms of phthisis are developed; and so close is sometimes the resemblance, that none other than the physical signs can furnish an indubitable diagnosis. When the affection is not thus intense, the symptoms fre-

quently yield during the warm months of summer, and the patient flatters himself that he is about to experience a complete restoration to health; but these appearances may be delusive; the disease continues in its latent form, and the return of cold weather brings with it the former and almost forgotten train of symptoms. The sonorous and sibilant râles are but seldom heard, for the tumefaction of the mucous lining has much diminished, and they are replaced by the mucous rattle consequent upon the secretion which now occupies the bronchial branches. Respiration is rarely suspended, for reasons which may be gathered from the last remark; it is diminished however, and may recur again but a moment after, as we have already explained. Occasionally it is observed to be *puerile* in a very great degree, while at the same time the patient may labor under a most disagreeable sense of suffocation. This condition of the respiratory function is remarkable; the instrument would lead us to believe that it is performed in its most perfect manner, but the sensations of the patient induce him to think that it is about to cease perhaps forever. "An increase in the necessity for respiration," are the words which Laennec uses to explain the phenomenon. The appearances of the sputa in the acute form have been related; they now become less viscous, more opaque, sometimes greyish, from a partial admixture with the black matter of the glands; but more frequently white and puriform. This is one of the forms of asthma.

Pituitary Catarrh, is characterized by nearly the same physical signs as the variety of which we have spoken; the tumefaction of the mucous membrane is not so great, and hence arises the little difference which is found to occur. The chest resounds well, and the sibilant and sonorous râles are recognized; respiration is not often suspended although it may be diminished, and why it should be thus is obvious. When the disease begins to yield, the mucous ronchus predominates; but it differs a little from the same râle in simple

or mucous catarrh. It is not so large; the bubbles burst upon the surface of a fluid of less consistence; the expectoration is colorless, transparent and ropy; a foamy or spumous superstratum floats upon its surface, which, when removed, discovers a fluid similar in appearance to the white of an egg, more or less diluted. When this form of catarrh becomes chronic, the sputa remain throughout as they have just been described, and it is perhaps in this rather than in the acute stage, that the affection is characterized by paroxysms. Now it is that the oppression and dyspnœa become excessive, the face is livid, and cerebral congestion to a greater or less extent takes place. During the access, but little or no expectoration is observed; presently it occurs and the patient experiences relief, for the air-cells are freed from obstruction. As time wears on, the paroxysms become more frequent and of longer duration. Expuition is sometimes enormous, and during the intervals of access, the unhappy subject grows more and more pale and emaciated. This is another variety of asthma;—it is the catarrhus suffocans of the nosologists.

Dry Catarrh exists rather in a chronic and latent, than an acute form; and it is so named because the expectoration is at all times scanty; frequently there is so little that the patient will tell you that he does not expectorate at all, and when he does notice it, it is in the morning when he leaves his bed. It is then observed to be of a pearly color, or vitreform, and somewhat globular from the position it may have occupied in the bronchiæ. The chest, as in the other varieties, is resonant; respiration is feeble, or is not heard in the affected points; it then becomes audible where before there was none, and the reverse of this also happens. The sibilant râle predominates, and by reason of the character of the secretion, the mucous rattle is seldom heard. The disease is found to occupy more generally the smaller ramifications, which when obstructed by the tumefaction of their lining membrane or by the viscid secretion, prevents in

proportion to the cause which is acting the freedom of respiration. The subject is asthmatic; and as expuition is more or less easily performed, so is there more or less of dyspnœa.

Emphysema.—Emphysema is of two kinds, the vesicular and the interlobular, and it may be said without the fear of contradiction, that the functional symptoms alone could never reveal the true character of the lesion. M. Louis, to whom we have had frequent occasion to refer, remarked to the writer, that patients from this side of the Atlantic had often sought his advice under the supposition, confirmed by their former attendants, that they labored under phthisis. A closer investigation into the mere functional derangements of the two diseases, ought to have dispelled the error.

The pathology of emphysema is the dilatation and permanent distention of the air vesicles of the lung. To examine with nicety the disposition of the enlarged cells, a dry preparation of the organ should be made; but even in its recent state, the unassisted eye is almost always sufficient of itself to detect the lesion. Upon inspecting the borders of the lung particularly, numerous cells are observed to be enlarged in size, and they vary considerably in this respect. As a general rule, it may be said that they equal in magnitude the head of a common pin; when larger, it arises in some instances from the extreme dilatation of a single vesicle, or from the reunion of two or more consecutive to a rupture of the delicate partitions which separate them. The cells rarely project beyond the level surface of the pleura, and the fact that there is no extravasation of air into the cellular tissue which connects this membrane with the parenchymatous structure of the lung, is amply proved from the impossibility of displacing the collection of air, by any degree of force short of rupturing the cell itself.

When one, or several vesicles united, are enormously distended, their projection beyond the level of the pleura does occasionally occur, and in proportion to the continued

activity of the cause does it increase. Under such circumstances they have been seen to possess a sort of neck or pedicle, and when opened by the knife their continuity with the extreme or ultimate divisions of the bronchiæ is clearly manifest. In the early part of this essay it was remarked, that the parietes of all the hollow organs, when subjected to dilatation for even a short space of time, became more or less hypertrophied. The same thing occurs in the disease under consideration, and it should be borne in mind, for upon this fact depends in some degree the prolonged incarceration of the air within the cells; and for the same reason is it, that when a projecting vesicle is divided its sides do not collapse.

When the chest is opened and the lungs are healthy, they occupy a position along the spinal column, and have evidently receded from the lateral and anterior walls of the cavity. But a very different state of things takes place whenever they are emphysematous; no sooner is the incision made, and the more so proportionably to the extent of the disease, than they forcibly escape from the osseous parietes which contained them;—and when pressed by the fingers, the feeling of crepitation which belongs to them in their natural condition is measurably diminished. In consequence of the severe and prolonged efforts which are made to respire, the blood is thrown back upon the heart and large vessels, and a simple hypertrophy or dilatation with hypertrophy of these organs, is very often found upon examination.

The functional symptoms are dyspnœa, produced by exercise; cough, which is not frequent, and generally attended by very moderate expectoration; when it does occur it is transparent, viscid, and frothy. During the paroxysms, (for this like the different varieties of catarrh is a paroxysmal affection,) the dyspnœa becomes excessive, the lips appear swelled and violet-colored, and cerebral congestion to a certain extent, is added to the train of symptoms. When percussion is made over the emphysematous portions of the lung, a preternaturally full and clear sound is devel-

oped, and as the function of respiration is enfeebled and diminished, if not entirely suspended, by reason of the obstruction to the entrance of the air, and the pressure of the dilated upon the healthy cells, we may reasonably look upon these facts conjoined as affording strong evidence of the existence of the disease. The only case, if reliance be placed exclusively upon these signs with which it can be confounded, is pneumo-thorax. But besides that the absence of respiration is more general in this affection than in emphysema, we have the physical evidences of the catarrhal condition of the mucous membrane, which will be adverted to when we speak of the causes. The râle sibilant, owing to the displacement of the bronchial secretion in the smaller branches is clearly heard, although the respiration is feeble. The dry *crepitant* ronchus is occasionally distinguished, but not often, and appears to arise in vesicular emphysema from the penetration of the air into the dry and dilated cells. A convexity of the parietes of the chest, proportioned to the degree and extent of the diseased lung, is very clearly perceptible; the intercostal spaces are widened, and when both lungs are much affected, instead of the flattened surface which the thorax presents anteriorly, its form becomes circular. The disease may continue for years; it is one of the forms of asthma, the paroxysms of which yield when free expuition is established.

Among the occasional causes of emphysema, may be classed the frequent playing upon wind instruments, and all violent efforts in the execution of which the air is retained within the lungs; the cells are thus dilated, and when such exertions are frequently repeated, the dilatation becomes permanent. To this category may be added pressure upon the bronchiæ from tumors, or their obstruction caused by polypi, &c. But in a very large majority of cases, the disease succeeds to long continued and extensive dry catarrh; and by recurring to the pathology of this form of catarrh, the mechanism of its production is without difficulty explained.

The first step is the obstruction of the more minute bronchial branches, by the tumefaction of their lining membrane and the viscid secretion which results; and as inspiration is performed with more energy than expiration, the air which is inhaled in sufficient quantities to fill at least partially the vesicles during the first process, cannot *all* be forced out when the individual makes an effort to expire. A portion, then, remains, and as the respiratory function continues to be performed, the cells are more and more distended, and ultimately become dilated. As the dilatation is effected and continued, so do the vesicular parietes become hypertrophied; they consequently lose in a measure their organic contractility, and it is not unreasonable to regard this as one of the causes of the permanent retention of the air. Both their own, and the expulsive efforts belonging to the muscles are embarrassed.

Another mode by which dilatation has been accounted for, is the rarefaction of the air after it has gained access to the vesicles. At the moment of its introduction, it is supposed to have lost but little of its atmospheric temperature; this is speedily exalted by the greater animal heat, and the air thus becomes rarefied. The idea is at least ingenious and beautiful in theory, if it be not true in fact.

Interlobular emphysema is produced by the forcible retention of the air consequent upon severe and prolonged efforts, such as the exertions of childbirth, and raising burdens disproportionate to the strength of the individual; obstructions in the larger bronchiæ by interfering with expiration, are also causes of this disease, and children who have been the subjects of croup are now and then affected with it.

The extravasation or infiltration of air into the inter-areolar tissue of the lung, constitutes the real character of this variety of the disease; and the lesion is due to the rupture of the thin parietes of the vesicles. When the extravasation is considerable the air is often seen beneath the pulmonary pleura, and as it may be displaced and moved in different directions by simple pressure, it is very evident that it is not

contained within a distended cell. Single lobes may be surrounded by the air, which is thus retained by means of the delicate cellular partitions which enclose them; or as frequently happens, two or more lobuli are conjoined and isolated, forming as it were a larger lobe around which the air is situated.

When the affection has existed for some time, the cellular partitions which mark out the several lobes, increase in thickness to a line or more; there is in fact a hypertrophy of this tissue, and they may be seen passing in various directions and at different angles, and sometimes parallel to each other; the pulmonary parenchyma, situated between them, is of course healthy, for this is not the seat of the disease.

The chest resounds well on percussion, and if the affection be extensive, the resonance is preternaturally loud; respiration is diminished as the lobes are pressed upon by the extravasated air; but as the resonance is still perfect, we have no reason to suspect the presence of any disease in which sanguine engorgement constitutes the principal feature. The dry crepitant râle with large bubbles is given as pathognomonic of interlobular emphysema; it is supposed with reason, to arise from the bursting of the over distended and weakened air-cells. Dyspnœa is the most prominent functional symptom, and the paroxysms of the vesicular form of the disease particularly, constitute another variety of asthma. The access is occasionally distressing in the extreme, but yields speedily to copious expuition.

Asthma.—When we consider the several forms of catarrh and emphysema of which we have given the succinct history, it appears evident that asthma is in very many instances nothing more than a symptom of an original and independent disease. This fact will demonstrate the importance of clearly elucidating our diagnosis by every available mean within our reach; and it cannot now be questioned that the study of physical signs is the only sure and undoubted resource. Without the aid which these will assuredly give,

every remedial measure must be prescribed at random, and it is time that empiricism should yield to the clear light of reason.

That asthma is sometimes an idiopathic affection we are scarcely permitted to doubt, because cases are reported by those most skilful in the use of the stethoscope, in which this instrument was impotent to detect the slightest lesion; and where opportunities for making examination after death have occurred, no derangement of structure has been observed. To such forms of the disease can alone be appropriated the names of nervous and spasmodic; and nearly every thing that can be said relatively to the pathological condition necessary to the production of symptoms, must from the nature of things be hypothetical.

It is not necessary to our purpose to describe the symptoms of nervous asthma, nor can we advance one step our present knowledge of the subject, by reiterating the oft-repeated doctrine of the deranged and unequal distribution of the nervous energies; whether in such cases the lungs receive more or less than their accustomed portion, who can tell? But there is an idea, first suggested, if our memory does not deceive us, in the very excellent little work of Mr. Teale on Neuralgic affections, that the form of disease now under consideration may be due to an irritation of the rachidian column; and our recollection inclines us to the belief that several cases were treated upon this principle with the most entire success. The point of irritation is discovered by pressing upon the spinous processes of the vertebræ, when some degree of tenderness is immediately felt; and notwithstanding it is impossible in the present state of the science to offer a satisfactory explanation of the fact, yet is it not the less true. As to ourselves we have met with no case referrible to a spinal lesion, and therefore speak not from any experience of our own.

Although, as already remarked, it is incompetent for the instrument to detect any structural derangement, yet does it

reveal a singular peculiarity in the respiratory function. While the patient is gasping for breath, and suffering all the agonies of an anticipated suffocation, the respiration as studied through the medium of the stethoscope, appears to be carried on with more than its usual intensity; the sensation is experienced by the observer, as if the vesicles were distended to their utmost, by the rapid and unobstructed ingress of the air; it has become eminently *puerile* in its character, and it must be from some derangement of the nervous influence, that this increased necessity for respiration is awakened. As soon as the paroxysm has finished, the gentle respiratory murmur of health is again recognized. It is not pretended that puerile respiration is alone heard in simple nervous asthma; in the case of chronic dry catarrh, where dyspnœa is the predominant symptom of the paroxysm, it is often observed, and there is no other way of accounting for its production, than by admitting the accessory influence of nervous derangement.

Many years since, before pathological anatomy had asserted its just claim to the elucidation of disease, every attack of asthma was supposed to be spasmodic; and although subsequent research has abundantly demonstrated the falsity of the hypothesis, yet is there reason to believe from the structure of the bronchial branches, that there are cases which belong to this category. Lauth, Reisseissen, and other anatomists, have proved the existence of circular muscular fibres in the minutest ramifications of the bronchiæ, and analogy might lead to the inference that they entered into the formation of the parietes of the air-cells. A similar train of functional symptoms belongs to this, as to the other varieties of asthma; and when spasm, either of the smaller bronchiæ or the air vesicles, or both at one and the same time exists, the entrance of the air is impeded, and respiration must be more or less diminished. It occurs in many instances, that traces of slight catarrh are discoverable by the instrument, but not sufficient to account for

the paroxysm. Whatever influence this circumstance may possess, it should be regarded as acting conjointly with the more active one of spasm; and if it be allowable to draw a pathological deduction from the effect of a remedial agent, this explanation might be considered as at least plausible. We have in our eye the case of a medical gentleman, in whom the affection was probably altogether catarrhal in its origin, for there is expectoration; the paroxysms of the disease are both relieved and rendered less frequent by the anti-spasmodic virtues of tobacco. We speak problematically, for we have made no examination.

Dilatation of the Bronchiæ.—The researches of modern observers have proved not only the existence, but the frequent occurrence of this disease. Resembling as it does in a certain stage of its progress, phthisis pulmonalis, it is more than probable that it may frequently have been mistaken for that affection; and the error must have remained always uncorrected during life, had not the discovery of physical signs directed us to a certain knowledge of the lesion.

Dilatation of the bronchiæ assumes various forms, and where there is a simple enlargement without alteration in the form of the branch or branches, it often requires the most careful and minute examinations to detect its presence; where this is the character of the alteration, the dilated branch is larger than the one from which it springs, which is never the case in the natural progression towards their ultimate divisions. Sometimes the branch forms a sort of cul-de-sac, at the bottom and sides of which may be noticed the orifices of several smaller bronchiæ which preserve their normal diameters. In other cases the natural form of the tube is altered; a single or several successive cavities are observed in its course, and many contiguous branches may be affected in a similar manner. The mucous membrane of the diseased bronchiæ, seldom or never remains in tact; it becomes generally or unequally hypertrophied, soft, and of a red or deep violet color. Occasionally the entire parietes is

observed to be extremely thin, and resembles in its tenuity the pellicle of an onion. The cellular layer, external to the branch and connecting it with the pulmonary tissue, is frequently rendered firm and dense, and around the smaller ramifications seems to be almost cartilaginous; and the intermediate parenchymatous structure is compressed, deprived of air and flaccid, assimilating itself in appearance to that condition of the lung which is the effect of pleuritic effusion. The minute bronchiæ are oftener dilated than those of larger calibre, because in the latter, expuition is more easily performed, and in a majority of instances the superior lobe becomes the principal seat of the affection; rarely is the entire lung diseased.

The stethoscopic signs which result from this lesion are generally so well marked, as to leave us free from all doubt. Should a case occur wherein all or nearly all the bronchial branches are dilated, the resonance elicited on percussion would be duller than natural; for there would be pressure upon the pulmonary tissue in numerous points, and the vesicles could not receive their due quantum of air; but this in truth is very seldom observed, because it rarely happens that the disease is so extensive. Confined to a smaller space, the variation from a healthy sound is scarcely appreciated; but the respiration is bronchial, and bronchophony exists, both referrible to the pressure exerted upon the surrounding tissue by the dilated branch, preventing the free ingress of air into cells, and thus causing an unnatural vocal and respiratory resonance in the affected part. When the dilatation is somewhat considerable, nearly freed from its secretion by recent expectoration, and the surrounding portion of the lung measurably hardened, pectoriloquy in its most perfect form is added to the signs just mentioned; thus, the first intonation of the voice is heard resounding in the cavity, and appears distinctly to pass through the instrument and enter the ear of the observer. The mucous râle with large bubbles is produced by the air rushing into the cavity, which

if it has become extensive, gives to the respiration the peculiar sound which is called *cavernous;* and the same character under similar circumstances belongs to the cough; when there is no cavity but simply a dilatation, the resonance of cough in consequence of the pressure, is confined and limited to the diseased part; and we have that variety denominated *tubular* or bronchial cough. If the dilatation be situated near the surface of the lung, and the secretion be not in too great a quantity, respiration, cough, and the voice, give the sensation of the *veiled-blowing;* something like a thin veil seems to interpose and prevent the passage of the air into the ear; the superior or external wall of the cavity must be thin, and free from compression and hardness. Diffused bronchophony is heard when the dilatation extends to several neighboring branches, and is not very great in any.

The functional symptoms are wholly inadequate of themselves to establish the diagnosis. The pulse is scarcely ever disturbed, and respiration is performed as usual, unless the patient uses active exertion; the expectoration is at first mucous, ultimately puriform, and occasionally it is passed up in large quantities. When there exists a large cavity, the stethoscopic signs denoting its presence, are exactly those of a tuberculous excavation; and how are we to distinguish? In the first place, if phthisis were the disease, we should frequently have the physical signs of the tubercles in their various stages of development, in other portions of the lung or in both lungs; for when excavations have formed in the superior, they (the tubercles) almost always exist in their crude condition to a greater or less extent in the inferior lobes. Another important distinctive character is, that in dilatation of the bronchiæ, there is little or no *emaciation;* while in phthisis the function of hæmatosis is so seriously deranged, that it sooner or later supervenes. Upon this single symptom have we seen the diagnosis based, and autopsy proved its correctness. The patient died of an acute

disease; but the discriminating tact of M. Louis, is sufficient to detect the minutest lesion in organs, when there are but few functional evidences of their derangement.

The cause which seems to predispose the bronchiæ to become dilated, is the prolonged continuance of catarrh; and as it depends too upon the *amount* of expectoration, the disease is observed to succeed with greater certainty to the chronic and mucous form of that affection. The secreted matter remaining in the bronchial branches for a certain time, necessarily tends to expand and dilate them; and as the natural tone of health is diminished more and more by the persistence of their catarrhal condition, the dilating influence of the collected sputa increases imperceptibly from day to day. This influence is also continuous; for no sooner is expuition of the contained secretion accomplished, than a new collection occupies its place.

It is not a little singular that pressure upon an organized and vital part should produce the very opposite conditions of hypertrophy and tenuity; that the fact is so, we have a right to believe, because the agent is clearly discernable, and the minutest inquiry has hitherto been unavailing in detecting any other. That circumstances may exist so intimately blended with the vital actions as to escape observation, may certainly be true; and all that we can now do, is to acknowledge the fact, and hope that at some future day the gradual progress of science may dispel the difficulty.

We now see why it is that an extreme thinness of a branch is sometimes observed on the one hand, while on the other, hypertrophy with dilatation results; both in the present condition of our knowledge referrible to the same cause. Hypertrophy, however, occurs from a simple increase of nutrition; and this circumstance has led M. Andral to imagine that in the case of a dilated bronchiæ, it may sometimes be viewed as the first link in the chain of causes; an augmented secretion of the affected part supervenes, and dilatation follows.

Pneumonia.—The labors of the pathologist have very clearly demonstrated the lesion which constitutes this disease, and traced out by appropriate signs, the differences which belong to each of its stages. The first is that of simple engouement, as contradistinguished from sanguine engorgement; it is an infarcted condition of the parenchyma, which is heavier, and firmer, and more compact, than in its natural state, and still crepitates more or less when pressed between the fingers. There is a veritable effusion into the pulmonary tissue, serous and sanguineous in its aspect, which permits the pitting of the lung on pressure, and which flows out abundantly when the organ is incised.

When induration succeeds, crepitation is no longer felt; the inflamed portion is much more firm than in its stage of engougement, and assumes that peculiar liver-like appearance, from whence is derived the name of hepatization. Make an incision into the lung and it is seen to be red, greyish, or violet color; an evident resistance is felt to the passage of the knife; the cellular partitions, insulating the several lobes, seem to have remained untouched, and are the more clearly discernable by the contrast; the serosity is much diminished in quantity, thicker and more bloody, and may be scraped from the cut surface by the handle of the scalpel; matter slightly puriform, is occasionally pressed out. A very singular appearance of the tissue is its granulation; and this characteristic seems to be one of the distinguishing marks between heptization and carnification. It is the result of the thickened and distended parietes of the minute air-cells; their forms are perfectly appreciated, and their color is either red or grey, from which the terms red or grey granulation are now admitted into medical language. There is no *dilatation* of the vesicles, or if there be, it of course passes away with the subsidence of the inflammation.

Purulent infiltration is the last link (if we exclude abscess) in the chain of cause and effect. The parenchyma still retains its hardness and its granulated aspect; yellow

points are at first observed, and as these spread and coalesce, the whole diseased mass becomes of a pale yellow colour. The lung is now softer and the granulations begin proportionably to disappear; and a viscid, opaque and puriform matter may be scraped off with the scalpel. We have said that the affected portion of the lung is of a pale yellow colour; yet it is not always so, for as the black matter which belongs to it in a state of health abounds, so does it influence the appearance of the organ. Upon this fact depend the variations of colour so frequently observed in the several stages of the disease; the hepatization is dark red, or ash colored, or grey, as it is absent or present.

Purulent collections or vomicæ are very rarely found as the termination of pneumonia, notwithstanding all that has been said by the numerous authorities upon this subject. Laennec very seldom indeed met with them; Andral bears the same testimony to their infrequency, and we heard M. Louis remark, that he had seen them but two or three times among the very numerous dissections which he had made of pneumonic patients. Whenever they have occurred, the disease has been partial and confined to one lung; were it general in one, and for a still stronger reason in both, death might take place from the serious impediment to respiration, before the stage of suppuration could supervene. This species of vomicæ differs essentially from the tuberculous excavations of phthisis; in the former the surrounding tissue is soft and infiltrated with pus, while in the last this is never the case. These will hereafter be described.

Observation testifies to the fact, that pneumonia more frequently invades the right lung than the left, and the inferior rather than its superior portion; of this truth we shall make further use when we speak of phthisis. When the different stages of the disease exist at the same time, (which they may do,) it is observed to be more advanced in the lower part of the organ, and it has occasionally been seen to occupy separate lobes, while the tissue intermediate

to these remains healthy. To this condition the name of lobular pneumonia has been assigned.

Chronic inflammation of the respiratory organ is not often met with, at least in its uncomplicated character; for the tissue is so vascular, that the disease if not arrested speedily, hurries on through its several stages. As an original affection, or one succeeding to the acute form, it is therefore of rare occurrence. It is a more frequent attendant upon gangrenous eschars and tuberculous excavations; the surrounding parenchyma is of a livid redness, and so firm that it grates beneath the scalpel; the granulations are also much more distinct than in acute pneumonia. When latent it is almost always complicated with some original disease; as pleurisy for example, thus forming a pleuro-pneumonia of which we have already spoken; with many of the eruptive fevers and chronic affections, and when consequent upon important surgical operations, it is often the cause of death.

We shall not lengthen our remarks by relating the general and functional symptoms of pneumonia, but would merely refer to what has been said when treating of pleurisy, to show that there is occasionally a little difficulty in distinguishing the two diseases, particularly in their early stage. There is one however which we cannot omit, for we believe it to be peculiar to pneumonia; we allude to the expectoration, and so much dependence do we place upon this, that we have frequently foretold the character of the disease, before resorting to other means.

When the sputa are collected in a vessel, they form a thick and tenacious mass, and adhere very intimately to its sides. Their aspect varies according to the stage of the disease; they are frequently intermixed with blood; of a yellowish striated appearance; seldom or never do they fail to assume the color of the rust of iron, all of which is no doubt owing to the variable quantity of blood contained in them. Bubbles of air are seen floating on the top, and thus remain for a length of time, on account of the viscidity of the secretion in

which they are contained. When induration is completely established, they become less viscid and less frothy; and during the period of purulent infiltration are mucous in their character; sometimes they are puriform.

The stethoscopic signs which belong to pneumonia vary according to its different states. In its first, or that of simple engouement, the *crepitant* rattle is alone heard; small bubbles are heard to burst upon the surface of a thin fluid at equal intervals of time, and the sound resembles the crepitation of salt when thrown upon the fire;—it is produced by the air passing into the cells containing a serosity more or less sanguineous. The thorax still affords a resonance on percussion, and the respiratory murmur is yet audible, although its intensity may be diminished. The surface over which the râle is detected, marks out exactly the extent of the disease. In proportion to the accession of hepatization does the crepitant ronchus diminish; this appears to be first established towards the centre of the affected portion of the lung; for while the signs which denote the induration progress, the crepitant râle may yet be distinguished in the surrounding tissue. In the hepatized part the murmur of respiration is gone, nor as we have just said, is there any râle; percussion yields a dull and flat sound, and bronchophony and bronchial respiration succeed. The former belongs to the voice; its resonance is no longer general for the part is engorged, and it only takes place in those bronchiæ which remain still unobstructed, and from whence it is transmitted to the ear through the medium of the hardened tissue; the same anatomical condition explains the production of the latter. Bronchial cough depends upon the same circumstances. When the hepatization surrounds one or more bronchial tubes which pass very near to the surface of the lung, the observer easily appreciates what has been called the *blowing respiration;* the air seems as if it were drawn from and then thrown back upon the ear during the process of inspiration and expiration. Why it is only heard when the induration is seated near the

surface of the organ, is readily understood from what has preceded. Should the disease have advanced to the stage of purulent infiltration, the mucous râle supervenes, and it is heard now for the first time; if it existed before, and it is nearly certain that it must, for the lining membrane of the bronchiæ contained within the affected portion of the lung is always found to be more or less inflamed, it has been masked by the greater intensity of the bronchial respiration. This then is one of the conditions upon which the râle depends, and it is also due to the *occasional* passage of puriform matter into the tubes as shown in a few instances by the appearance of the sputa. That it is not indicative of simple catarrh, we know from the preceding signs and those which still exist.

The signs of abscess are several; thus we have pectoriloquy either perfect or imperfect, the blowing respiration or the veiled blowing, if the side of the vomicæ be soft and thin and near the surface, all of which have been before explained; the mucous râle in the neighboring ramifications also occurs, together with the cavernous râle, cough and respiration. The cavernous or *gurgling* is a variety of the mucous ronchus; as its name imports it takes place in an excavation containing a puriform secretion, whether it be pneumonic, gangrenous, or tuberculous; the bubbles are larger and more abundant, and offer to the ear the distinct impression that they occur within a circumscribed cavity. The word *gargouillement*, expresses the same idea; and as there is more of euphony in the sound than in its English synonyme, we shall hereafter adopt its use. The cavernous respiration and cough, produced as they are within a hollow space, convey by the simple expression of the terms the ideas attached to them. Wherever gargouillement is heard, they, with pectoriloquy are found.

Resolution of pneumonic inflammation may occur at any period of the disease. Does it happen before hepatization is established,—the crepitant râle diminishes more and more, and the respiratory murmur becomes more distinct. If indu-

ration has taken place, the crepitant ronchus is substituted for bronchophony and bronchial respiration, and to the former finally succeeds the vesicular murmur of health; and should the affection not yield until the absorption of the purulent infiltration has commenced, the mucous gives place to the crepitant râle, and by and by normal respiration returns to the now healthy tissue; in some instances a slight œdema of the lung (the affected part) continues for a longer or shorter time.

Pulmonary Apoplexy.—This is the hæmoptoic engorgement of some, and perhaps the name would be more appropriate than the one here adopted; we have chosen it because it is in more general use. The analogy by which it is retained, is derived rather from the character of the lesion than from its effect. Occasional instances, however, of sudden death have been reported, where a true rupture of some pulmonary vessel was discovered upon examination.

The pathology of pulmonary apoplexy, is a sanguine exhalation into the parenchymatous tissue. Seldom or never is the entire organ affected, but the lesion is confined to a portion of the lung a few inches in extent, and the middle and inferior lobes are oftener than the superior the seats of the disease. The engorgement is sometimes so completely circumscribed, that the parts surrounding it are in a state of perfect health; but this is not always the case, as the infiltration of a sanguineous serosity upon which, indeed, one of the signs depends, has been observed. The engorged portion is of a dark red or brown color, and although granulated, yet is its aspect very different from that of pneumonia; the grey or ash colored appearance is never seen as in that disease, nor are the cellular partitions which mark out and define the several lobes; the tissue is here much harder, and both the bronchiæ and blood-vessels are found not to differ from the general color of the affected part. The centre of the mass often contains a coagulum, and the veins are more or less filled with blood in a state of partial coagulation.

The termination of hæmoptoic engorgement takes place generally by simple resolution; the parenchyma becomes gradually paler and softer, and the murmur of respiration is finally established. When the exhaled blood, however, is not perfectly absorbed and a coagulum remains, morbid alterations similar to those which occur in cerebral apoplexy are detected. The clot acts as a foreign substance; the neighboring tissue softens, suppuration follows, and in this way an excavation may be formed, the signs of which are now known. If ramollissement should not supervene, an accidental membrane is sometimes developed and the coagulum becomes encysted. M. Laennec, the cousin, has shrewdly intimated that this mode of termination may have been mistaken for true melanosis.

Spitting of blood is the most prominent sympton of pulmonary apoplexy, and when it is poured out by the mouthful, as it sometimes is, we may at least *suspect* the character of the disease. But rarely is it thus abundant, and the knowledge of its physical signs becomes then of great importance; for there is an expectoration of blood in other and very different affections, as in phthisis and bronchial hæmorrhage. Indeed, it very often happens that the irritation consequent upon the presence of tubercles determines repeated hæmoptisis; and the subject is then clothed with a double interest,—to both the patient and his physician.

When the engorgement is completely established, percussion yields a dull and flat sound, and there is an entire absence of respiration of all kinds in the engorged part. The crepitant râle is heard whenever the surrounding tissue is in a state of serous infiltration, and the mucous ronchus also exists, depending upon the presence of sanguine exudation in the neighboring bronchial branches. The general and functional symptoms are not mentioned, because they are universally known, and we will not hesitate to admit that cases may occur in which they may throw much light upon the diagnosis.

Consumption or Phthisis.—Commence we now a short history of this fell destroyer, whose fearful invasion no mortal arm can arrest, and yet whose flattering and hope-creating progress even to the very grave, would lead his victim to believe that he comes not to kill. The young and the beautiful are they who bow to his relentless decree, and while affection mourns over their too early doom, still is there something in such a fate to soften and hallow the deep gushings of the heaving breast. Some project of ambition may be blasted ere time could hurry on its completion, some dear dream of hope interrupted, some plighted vow may perish which no worldly circumstance could change, some widowed heart may sorrow in its young desolation, and they go down to the tomb in the very spring-time of life; no dross of earth has sullied the soul's first and purest aspirations; the warm burst of youth cherishes and consecrates its friendships till life has ceased, and the "callousness of age" has not yet hardened the heart impatient to be free. Pardon us, if these hasty reflections have crowded themselves upon us here; already have we consigned to earth's embrace one whose virtues endeared her to us, and we even now feel that the same destiny but too surely awaits another!

We will advance the opinion founded upon some observation, that no man, whatever may be his experience or professional acumen, can unequivocally pronounce upon the existence of phthisis in its early stage, if assisted only by its functional and general symptoms. For months may it assume the appearance of simple catarrh, the patient preserving a good mien and his appetite and strength unimpaired; nor would one be led from the character of the expectorated matter to suspect that a fatal disease had commenced. In truth, when the affection has made further advances and veritable pus is secreted, still can we not say with certainty that phthisis exists; for in chronic mucous catarrh, as was before remarked, we may have all the appearances of purulent expectoration. Hæmoptisis, too, which is so frequently but

a symptom of this disease, we feel well convinced has not always awakened that alarm which its repeated occurrence might justify. That spitting of blood may happen, and the patient yet recover entirely so as to enjoy uninterrupted health for years, we surely know; but here, it is the product of inflammation of the bronchial mucous tissue, or of hæmoptoic engorgement; and how important is it for the individual's tranquillity and the reputation of his attendant, that the diagnosis should be clear and unembarrassed by even a shade of doubt.

To do more than connect together at this time a few facts in the history of phthisis, is not our intention; a simple glance, however, at the formation of tubercles will be given, and we shall, as the question requires, relate the various physical signs indicative of its several stages; signs, which leave us not the slender happiness of suspense.

The very great importance of this mode of examination is further made manifest by the fact, that phthisis may proceed throughout its whole course and terminate fatally, and yet many of its rational symptoms may never have been revealed; the health is suffering from some cause or other, but there are not symptoms to indicate the lesion. Thus, Portal tells us he has met with cases in which the lung was even destroyed by suppuration, and yet there was no cough and consequently no expectoration; and in a very recent work published by Dr. Clark, similar instances are reported; and in one, particularly, where there had not been from the commencement to the end, the slightest cough, the lung upon one side was found crowded with tubercles, and upon the other numerous small cavities, and one large excavation was discovered. Louis offers evidence to the same fact. Besides, the *symptoms* are frequently very much mitigated or even temporarily suspended by the accession of other affections. Acute diarrhœa, dyspepsia, mania, and pregnancy have been found to induce such modifications as those to which we have just alluded. These are its latent forms.

The continuance of the disease is very variable. Bayle traced it through the long period of forty years; sometimes a few weeks are sufficient to cause the patient to succumb; but it is probable that from eighteen months to two years may be regarded as its mean duration. From these facts the division of consumption into its acute and chronic forms is seen to be strictly true, and its earlier or later termination will depend upon the violence of the morbid process, the original feebleness of the subject's constitution, or upon both conjoined. Cases of acute phthisis are by no means rare; the cough is troublesome, even violent; neuralgic pains about the chest, or those produced by the supervention of partial pneumonia or pleurisy occur; and the sympathetic action of the heart and arteries is prolonged and intense. These symptoms are protracted or renewed from time to time, by successive *crops* of tubercles; for while those which were first developed have proceeded to the condition of consolidated masses, or even to ramollissement, others may arise in portions of the lung hitherto untouched.

The chronic form of the disease may be said to last from four to six years or longer. The symptoms are all moderate in degree; the development of tubercle is slow, the number of them generally small, and it is occasionally remarkable to what an extent the patient retains his strength and good appearance. When the stage of tubercular maturation arrives, the resulting cavities are often of moderate extent; and sometimes there is a different transformation, viz. the conversion of tubercle into a chalky or calcareous substance. Two examples of prolonged phthisis have fallen under our observation, in both of which there was a quantity of calcareous matter expectorated; in the one the sputa were seldom seen to be puriform, and in the other, which still exists, they have not yet assumed that aspect. In the acute form we have never remarked a similar fact, nor do we now remember to have seen it noticed in the reports of others. Reasoning, then, from these few data, (not enough, perhaps, to deduce

a certain general conclusion,) we are inclined to the opinion that when chalky concretions are expectorated, we may regard such cases as those which will not speedily terminate; the reasons will be more fully expressed before we have concluded.

Tubercle always, or very nearly so, makes its first appearance in the upper portion of the lung; and it is consequently beneath the clavicle and above the spine of the scapula, that we are to direct our earliest attention, when we proceed to the examination of the physical signs. When speaking of pneumonia, the remark was made, that the lower portion of the lung was more frequently the seat of that affection than any other part; and we drew particular attention to the circumstance for the reason which we shall now mention. In latent pneumonic inflammation particularly, and in the first stage of phthisis, the stethoscope reveals very much the same signs; the respiratory murmur is replaced by bronchial respiration; diffused bronchophony and dullness upon percussion are found, and we have already seen how little is to be gained from a dependence upon general and functional symptoms. Now, the knowledge of the fact, that the one, as a general rule at least, occupies the upper and the other the lower and middle portions of the lung, will assist us in the endeavor to arrive at the true state of things. When, however, the crepitant râle is detected, (belonging as it does to pneumonia,) there can scarcely be room for further doubt; and the importance of the diagnosis is great, inasmuch as the treatment depends upon it; the one is certainly curable if proper measures be employed, while relief of the other is hopeless in the extreme.

Another singular circumstance in relation to phthisis, is that the disease commences in the right much oftener than the left lung. Is there any thing by which we can account for this; in the fact that the right division of the trachea is shorter and possesses a greater diameter than the other? If irritation produced by external agents floating in the atmos-

phere, be considered as the exciting cause of the development of tubercle, we might admit their easier introduction into the right lung upon anatomical principles. But the influence of irritation is a still mooted point, and perhaps the best authorities upon the subject would discard it altogether. In a late number of Johnson's Medico-Chirurgical Journal, there is a review of M. Louis's work upon phthisis very recently published, in which the writer asserts that the *left* lung is said by Louis to be the one in which the disease more frequently begins. We have not yet had an opportunity of seeing the work in question, but we feel assured there must be an error somewhere; for a long time we witnessed the autopsies and heard the clinical lectures at La Pitié, and the impression left upon our mind is, that the right lung, in a vast majority of instances, offered a greater extent of disease than the other; and in six cases observed by us within the few last months, five of this number gave evidences of the correctness of the opinion.

Secondary lesions are scarcely ever absent. The most frequent, perhaps, is met with in the intestines; tubercles are developed similar to those found in the lungs; these sometimes ulcerate and open into the cavity of the peritoneum, and the patient is thus destroyed. Frequency of the intestinal discharges is the first symptom of their existence, and indeed the colliquative diarrhœa of the latter stage of the disease is the result of this cause; the internal coat of the intestine to a greater or less extent is red, and there may also be ramollissement of this tissue. Ulcerations along the course of the trachea and within the larynx, are very common; they are produced by the continual passage of expectorated matter, and the fact would appear to derive proof from their location; the posterior surface of these organs being most generally affected. We here see the reason why phthisical patients often become extremely hoarse, and when ulceration has attacked the vocal cords the voice is nearly extinct. Partial pleurisies arise from the develop-

ment of tuberculous masses in the substance of the membrane, or from consecutive implication by reason of its contiguity to the parenchymatous tissue. In such a case the symptoms and signs are such as have been described under the head of pleuro-pneumonia; the *sudden* accession of pain will also lead us to suspect the true lesion. The integrity of the pleura, too, may be destroyed by tuberculous ramollissement, and a fatal pneumo-thorax be the consequence. Tubercles, simultaneously with their presence in the lungs, have been found in every organ of the body; the muscles themselves do not invariably escape, nor do the bones. A fatty matter is occasionally developed in the hepatic parenchyma, and extreme emaciation gives a ghastly appearance to the unfortunate subject.

Bodies distinct and isolated, or infiltrations into the pulmonary tissue are the forms in which tubercle developes itself. The miliary variety is by far the most common; their size varies, but as the name imports, is generally equal to that of millet seed. There is also much diversity in form, as they are found either round or irregular. When seen in the first stage of formation, they present the appearance of small, greyish, demi-transparent grains, imbedded in the parenchyma of the lung; they are often united in groups from their earliest existence, and still oftener does this arrangement take place by a gradual enlargement, as they proceed towards the stage of maturation. When the transformation commences, a small yellow point is perceptible in the centre of each tubercle, and advances towards the circumference, agreeably to the observation of Laennec; while other and later authorities insist that it may begin in any part of the tubercle. Even after groups are formed, if an incision be made, numerous yellow spots are discoverable, surrounded by the original grey and nearly transparent matter; and when the entire mass has become changed into this yellow substance, the now homogeneous collection assumes the character of *crude* tubercle. The parenchymatous tissue in

which it is situated is still perfectly healthy ; it may undergo, indeed, a physical change which will be alluded to hereafter.

Another variety is the granulated tubercle, which differs from the miliary in several particulars. The size may be about the same, but its transparency is perfect, and it is remarkable for its uniformity of volume ; it is round or oval, seldom or never irregular, and there is not often a union of many individuals by which groups are formed. Whenever they are formed into masses and a division is made with the knife, each tubercle is observed to be still isolated by the intervention of very delicate cellular tissue. After the lapse of some time they become opaque and yellow, and the collection becomes uniform.

The infiltration of a gelatinous looking substance is also one of the modes of tuberculous formation ; but it is rarely seen unless accompanied by one of the varieties already mentioned. It appears in transparent masses not unlike jelly, and nearly of the consistence of cartilage. As the disease advances, these assume a greyish color ; and it is thus beyond a doubt that the grey infiltration is produced, which has been referred to by some as a distinct variety. In this state it is still more consistent than it was originally, and when cut, the surfaces present a firm and smooth aspect. Small yellow points, as in other cases, are developed in various parts of the mass, and as these increase, the whole is finally converted into crude tubercle.

All these forms are probably the result of morbid secretion ; but we shall not here attempt to collect the arguments on either side of the question. That tubercles arise uninfluenced by hereditary predisposition, we are much inclined to doubt ; for we never yet have met with the individual who could not refer to some member of his family as having been affected with a disease similar to his own.

From the state of crude tubercle, the next step is that of ramollissement, which would appear to commence indiffer-

ently at any point of the mass. Sufficiently soft at first to be easily flattened by pressing it between the fingers, its consistency now lessens, and it becomes unctuous to the touch; then more liquid, and may ultimately partake of the appearance of pus. Sometimes a more liquid matter is formed, and caseous particles are intermixed with it. Excavations, varying in extent, result from this ramollissement, and tubercles in their yet crude condition are seen scattered around them. As was before remarked, the transformation is not invariably puriform; sometimes calcareous concretions are formed and appear in the expectorated matter.

As the disease progresses, the ulcerated cavities become larger and more rugged by the gradual softening of neighboring tubercles, and thus approach nearer and nearer to the surface. Portions of pulmonary parenchyma not yet destroyed, frequently extend from one part of the excavation to another, forming, as it were, distinct columns which bear no forced resemblance to the internal structure of the heart. These have been mistaken for bronchial branches, but repeated examination proves that they possess no calibre; the bronchial tubes open upon the sides of the cavity, and there they are arrested. Blood-vessels are seen to creep around the excavation, but their branches, like those of the bronchiæ, extend no further; they are obliterated with the increasing ulceration. After some time a false membrane is observed to form around the walls of the excavation, which, in accordance with the opinion of Bayle, is believed by some to secrete pus; this fluid is also secreted without doubt by the lining membrane of the bronchiæ which open into the cavity, for they are constantly found inflamed. The false membrane is white and opaque, and is sufficiently soft in the general to be scraped off by the handle of the knife; it may be thicker in some points than in others. Occasionally it becomes demi-cartilaginous, and another membrane, as first described, is thrown out beneath it. It oftener happens than otherwise that no membrane is formed; and when this is the

case the sides of the excavation are hardened, and frequently studded with tubercles. Anterior to their maturation the false membrane is sometimes produced, and they thus become encysted.

The extinction of phthisical predisposition we believe to be impossible; but we are willing to admit that it may remain dormant for years, and death from other diseases, in persons thus disposed, may have induced the belief that in them it never existed. And what are we to say to the question, Is Phthisis ever *cured?* That the lesion upon which the symptoms depend, both functional and physical, is *sometimes* arrested, we know, for we have seen one case and read of several others. But it is after all only a suspension of the disease, which may return at a longer or shorter interval, for the predisposition has not been destroyed. Happy, however, the unfortunate who may receive this temporary reprieve.

The tubercular excavation may be obliterated by the formation of a true cicatrix. Laennec and others report several examples of this kind. While the excavation yet existed, the physical signs demonstrated its location; these have passed away with the returning health, and death from some other cause, or the re-appearance of phthisis at some subsequent epoch, has enabled the observer to detect the mode of restitution which nature had adopted. The resulting cicatrix is demi-cartilaginous or cellular, and there is a slight depression in the portion of the lung where it is situated.

But the most usual mode of termination, is perhaps that of the formation of false membrane around the walls of the excavation. The membrane is no longer soft but becomes demi-cartilaginous, and resembles the lining structure of a fistula; the cavity is empty, and pus is no longer secreted from any source; or if it be, it is in consequence of the chronic inflammation of the neighboring bronchial branches which has not yet disappeared. We witnessed, as we have said, one example of *apparent* recovery from phthisis, and this was the form under which the amendment took place.

A large excavation existed at the top of the right lung; pus was expectorated in quantities, and the emaciation was considerable. By and by the symptoms gradually diminished, together with the signs indicative of excavation containing *a fluid*, and the patient began to recover her strength and embonpoint; the cavity however was not obliterated; it was now converted into a fistulous opening as shown by the stethoscope, for the cough and respiration continued to be cavernous.

The sputa of the consumptive patient can never enable us to arrive at a proper conclusion. Like the expectoration of catarrh, this too is at first nothing but mucous; like catarrh still in its chronic form, it subsequently becomes puriform. Rarely does it happen that particles of tubercle are expelled; the secretion ultimately assumes a pale yellow or ash color, and unites into masses in the vessel containing it. Towards the close of the disease it is opaque, and is frequently moulded into large globules, in consequence of having been impacted in the bronchiæ.

The physical signs made manifest by the stethoscope, vary according to the stage of the disease. While the tubercles are yet miliary, anterior to the formation of crude tubercle, the functional symptoms may entirely fail us; and perhaps the same may be said also of the other means, by which alone we could form an opinion. But the condition of things changes materially so soon as the tubercle increases and becomes crude. The surrounding parenchyma rendered more firm and dense by pressure, and the vesicles being prevented by the same cause from receiving their accustomed quantum of air, two modifications in the respiratory function immediately ensue. The respiratory murmur ceases to be heard in proportion to the extent of the cause, and respiration is weakened in the affected part; or the passage of the air through the bronchiæ may be appreciated by the ear to which it is conveyed with more certainty, as the pulmonary tissue is more dense;—in other words, there is bronchial

respiration. A diffused bronchophony too is manifested when the patient speaks, and there is an evident dullness of sound on percussion. After the tubercles have begun to soften, the same signs still persist, because ramollissement has not yet advanced sufficiently far to produce an excavation.

When this however has formed, gargouillement, which is a variety of the mucous râle, is produced both by the cough and inspiration; and as the cavity becomes more empty by expectoration, the respiration and cough are ultimately cavernous. Bronchophony is still heard approaching to pectoriloquy. The resonance too, elicited by percussion, which before was dull, is now clear and distinct, and may indeed be more so than natural; and gargouillement may be made to appear, by gently striking upon that part of the thorax situated immediately over the excavation. When this has approached near to the surface of the lung, the same method of exploration produces a resonance which has been compared to the sound proceeding from a *cracked vessel.* The impression made upon the thoracic parietes is imparted to the superior wall of the cavity, which being suddenly compressed, causes the air to rush with greater or less violence through the small bronchial tubes which communicate with it, and the unassisted ear appreciates the sound which ensues. Blowing respiration, the veiled blowing, and pectoriloquy, are all heard after the cavity has formed, provided other circumstances necessary to their production, at the same time exist, all of which were formerly explained.

When the excavation is complete, that is, when it no longer contains any puriform matter, gargouillement entirely ceases, but the respiration and cough remain cavernous. Pectoriloquy is now heard in its most perfect form if the cavity be not too extensive, for then the resonance of the voice becomes too much diffused; and if the bronchial tubes which open into the excavation are at any time obstructed, it may for the moment be entirely suspended. Should an

opening take place into the cavity of the pleura, pectoriloquy ceases altogether.

Nor, as said above, if the excavation be very large is it heard; but this sign is replaced, if the cavity contains only a small quantity of fluid, by the metallic tinkling and the amphoric sound. The first is produced by the agitation of the air contained in the cavity, when the patient either speaks, coughs, or inspires; the other appears to depend upon the existence of two or more fistulous communications between a similar excavation and the bronchiæ, and is produced by the same means as the first. Under such circumstances, the other signs of a tuberculous cavity are also present, except as we have just remarked, the pectoriloquy.

Having already extended our remarks further than it was our intention originally to have done, we shall say but a few words on the subject of affections of the heart. It has been our wish, however, to lay before the Committee all the most important physical signs, and the diseases which have been selected, appeared to us best calculated to effect this object. For the full completion of this purpose, all that now remains for us to do may be accomplished within the compass of a few pages.

Pericardium.—Inflammation of the serous membrane covering and surrounding the heart, may be either acute or chronic; and the product of this inflammation, like that of the pleura, may be a membraniform exudation, or the secretion of a serous fluid or pus; or both the exudation and the liquid effusion may exist at one and the same time. This plastic exudation is rather more consistent than that of pleurisy, and in consequence of being of unequal thickness, it frequently has a mamillated appearance. A general redness of the membrane is less often observed in acute than chronic pericarditis; but the albuminous secretion is spread over both surfaces. Adhesions may take place as in pleurisy. The chronic form of the disease is uniformly attended by a collec-

tion, varying from a few ounces to a pound or more, of a serous or puriform fluid; sometimes its appearance is lactescent with particles of concrete albumen floating in the mass.

Many have borne testimony to the fact of a singular want of uniformity in the functional symptoms of pericarditis; several of them belong to other diseases, and in truth no inflammation whatever of the pericardium, has on some occasions been found, where a majority of them were present. The physical signs are more certain; and when the disease has resulted in liquid effusion, may be said to offer evidences of this condition even to a demonstration.

When the instrument is applied over the region of the heart, the contractions of the ventricles are observed to be at one time strong, then of a feebler character and intermitting, thus coinciding with the intermission of the pulse; and even while the pulse is small and thready, auscultation manifests a greater force in the action of the heart than natural. If the albuminous exudation be copious, a sound rather duller than natural, which is much augmented if a fluid secretion has taken place, is perceived when we use percussion; and the friction of the opposite surfaces of the pericardium, (little or no fluid being present,) now covered with a false membrane, gives rise to the *leather sound*, similar to that produced by riding upon a new saddle. This sign when it can be appreciated is pathognomonic, having never been distinguished in any other disease than that of pericarditis.

If the secretion, serous, lactescent, or puriform, exists in considerable quantity, the resonance is eminently dull on percussion. The actions of the heart are tumultuous, and appear to be heard *deep* within the thorax. There is besides an evident prominence of the cardiac region, due to the distention of the pericardium. These signs, if we mistake not, were first promulgated by M. Louis. Corvisart thought he could distinguish very clearly a fluctuation, by pressing with the finger upon the intercostal spaces.

Whoever may have industriously pursued the subject for

himself, or derived his information from the works of those who have had the amplest opportunities for observation, must have arrived at the conclusion, that a correct diagnosis of the various affections of the heart is of all others the most difficult. Whether we form our opinions from general or functional symptoms, or from physical signs conjoined with these, the remark is not the less true; and it is only after the most careful and repeated examinations, that we should venture to pronounce upon the probability of an organic lesion. If general symptoms continue, and above all, if the physical signs persist without alteration, except it be in their intensity, the probability of course becomes the stronger. Cases are recorded in which both the symptoms and the signs have passed away; and there are others where autopsy has revealed a hypertrophy or a dilatation, and yet neither the signs or symptoms have existed in sufficient intensity to induce a belief of the extent to which the organic alteration had advanced. That the means however by which we are to judge are valuable, cannot for a moment be doubted; for they have oftener been observed to belong to a lesion of structure, than to occur uninfluenced by this cause. All that we would insist upon, is a most guarded caution, and a sure knowledge of the fact that the signs are constant.

Hypertrophy of the Heart.—An increase in the nutritive function of the heart's muscular structure constitutes the disease denominated hypertrophy. Its tissue is more red and firmer than natural, and the thickness notably augmented. The interventricular partition is frequently involved in the morbid action, and the fleshy columns of the affected ventricle are not always exempt. We give merely the general characters of the lesion.

One of the ventricles may alone be affected, or both at the same time; the hypertrophy may indeed be partial in one or both, or one may be dilated and the other hypertrophied; or in fine there may be dilatation accompanied with increase of nutrition. The different *forms* which the disease

may assume, appear to have been better illustrated by M. Bertin, than by any other observer, and they are these. The sides of the affected cavity may be increased in thickness without the least alteration in its capacity;—this increase of thickness may exist with augmentation of capacity;—and lastly, there may be diminished capacity with unnatural thickness of the ventricular or auricular walls. The second variety here mentioned, can be nothing else, however, than the hypertrophy with dilatation of other writers. These different forms have been named by Bertin, simple, eccentric, and concentric hypertrophy. With the exception perhaps of the second, if it be an example of dilatation conjoined with hypertrophy, there are no physical signs to enable us certainly to distinguish between them.

Left Ventricle.—The indications of disease in this ventricle, derived from the physical signs, are referrible to their locality, inasmuch as they are nearly the same for both the ventricular cavities. When the left is affected, it is between the cartilages of the fifth and seventh ribs that we are particularly to direct our examination. If the instrument be here applied, the sounds of the heart's pulsations will be found duller than natural, and so much prolonged that the noise of the auricular contraction is nearly or quite inaudible; the patient feels oftentimes most disagreeably the beating of his heart, the contractions of which if there be no complication of disease, are found to be confined to a limited extent of the thoracic surface; frequently they are scarcely heard beneath the left clavicle. The *impulse* of the heart is so great, that the observer's head is sensibly raised by the impression made upon the cylinder during the time of its systole; and if its parietes be much thickened, there is not only an absence of the respiratory murmur in the præcordial region, but an evident flatness of sound on percussion. The pulse may be strong and full, although the reverse of this may take place. When this last condition exists, can it be referred to the concentric form of hypertrophy? The ca-

pacity of the cavity being diminished, it would of course contain less blood, and less would be thrown into the aorta at any given systole; and upon this, it seems to us, would depend the increased or diminished volume of the artery. We throw out the idea as merely probable, having no fact upon which to sustain it. Intermissions and irregularities of the pulse are not often observed.

Right Ventricle.—When the right ventricle is hypertrophied, its contractions produce the same varieties of sound as those of the left; but it is over the inferior portion of the sternum that we are to seek for them, as also for the increased impulse. The extent over which they may be heard, is limited as in the former case. There is one physical sign also, which belongs solely to disease of this side of the heart, and that is the swelling of the external jugular veins; and there is one condition in which, by this sign alone, we are enabled to deduce a correct diagnosis. It sometimes occurs that when the left ventricle is enormously hypertrophied, it is carried forward, and thus becomes anterior. Its contractions are then strongest beneath the sternum; and was there not an absence of tumefaction in the veins, the location of the disease might easily be mistaken.

The *bellows sound* has been heard both in the heart and arteries, when they have proved to be in a state of perfect health. Upon itself therefore, when not connected with other signs, no reliance should be placed; nor where the disease is uncomplicated hypertrophy is it perhaps often heard. Should there exist however at the same time a contraction of any of the orifices of the heart from any cause, it may sometimes be appreciated, although it is rarely constant. It would seem the rather to depend according to the opinion of the best informed, upon some vital cause, such as a disturbance in the function of innervation. The *rasp* sound, resembling the noise elicited by rasping a piece of soft wood, is always the result of a physical cause; an impediment exists to the free passage of the blood through the orifices,

forming a communication between the different cavities, by their simple contraction or the deposition of osseous matter. The *purring* sensation, appreciated by the application of the hand upon the thorax, is felt whenever the rasp sound takes place, and is produced by the same structural derangement. It derives its name from its resemblance to the feeling communicated to the hand when applied to the back of a cat, when she is in the act of purring. These several sounds do not belong of themselves, either to hypertrophy or dilatation of the heart. But when the orifices or valves are affected at the same time, they are present with the other signs. We mention them in this place, because the complication does sometimes occur, and because no further allusion will be made to the lesions of the valvular orifices. Double hypertrophy is recognized by the simultaneous occurrence of the appropriate signs in both the right and left præcordial region.

Dilatation.—The anatomical character of this lesion is an unnatural thinness of the sides, and an augmented capacity of the affected cavity; there is also an increased separation of the fleshy pillars in consequence of the dilatation. One side of the heart may be affected, or both at the same time, which is the most frequent form the disease assumes; or there may be dilatation of one side, and hypertrophy of the other.

It ought, perhaps, to have been mentioned before, that in a perfectly healthy heart, its pulsations are scarcely heard beyond the left side of the thorax. When appreciated elsewhere, the consequence of dilatation, the order of succession is as follows, viz.; on the right anterior, on the left posterior, and on the right posterior side of the chest, and the extent to which the contractions are heard, will serve as the measure of the disease.

Left Ventricle.—To distinguish dilatation, we are to be guided by the impulse and the sound produced by the heart's contractions; and they are exactly the reverse of those which occur in hypertrophy. The systole produces little or no im-

pulsion, so little indeed that the hand applied over the region of the heart can in many cases barely appreciate it; but the *sound* is clear and loud, and may be heard in other parts than the left side of the chest. By using percussion, the resonance is generally found to be natural. The signs belonging to disease of this ventricle, are heard over the left præcordial region; that is, between the fifth and seventh ribs.

Right Ventricle.—The characteristic signs are the same as in dilatation of the left side; but the instrument must be applied here over the inferior portion of the sternum, where, together with the right side, the sound of the contractions is best heard. In this form of the disease the face is frequently livid, swelling of the jugular veins occurs, and hæmoptysis is a frequent complication. Another, which is very constant both in hypertrophy and dilatation, is an infiltration into the cellular tissue of the abdominal extremities, and is found to a greater extent around the malleoli. The pulse is for the most part soft and weak, and palpitations are more common than in hypertrophy. When the two ventricles are dilated, the physical signs are found in both præcordial regions; and should the sound of the contractions be heard over the right posterior side of the thorax, the dilatation is extreme.

Hypertrophy of one and dilatation of the other ventricle, are recognized by mixed signs; and we have only to bear in mind those which attach to each lesion, to form a correct diagnosis; every thing depends of course upon the location wherein the signs are discoverable.

Dilatation with hypertrophy conjoined, is characterized by both a strong impulse, and a loud clear sound, when the heart contracts. The auricular contractions become sonorous, and are heard as well as the ventricular over a large extent of surface, and it is in this variety of disease, that the actions of the heart are frequently most violent. A careful examination of both cardiac regions will lead to a knowledge of the affected side; or if both present the proper indications,

the affection is of course general. Affections of the auricles are not very frequent, and perhaps never isolated.

Aneurism of the Aorta.—In order more fully to explain the physical signs in aneurism of this vessel, a few lines will be devoted to the anatomical character of the disease. A general dilatation of the affected portion of the artery, constitutes what has been denominated *true* aneurism. The formation of the other variety, known under the name of consecutive *false* aneurism, has been differently explained by different individuals; and for the reason that it is very seldom met with in the thoracic aorta, and because too we are not aware of any signs peculiar to itself, no further reference to it will be made.

When the internal coat of the diseased artery is examined, it is found to be red, not uniformly, but rather in patches, and its integrity is frequently interrupted by a true solution of continuity, from whence result rugosities in greater or less number. Osseous depositions also, are formed between the fibrous and internal coat of the artery, or they may be imbedded in the substance of this last itself. It is probably owing to the inequalities within the artery, produced, as we have mentioned, and thus furnishing an impediment to the free course of the blood, that portions of it are retained and coagula formed. These ultimately become organized, and it is in this way that in large aneurisms, particularly, the fibrinous concretions are deposited which are so often found upon dissection. They present themselves in distinct layers, frequently exhibiting the successive stages of organization, and are no doubt, as suggested by Hodgson, the means which nature employs for making reparation as far as it is possible to be accomplished.

The *symptoms* belonging to aneurism, are those of too many other and different affections to place much dependence upon them, and we may almost say as much in relation to its physical signs; although there may be a union of them to such an extent, as to leave but little doubt upon the mind of

any. It may frequently happen that the process of reasoning by exclusion will afford much assistance in forming a correct diagnosis.

When the aneurism is still small, the suspicion of its existence is frequently awakened while the patient may be under examination for a different disease; for until it has reached a sufficient size to compress, and thus interfere with the functions of some neighboring organ, it may produce no derangement whatever in the œconomy. Should it be accidentally detected before this period, the stethoscope will reveal a *single* pulsation isochronous with that of the pulse, and the bellows sound may frequently be observed in connection with it. The pulsation will be better distinguished under the right clavicle, if the arch of the aorta be aneurismatic. Oftener, however, and this will depend upon the rugose condition of the internal coat, the rasp sound will be detected, *always* accompanied by the purring or gently tremulous sensation communicated to the hand when applied to the thorax; this arises, as explained elsewhere, from the impediment to the current of the blood. When these signs are noticed and *none other*, there may be aneurism or there may not, and for this reason. Depositions of osseous matter sometimes form upon the internal coat of the artery, without the slightest dilatation being perceptible; and whenever this is the case the two signs last mentioned must almost inevitably ensue. An instance of this kind we saw at La Pitié, and it was there mistaken for aneurism.

But when the disease has much increased, and the function of respiration is impeded, we have an additional symptom to guide us in the diagnosis; and if there be also a considerable deposition of fibrinous concretion, the sound upon percussion is manifestly dull. The difficulty in breathing may arise from two causes, and there is a notable difference in the *character* of the oppression. In the one case, there is a constant (while the paroxysm lasts) gasping for breath, with an utter impossibility of satisfying the necessity; and

in the other, there is a *wheezing* noise accompanying every inspiration, showing most clearly that the tumor is pressing upon some part of the trachea. But in the instance first named, the pressure is exerted upon the pulmonary artery; and the usual quantum of blood flowing through this channel to the lungs, and upon which their regular action of course depends, is thus greatly interrupted. The distinction here drawn is important, for it will lead us to know at what point in the aorta the dilatation commences. If its arch is affected, the trachea will be compressed; if its *ascending* portion, commencing a short distance above the valves, be the seat of disease, the pulmonary artery will be similarly situated; and it is only by the nature of the oppression that the true location of the aneurism can be made manifest. What we here record we have seen, and the autopsy proved its correctness.

The difference in the force of the pulse in the two arms has been regarded as a valuable sign; but it is by no means a constant one, and in truth an impediment to the circulation in both radial arteries may exist at the same time, if the aneurism be sufficiently large to press upon the left subclavian, and the free passage of the blood into the innominata be impeded from any cause.

When the aneurismatic tumor, after a length of time, as it sometimes does, has worn away the sternum and the cartilages of the ribs, and thus shows itself externally, scarcely any doubt of its nature can remain.

The descending thoracic aorta may be affected with aneurism, and the neighboring vertebræ, like the sternum, may suffer from pressure. Pain, often mistaken for rheumatism, is a very constant attendant, and many or all of the physical signs heretofore enumerated, may be detected upon close examination.

In submitting this Essay to the consideration of the Committee, we are aware that many other affections might have

been embraced, in which the use of percussion and the stethoscope are capable of furnishing the most beneficial results. Our little work, too, might perhaps have been enriched, certain it is, it might have been much prolonged, by the full relation of cases taken either from hospital or private practice; but if we have said enough to raise to its deserved elevation in the minds of any, the subject upon which we have ventured to write, we shall feel that we have done something for "the cause." It may also be permitted us to remark, that we have, with but very few exceptions, commented upon no condition of disease which we have not witnessed in life and in death; if we have *learned* from others, we have, in numerous instances, demonstrated for ourselves, and it has been our aim not to transcend, in the smallest degree, the most rigid professional faith. We shall then claim something on the score of experience, and shall now bring to a close our imperfect history of the importance of physical signs. "What is writ, is writ—would it were worthier;"—yet, with all its imperfections, should it be destined to meet the public eye, and thereby lead one member of the profession to avail himself of its utility, it will have amply responded to the ambition of the writer.

DISSERTATION,

BY

OLIVER W. HOLMES, M. D.

Inter labores et tædia.

DISSERTATION.

"How far are the external means of exploring the condition of the internal organs, to be considered useful and important in medical practice?"

"The external means of exploring the condition of the internal organs," might be construed to include all the modes of examination in which the senses of the observer are immediately applied to the organs of the patient, or to their products;—all, of what have been called, the objective signs. But as certain of the objective signs, the state of the pulse and of the tongue, for instance, have been long and generally allowed to be in the highest degree useful and important in medical practice, it seems expedient to depart so far from the letter of the question, as to consider only those methods of investigation which have been less extensively adopted, or whose value has been less fully appreciated. To these methods I shall give the general name of *Direct Exploration.*

To determine *how far* they are useful and important, will require much time and labor; for their importance and

usefulness vary in different diseases; and it is only by a careful estimate of their value in each of these diseases, that we can form an approximative opinion of their collective value in medical practice. Our answer to the question then, must be sought for, not in a single proposition assigning the exact degree of utility of the methods under consideration, but in a series of results relating to the most important medical diseases to which the use of direct exploration is applicable.

As each of these diseases passes before us, three questions will arise;

1. How far are its general symptoms uncertain or insufficient to direct the practitioner?

2. How far are its physical signs characteristic and constant?

3. What practical results follow from the information they afford us?

But we shall answer these questions in greater or less detail according to several circumstances. Thus, in some diseases it is so well known that the general symptoms are but imperfect guides, that no practical man requires any proof of the proposition. Again, we shall answer the second question more fully, in proportion as we may have ideas to bring forward, which may be novel, or seem interesting. In answering the third question, we shall content ourselves with indicating the most important practical consequences, derived from the more accurate discrimination of various morbid conditions by means of direct exploration, without carrying them into the details which are to be sought for in systematic treatises upon disease.

We have prefixed a few thoughts upon the subject of direct exploration, for offering which at the present day, our apology must be found in the opinions still entertained by some of those whose ideas possess value and influence with the community.

General Considerations on Direct Exploration.

The physical principles on which the different methods of this art are founded, may be expressed in the following formula.

The organs beyond our immediate inspection, are capable of producing certain changes in the form of the external parietes perceptible to the eye (inspection, mensuration); they undergo certain modifications in their consistence, volume, figure, movement, appreciable by the touch (palpation); and they can transmit to the ear, either in consequence of their own actions (auscultation), or when submitted to certain mechanical impressions (percussion, succussion), sounds which vary with their conditions. (Note A.)

Of the methods of investigation founded on these principles, those which depend upon the exercise of vision and tact, have been employed from time immemorial. Of the three methods derived from the exercise of the sense of hearing, Percussion, Succussion, Auscultation,—the second only has been rendered of any practical utility until more modern times; for the remark of Hippocrates, cited by Laennec,[1] was an almost isolated observation, which produced no result, and did not even attract the attention of his commentators. (Note B.) The circumstances in which succussion is applicable, are so comparatively rare, that we may in point of fact consider the application of the sense of hearing to the direct exploration of the internal organs, as an invention originating with Avenbrugger, in 1761; forced upon the public attention by Corvisart, in 1808; organized, extended, and perfected, by Laennec, in 1815.[2] The

[1] Vol. 1. p. 37. 3d edit. [2] Percussion was made use of by the ancients in the case of *Tympanites*, as its name indicates. "Tympanias autem, ultra tumoris spectaculum etiam auditu sonorus est; nam ad palmæ percussum abdomen sonitum edit." (Aretæus De sign. et caus. diut. morb. Lib. ii. Cap. 1.)—"Si verberetur superior venter, instar tympani sonitum edat." (Paul. Æginet. Lib. iii. Cap. 48.)

treatise of Laennec on mediate auscultation, was translated by Dr. Forbes, in 1821; and thus the new methods of direct exploration can only be said to have been before the English and American public for the space of fifteen years. It is to be remembered, that in the very city where they originated, the discoveries of Laennec were not at once received without opposition. Thus in the first edition of the Dictionary of Medicine, in twenty-one volumes, the author of the article Auscultation, estimated so very moderately the importance of the new method of exploration, that after reading it, one might have been tempted to throw the stethoscope into the receptacle which holds the scala of Hippocrates and the balance of Sanctorius. It was from this article that Dr. Good derived one of his two authorities for undervaluing auscultation.[1] Unfortunately, the author and editors had committed so serious an error, that in the second edition of the Dictionary of Medicine, now publishing, it has been thought necessary to suppress it entirely, although its author is still one of the collaborators, and a popular professor in the School of Medicine; and the treatise which has taken its place is from the hands of one of the most ardent admirers of Laennec.

If the arts of direct exploration struggled with difficulties in Paris, it might well be supposed that they would fight their way with tenfold labor into general acceptation in medical communities where novelty excites and concentrates attention with less activity. This has been the case in our own country; and at the present day it is well known that some practitioners of a certain merit, and particularly some who pride themselves on strong sense and intuitive sagacity, habitually neglect and depreciate the value of the physical signs, even of thoracic disease.

Several causes have combined to produce this indifference and disbelief. We need not mention the reasonable scepticism with which those who have often been deluded by

[1] Study of Med. iii. 207.

novelties, regard almost every innovation. But, if with the most startling novelty, and with extravagant promises, an invention come forward which demands the laborious training of a sense hitherto uncultivated in its more delicate capacities, bearing in one hand an instrument which is to be the practitioner's inseparable companion, and in the other a treatise full of new terms and peculiar doctrines, is it to be supposed that the schools of Sydenham and Cullen, would consent, without a struggle, to recommence their education and remodel their nosology?

It was perfectly natural that they should look with suspicion upon this introduction of medical machinery among the old hard working operatives; that they should for a while smile at its pretensions, and when its use began to creep in among them, that they should observe and signalize all the errors and defects which happened in its practical application. And erroneous conclusions are formed by those who employ direct exploration, as well as others.

They are not always sufficiently careful in their examinations, any more than other people in their investigations; they draw positive conclusions from insufficient premises, as often as other observers. There is sometimes a tendency in those who have long employed the physical signs, to carry their observation to that infinitesimal minuteness which the tare and trett, inseparable from the mass of evidence, may render nugatory. But all this is true also of the analyst, whose balance turns on plates of polished crystal; yet who would found an argument on the errors of careless analysts, or the fractional differences in the tables of Thenard and Berzelius?

If mistakes are sometimes committed by those who have studied the art of direct exploration under the most favorable circumstances, with the best instructors, and in large numbers of patients, we may well suppose, that such as have been obliged to learn only from books, and without the opportunity of attending ample hospitals, must be still more

liable to errors. That such have been committed is probable; and instances considered as such, we have all heard brought forward as proofs of the inadequacy of the method under consideration. Some of the sources of error we have alluded to; the principle in logic or out of logic, which turns them into an argument against the art, we have seen too often exemplified in attacks upon the whole science of medicine, founded upon the errors and discrepancies of those who exercise it.

The question before the medical profession, is not whether the arts of direct exploration are new; it is not whether they require much study; it is not whether mistakes may be or have been committed; for even if a long catalogue of them could be accumulated, it would prove no more against the method, than a history of the aneurisms which have been opened as abscesses, or of the solid tumors whose arteries have been tied as aneurismal, would prove against the utility of the surgeon's examining tumors.

The questions before the profession are: Are the new methods of exploration founded on rational principles? Do they lead to any useful results? Are they received as important by those whose opinion is most to be relied upon?

It requires little to show that they are founded on correct principles. That a cavity with yielding walls must be dilated by the accumulation of fluids within it; that the impulse of a heart tripled in volume and in vigor, must be more sensible to the hand; that a chest crowded with liquid should sound differently, when struck upon, from the healthy state in which even Virgil knew enough of percussion to say,

—— pectore vastos
Dant sonitus[1] ——;

that the movements of a fluid which only partly fills the pleura, should be perceptible to the patient and those about

[1] Æneid, V. 434.

him, as well as those of liquid in the stomach or bowels; that the rattling of different morbid secretions in the bronchiæ should be heard on applying the ear to the chest, when, in the trachea, which is only a larger bronchia, they may often be heard through a whole apartment;—all these propositions are sufficiently in accordance with physical laws to obtain an easy assent.

Do they produce any useful results? They enable us, in many cases, to distinguish phthisis before its existence is shown by the general symptoms, at a period when we can say, do this and you may live, do that and you must die; they enable us to determine the stage and the degree of pneumonia, even when its rational signs are wanting, at the time when treatment is most effectual; they reveal to us the existence of pleurisies, which, clear as the day when properly sought after, have yet been long wasting the patient and perplexing the physician; they declare so distinctly the existence of pericarditis, that this once dreaded and most obscure disease may be recognized even by the half taught student; they have, in a word, rendered the derangements of those very organs which nature seems to have barred and bolted from our reach so carefully, the best understood of all those which affect the organs of the visceral cavities.

What has been the decision of those whose opinions are most valuable with regard to the arts of direct exploration?

We have seen how the opinion of the editors of a great public work, the Dictionary of Medicine, had changed in the interval of publication of its first and second editions. We can bring forward testimony which has different claims to attention. It is rare to find a less amiable feeling expressed by the living for the dead, than the father of the "physiological doctrine" has expressed in his numerous allusions to the illustrious inventor of auscultation.[1] Even he, however, can use the following language. "I must

[1] Exam. des doct. Med. Vol. IV. p. 163—366, etc.

render justice to the sagacity with which M. Laennec is able to discover and to follow in its progress the disorganization of the lungs by the employment of his cylinder. I make use of it every day with the highest advantage. Without this ingenious instrument, we could obtain only approximative notions of the existence of purulent collections, and of the different degrees of permeability of the pulmonary tissue. With it, all these questions are resolved in the most satisfactory manner."[1] M. Bouillaud, a representative of many of the prejudices as well as doctrines of Broussais, and certainly no idolizer of the "School of La Charité," as he calls his great predecessors and their adherents, makes use, however, of direct exploration with a zeal which the succeeding pages will testify. M. Piorry has succeeded in creating himself an European reputation, by a slight but useful modification in the single art of percussion. Not only are the classical works of Louis and Andral filled with the applications of the art of direct exploration, but the stethoscope and the plexímeter are to be found in the hands of every Parisian student, and what is still more, of grey headed professors who were no longer young when Laennec published his discoveries; as means of investigation which it would be ignorance not to understand, and unpardonable carelessness to neglect. If we look at the English physicians, whom we are accustomed to believe less ardent for curious innovations, the pages of the London Cyclopedia of Practical Medicine, filled by the most distinguished practitioners in the country, bear witness to the immense value of the new resources which have been offered to science. The names of Clark, and Forbes, and Hope, may fairly be weighed against that of the flippant scribbler of a page in the Athenæum, who, in 1836, in speaking of the stethoscope, tells us that "the toy is a new toy." If Harvey, among all his opponents, deigned only to answer Riolanus, and that on account of his "rank,

[1] Op. cit. iv. 147.

fame, and learning," the inventor of the "new toy," were he still living, would have even fewer controversies than the discoverer of the circulation. It would be easy to multiply names, not only in England but in our country; but we are unwilling to carry this invidious argument farther, especially as it is fully understood by all who keep pace with the current medical literature.

We shall proceed to examine the use and importance of direct exploration in the most important diseases to which it may be applied with a prospect of utility.

Diseases of the Lungs.

Tubercular Phthisis.

It is so well known that the organic lesion which tends to produce the array of symptoms from which the name of this disease was derived, frequently exists without betraying itself by these characters, that it is unnecessary to support this point by particular evidence. The insufficiency of the general symptoms in many cases to reveal its existence, and the importance which has been attached to its early discrimination, may be estimated by the numerous experiments which have been instituted in ancient and modern times, to afford the means of distinguishing purulent expectoration from that resembling it in character, and supposed to be less dangerous. It is now well known that whatever be the degree of their accuracy, they are of little value, from the fact that mucous membranes may secrete pus during inflammation; and that on the other hand, the existence of tubercular disease in the lungs is by no means always attended with purulent secretion.

If we can detect the existence of tubercles in their crude or primitive state, we may remount nearer to the origin of the disease, than the experimenters we have referred to even

attempted; for it is proved by dissections, that these bodies, and even excavations in the lungs, may precede the existence of either cough or expectoration;[1] and they are found in the bodies of patients dead of various diseases, and in whom no thoracic symptoms have excited attention.[2]

Can we detect their existence in their different stages by means of the physical signs? Let us examine these signs in succession.

The value of *inspection* of the thorax, it is not easy to determine; for means so much more exact are commonly employed, that we are too apt to overlook the assistance it may afford us. A phenomenon evident to inspection, namely, the immobility during respiration of those parts of the chest which correspond to a collection of tubercles, is mentioned by Andral,[3] and again by Dr. Clark,[4] as affording valuable information. Laennec says on the contrary, "I have never been able to find manifest and constant inequality in the movements of the two sides of the thorax, except in cases of very abundant empyema, or of deformity of the thorax."[5] M. Louis does not advert to this sign in speaking of the diagnosis of phthisis, and although in the habit of inspecting the chest with great minuteness, he does not habitually call the attention of his students to this circumstance. It has been said also, that the depression of the thoracic parietes follows the cicatrization of tubercular cavities;[6] a circumstance probable enough in itself, but which I do not remember to have witnessed.

The utility of *palpation*, in the diagnosis of phthisis, is very limited from the nature of the thoracic parietes. It is only capable of transmitting to our perception certain movements which take place in the lungs, and which may be nearly as well appreciated by the ear, which in this case becomes an organ of tact as well as of hearing. In applying

[1] Louis Rech. sur la Phthisie, cases 31, 32. Andral Clin. Med. ii. p. 112–13. [2] Laennec i. 63. (Paris 1831.) [3] Clin. Med. ii. 97. [4] Lond. Cyc. Art. Tubercular Phthisis. [5] Vol. i. p. 22. [6] Laennec ii. 341. Andral ii. 97.

the hand to the chest of a tuberculous patient, we may sometimes feel the movement of fluids in the bronchiæ or tuberculous cavities, and on making him speak, a thrill of unnatural force may sometimes be felt over the seat of tubercles or excavations.

I remember the case of a woman, in whom percussion and auscultation gave indubitable evidence of the existence of extensive tubercular disease at the upper part of the right lung—disease of which she died in less than two months from the time when I had first seen her. This patient complained to me of a jarring or thrilling sensation beneath the right clavicle whenever she was speaking, and so much had it excited her attention, that she had a constant disposition to place the left hand upon this region; where, upon placing my own, the vibrations to which she referred were exceedingly evident.

We come to a more important means of examination in the disease we are considering; the use of *percussion*.

In those cases of tuberculous disease in which a large part of the lungs is changed from the condition of a light, porous, and consequently resonant body, to a dense and solid mass, no one can doubt that the sound returned on percussion must be modified. In point of fact, the difference is sometimes so great that the patient himself is alarmed by it. This is still more true when with the solidification of the lung there exist also caverns of sufficient extent to give rise to the sound which has been named from its resemblance to that given by a cracked vessel. It is often necessary in cases of this kind, to use percussion with very moderate force, in order not to render too palpable a sound so calculated to excite the fears of the patient and those around him. In proportion as the tubercular disease is less developed, the signs which are obvious on the slightest examination in the stage of advanced disease, and detected without much difficulty at an earlier period than that of extensive disorganization, require more

care to elicit and to perceive. The testimony of Laennec,[1] of Andral,[2] and of Dr. Clark,[3] agree in the fact that a certain number of tubercles, if surrounded by healthy pulmonary tissue, may exist without giving evidence upon percussion. How great must be the change of structure in the lung before we can recognize it? No precise answer can ever be returned to this question; for it must depend in part upon the more or less superficial situation, upon the relative distance or proximity of the indurated masses with regard to each other, and upon the delicacy of the observer's ear, and his art in percussing. It is enough to say, that a degree of disease far short of that commonly found in declared phthisis, may be recognized by any person with senses of common acutenesss when percussion is properly applied by another, and that the art of practising it with sufficient accuracy for common purposes may be acquired in a few trials. The author of a work on auscultation, M. Raciborski, when resident physician at la Charité, was in the habit of delivering a course of complete clinical instructions in auscultation and percussion, in about a dozen lessons. However insufficient this time may have been for the purpose, yet it may give some notion of the facility with which the ear appreciates the more striking phenomena; and among them none is more readily seized than a difference of sonorousness in the two sides of the thorax.

An instance of the accuracy of the evidence afforded by percussion, may be found in the twenty-ninth case reported in the memoir of Dr. Jackson,[4] in which the resonance was declared obscure at the right summit nearly four months before death, and yet on examination after death, the disease was still found in its first period.

It has been said[5] that the results of percussion may be rendered deceptive by the co-existence of emphysema or

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[1] ii. 127. [2] ii. 60. [3] Lond. Cyc., Art. Tub. Phthisis. [4] Memoir of James Jackson Jr., M. D. [5] Andral, ii. 61. Clark, Lond. Cyc.

dilatation of the vesicles with tubercles. Were this coincidence frequent, it would certainly diminish the value of percussion in the diagnosis of tubercles. But we are disposed to think that Dr. Clark has overrated the frequency of this double lesion when he says, "This will be the case when the pulmonary vesicles are dilated, which they often are amid groups of small tubercles." During a long attendance in an autopsy room, when great numbers of tuberculous patients were examined, and where the eyes of the examiners were particularly active in searching for emphysema, although it was not uncommon to find a few vesicles at the anterior margin of the lungs presenting an appearance which was there considered and called emphysematous; we do not remember a single instance in which the lesion described by Dr. Clark was obvious enough to attract attention. Two cases of this kind I have, indeed, seen in one of the British museums, which attracted my attention from their being new to me; and in looking over the catalogue of the anatomical cabinet of Guy's hospital, among ten specimens of tuberculous and five of emphysematous lungs, only once does there "seem" to be any thing like a coincidence of these two lesions.[1] A remark of M. Louis,[2] that "Emphysema does not dispose to tubercles," would imply that he has not often observed the coincidence. We may remark here that the invention of mediate percussion, which Laennec did not employ, and which was brought before the public about the time that Andral published his Clinique Medicale, has rendered our appreciation of the resonance much more precise, and undoubtedly given us positive signs in some cases where the method of Avenbrugger would have been insufficient. Like the other signs of tubercular disease, those derived from percussion should be sought for especially about the clavicular and acromial regions. Obscurity of resonance being detected beneath one or both clavicles, or

[1] Catalogue, etc. No. 1721. [2] MS. Notes.

at any part of the chest corresponding to the summit of the lungs, what conclusion is to be formed with regard to the nature of the disease? I answer this question by a remark of Chomel in one of his lectures.[1] "Obscurity of sound and feeble respiration under one of the clavicles, give strong reason to suppose the existence of tubercles; for partial effusions take place, in the immense majority of cases, at the inferior and posterior parts of the chest, and it is almost never that chronic pneumonia is primitive and without the presence of tubercles."

The information afforded by *auscultation*, relates either to the character of the respiration, to its complication with certain rattles, or to the resonance afforded by the cough or voice.

It is necessary to concede, for this method of exploration, as we have done for percussion, that there may exist a limited number of tubercles in the lungs which shall elude its researches.[2] Let us remark, that the conclusions of Laennec, of Andral, and of Louis, as recorded in the works we have quoted, are not to be taken as the standard of our present knowledge of the subject. Thus, the first of these authors passes rather lightly over the changes in the character of the respiration which reveal the existence of tubercles.[3] M. Andral remarks, that the respiration may be natural, or in excess, or deficient, that it may be accompanied by different rattles, or bronchial in its character.[4] M. Louis, in speaking of this first period of tubercular disease, tells us that the respiratory sound was either unchanged in character or weakened, or attended with mucous or sonorous rattles.[5] More recent observation has detected certain changes in the character of the respiration during the early stages, which afford additional information. It is very common to hear M. Louis declare the respiration "rude" or

[1] MS. Notes. [2] Louis Phthisie, 182. Andral, ii. 68. [3] Vol. ii. p. 127. [4] Vol. ii. pp. 69, 76. [5] Phthisie, 182.

rough under one of the clavicles. This he considers as affording strong evidence of tubercular disease. One of our American students, whose loss science will long lament, has carried the accuracy of observation still farther by examining separately the sounds of inspiration and expiration.[1] In the early stages of tubercular disease, he observed the existence of a prolonged expiration, having something of the bronchial character. The cases referred to by him render it probable that this sign will take its place as one of the earliest indications of the disease we are considering; and I may add that it is frequently referred to by M. Louis as affording certain probabilities of its existence. But notwithstanding the value we attach to this sign, it is not to be considered alone as a proof of the existence of tubercles. I examined a woman two years ago, in company with a gentleman very accurate in auscultation, in whom both of us recognised a distinctly prolonged expiration at the posterior and upper part of the right lung. Within a day or two this patient was seized with cholera, and died within twenty-four hours from the attack. The upper lobe of the right lung was examined with scrupulous care, and offered nothing in its substance or bronchiæ to account for the circumstance we had observed. This case goes to confirm an opinion expressed by Dr. Gerhard.[2] "The sound in the right lung of a phthisical patient should not be regarded as morbid, unless the respiration is decidedly blowing; a slight difference perceptible by an accurate auscultator, does not necessarily indicate disease." He adds, "But if the respiration be more blowing at the summit of the left than the right side, there can be no reasonable doubt that the lung contains tuberculous matter." This circumstance he attributes to the different arrangement of the bronchiæ on the two sides.

The existence of distinctly marked bronchial respiration at

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[1] Memoir of James Jackson, Jr., M. D., pp. 341, et seq.

[2] On the Diagnosis of Diseases of the Chest, p. 106, (Philadelphia, 1836.)

one or both summits is a sign of great importance. It is true, as Andral says, that "it announces only the impermeability of the pulmonary tissue."[1] This sign may indeed arise in pneumonic hepatization of the upper lobes; but the date and symptoms of the disease can rarely leave doubt as to which of these two affections it is due in any given case, and the other lesions which may occasion it are so comparatively rare, that this single phenomenon is sufficient to give very strong presumptions of the existence of tubercles, whenever the affection is of a chronic nature. We can only consider the remark of Andral, that "it cannot serve to discover the existence of tubercles,"[2] as a careless expression, which means only that it does not by itself constitute an absolute proof of their existence.

The presence of cavernous or amphoric respiration at the summit of the lungs, is practical proof of the existence of a cavity, which ninety-nine times in a hundred is the consequence of tubercular disease, and in very rare cases, of dilatation of the bronchiæ; an instance of which may be found in the eleventh case of Louis.[3]

The rattles which are found in the early stage of phthisis, may be of somewhat various character, sometimes being but a rare or solitary crackling, and at others a more or less large and regular subcrepitous or mucous bubbling. At a later stage, when cavities have formed in the lungs, a distinct gurgling may often be heard over their situation. But whatever be the character of the rattle, the most important circumstance is its position. Bronchitis, as is frequently observed by M. Louis in his lectures, almost universally affects the lower and posterior parts of the lungs, and Chomel remarks in speaking of emphysema, that it is almost always more marked near their base than their summit. The law which determines that tubercles shall commence at the upper part of the lungs is so general, on the other hand, that of one

[1] Clin. Med. ii. 76. [2] Loc. cit. [3] Phthisie, p. 235.

hundred and twenty-three cases analyzed by M. Louis, in all but two they were more numerous, larger, and more advanced in their developement at the summit, than at the base.[1]

The presence of the gurgling sound at the superior parts of the lungs, gives strong presumptions of the existence of a cavity. But even this, as Andral remarks, cannot be considered as a true pathognomic sign of the existence of phthisis, for he has found a true gurgling sound in cases of simple bronchitis.[2] It is necessary particularly to suspect this phenomenon over the points occupied by the large bronchiæ. The induration of the lung appears to give greater intensity to this sound—for I have heard it in one case at some distance from the chest, in a patient whose lungs were condensed by tubercular matter, and in which no excavation was noticed in the examination of the organs, the bronchiæ of which were not dilated. As this, however, is a sign which is shown every day to coincide with tubercular cavities, these exceptions, while they take from it the character of mathematical certainty, do not destroy its claim to the rank of a valuable element in diagnosis, especially when it is found in that part of the chest corresponding to the usual region of tubercular disease.

There remain the phenomena afforded by the *voice* and *cough* as explored by auscultation. I cannot but think that the minute distinctions of Laennec, between bronchophony and perfect and imperfect pectoriloquy, have constituted one of the most perplexing and repulsive points to the learners of the art of auscultation. To speak of the tones of the voice being heard a *short distance up the stethoscope*, for instance,[3] is to present to the student a distinction of such tenuity as must seem beyond the reach of his faculties. That they have led into error I am confident. These opinions, which I had formed from the examination of cases of pneumonia, I have found on investigation to be confirmed

[1] Phthisie, p. 2. [2] Clin. Med. ii. 79. [3] Vol. ii. p. 132.

by that of several authors. As this is a point of some consequence, I shall adduce authorities in support of my own impressions. "It must not be forgotten that without the existence of any tubercular excavation, and by the sole fact of considerable induration of the pulmonary tissue, the voice may present a resonance more or less resembling that of perfect pectoriloquy; under which circumstances according to Laennec, it constitutes bronchophony; but if it is true that these phenomena are only separated by slight gradations, we must perceive how they will tend to run together, so that they can only be distinguished by an infinitely practised ear."[1]

"Pectoriloquy may exist in different degrees of tubercular disease, pulmonary induration and effusion."[2]

"I may be allowed to mention here, that I have upon an important occasion, (Concours, etc.) established in a positive manner, that pectoriloquy, considered previously as the exclusive character of cavities in the lungs, existed in pneumonia with induration."[3]

It seems as if the inventor of auscultation, in his anxiety to uphold the constant coincidence between pectoriloquy and pulmonary excavations, had somewhat forgotten the principles which he commonly followed with such rigor. He uses the following expressions:—"Pectoriloquy is doubtful when the resonance is very feeble, and cannot be distinguished from bronchophony except by the aid of signs deduced from the place where it exists, the general symptoms and the progress of the disease."[4] It is very clear that these circumstances may help us in the diagnosis of the disease, but they cannot make a difference between two sounds which he has already declared undistinguishable in themselves.

[1] Clin. Med. ii. p. 82. [2] Chomel. MS. Notes. [3] Cruveilhier, article Pleurisy. Dict. de Med. et de Chir. pratiques. In the article Auscultation in the other dictionary (Dict. de Med. ou Repertoire etc.) it is said by Dance, that pectoriloquy "may be confounded with bronchophony, and reciprocally if we trust only to the modification of resonance of the voice." [4] Laennec, i. 67.

At the same time that we point out certain restrictions, which it is necessary to remember if we would not sometimes fall into error, the unnatural resonance of the voice is to be ranked as one of the most constant, the earliest, and most delicate signs of the presence of tubercles. It is not uncommon to find it, when the rational symptoms are such as to excite little attention, accompanied perhaps by a slight change in the respiration, but without the presence of rattles, and accompanied by very tolerable resonance of the chest. Even the perfect transmission of the voice is sometimes found in such cases. "More than once" says Dr. Williams[1] "has it occurred to me that the very words, which in that delusive confidence with which this malady enshrouds its victims, ridiculed my examination of the chest, roundly saying, that nothing ailed them there, have belied their meaning, and coming from the breast, have told a far different tale!"

A phenomenon which has never to my knowledge been pointed out, consists in a confused jarring, distinguishable while the patient is engaged in conversation, and which is probably a true bronchophony heard at a distance from the chest. This character of voice perhaps corresponds to the "vox clangosa" of Morton.[2] I have found since observing this phenomenon, that M. Piorry has detected a similar fact with regard to hægophony. "In almost all the old women observed at Salpêtrière who presented hægophony when examined by auscultation, the voice listened to directly, as it came from the mouth, offered the same character."[3] (Note C.)

The signs revealed by the cough are sometimes useful as auxiliary to those afforded by the respiration and voice, but do not require any particular examination independently of the others.

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[1] Rational Exposition, p. 184, note. [2] Phthisiologia, Lib. ii. Cap. 3.
[3] Procedé operatoire, etc. p. 61.

The increased sound of the heart over to the points invaded by tubercles, which has been noticed by Dr. Gerhard[1] as a new sign, and attributed to M. Louis, does not appear to us to merit that appellation. Although Laennec, in treating of the physical signs of tubercles, does not mention this circumstance, yet when speaking of the extent of the pulsations of the heart,[2] he uses such expressions as the following —"thus, if there are tuberculous excavations at the summit of the right lung, the pulsations of the heart will be heard more distinctly under the right clavicle and axilla than under the left, and sometimes even than in the cardiac region." A little above, he speaks of this circumstance as difficult to explain, "unless we suppose that the sound is transmitted in this case, not through the excavations, but through the medium of their engorged and condensed parietes." But this sign certainly assumes a new value, if, as Dr. Gerhard asserts, and as we believe correct, it is sometimes present at a very early period of the disease.

In forming our conclusions upon the collective value of the physical signs of tubercles, we should present the following propositions.

1. There are cases in which tubercles exist in limited number without giving rise to any appreciable change in the results of direct exploration.

2. None of the signs of tubercular disease can be considered in itself as absolutely pathognomonic.

3. The co-existence of several signs, their being found at the points disposed to tubercular disease, the great frequency of tubercular disease, the extreme comparative rarity of any other lesions capable of producing the same physical signs, enable us in many cases to arrive at a degree of probability which is for practical purposes equivalent to certainty.

4. The co-existence of physical signs not in themselves absolutely decisive, with general symptoms insufficient alone

[1] Op. cit. pp. 108–109. [2] Vol. iii. p. 8.

to characterize the presence of phthisis, may authorize us to consider the patient as affected with that disease.

The application of the knowledge derived from direct exploration may be made to three classes of patients.

First, those in whom the general symptoms have excited no suspicions of phthisis. These latent cases have not been unnoticed heretofore by accurate observers. Thus we have been warned, in the course of our studies, to suspect *emaciation* as a sign of the existence of tubercles, even without any local symptom. It is probable that an auscultator of the present day would form a very different opinion of those cases which induced Dr. Percival to say, "I willingly subscribe to idiopathic hectic, and have known it to last three months without any pulmonary affection, and then to break out in the lungs."[1] On referring to my notes upon this subject, I find the following remark of Louis. "In certain very rare cases, patients die under hectic fever, with tubercles which had been recognized by auscultation, but who had never been affected with cough."

By cases disguised in a different manner, it is probable that Wilson Philip was misled in the creation of his celebrated entity, Dyspeptic Phthisis. There can be little question for those familiar with direct exploration, that in cases in which, according to that author, "the patient lives until almost the whole lungs are rendered incapable of their functions,"[2] a few moments devoted to percussion and auscultation would have detected the principal disease, while he was speculating about the connection of the liver and the spleen, and losing himself in the divisions of the cœliac artery.

The practical importance of ascertaining the existence of tubercles in an unsuspected patient, is obvious. We no longer treat the insignificant or deceptive symptoms which may have shown themselves as unimportant, or with reference to some imaginary disease. The discovery of

[1] Good, Study of Med. Vol. ii. p. 152. [2] On Indigestion, p. 166.

their existence authorizes us to recommend the change of habits and of climate in certain instances, where, but for these means of exploration, we might have dallied with the disease until there was no longer any hope of suspending its progress. It is beyond doubt that external circumstances possess a considerable influence over the course of tubercular disease; this has long been known with regard to patients affected with hæmoptysis and the general symptoms of tubercles; facts like that in the twenty-seventh observation of Laennec, and some which I have heard from other sources, seem to show that the same thing is sometimes true where the physical signs of disease exist. Those who have studied the disease attentively, among that class of patients who possess the means of changing their climate and manner of life, would probably be able to offer many examples of this nature. Let those who are fond of telling us we have gained nothing by the attention paid of late years to the history and the signs of phthisis, reflect upon a remark in Dr. Clark's admirable essay on this affection. "The beneficial effects of a residence for one or two winters in Madeira, have become much more apparent since the public have been impressed with the necessity of adopting change of climate rather as a preventive than as a means of cure. A few years ago it was a matter of little moment to select a climate for the consumptive patient, because he was generally in the advanced stage of the disease, without hope of recovery, before the measure was proposed or adopted; and its fatal termination was not unfrequently accelerated by the only means to which he looked for safety."[1]

This is not the place to expose the different methods of treatment which may be employed with hopes of utility, under the circumstances we are supposing; the key to them all lies in the discovery of the fact, that the patient is laboring under a disease whose future tendencies we know but too well when its presence has been determined.

[1] London Cyclopedia.

The second class of patients comprehends those in whom the existence of phthisical symptoms has excited suspicions of this disease, which are converted into certainty by the results of direct exploration. It is for this class of patients that the use of this method of forming a diagnosis is most frequently employed. The presence of the physical signs of tubercles in such cases presents us with definite indications, the application of which is to be modified by the extent to which the constitution is undermined by the general symptoms. Other things being equal, the extent to which the disorganization of the lungs has proceeded must influence the prospects of treatment, and particularly must enable us to settle the delicate question which arises so frequently, whether the patient shall remain at home, or in the prospect of suspending his disease, undergo the fatigues and trials inseparable from change of climate, and expose himself to the chance of dying among strangers.

In the third class of patients, those upon whom the seal of tubercular disease is impressed so deeply that, as in the days of Aretæus, it is obvious to the first "man among the people" who looks upon the wasted victim, it might be thought that direct exploration was of no utility. Certainly in these circumstances we should deprecate the scientific zeal that would harass a suffering and exhausted being for the sake of guaging with idle minuteness the extent of the organic changes which are destroying him. It is too true that we have sometimes been reminded of the

'Centum me tetigere manus aquilone gelatæ'

in clinical examinations. But if such abuses were matter of sarcasm in the time of the Romans, they are not to be all laid to the charge of the modern methods of examination, which, when executed with delicacy and attention to the patient's comfort, and not too long continued or too often repeated, are seldom the source of uneasiness. And it is not to be imagined that even at this period they are altogether

fruitless. They at least, as Louis remarks in his lectures, give us some light upon the probable duration of the disease. For of two patients evidently phthisical, whose disease is of the same standing, the one in whom the disease has produced the most extensive disorganization, will probably offer its more rapid progress and more speedy termination.

The utility of direct exploration in the most important complications of phthisis, will be considered in connection with pneumonia and pleurisy.

We have conceded that a certain number of tubercles might sometimes exist without rendering themselves evident by distinct physical signs. In such cases we are obliged to rely upon the general symptoms, which may in themselves be sufficient to authorize us to consider the patient as tuberculous, and treat the disease upon that supposition. The remarks of Dr. Gerhard upon this subject,[1] and the case which he has reported in illustration of them, deserve the profound attention of every student of the arts of direct exploration.

With all the certainty which these methods have given us, we should not be induced to overlook the importance of those functional disturbances which, it may be, frequently precede the organic changes which we detect at a later period. The student who reads the treatise on auscultation of Laennec, should know by heart the chapter of Morton, on the precursory symptoms of phthisis.[2] By the proper employment of the rational and physical signs, which illustrate the obscurities and supply the deficiencies of each other, we may often detect the presence of tubercular disease before that melancholy period has arrived, "ubi incassum ab arte Medicâ exspectantur miracula, cum de animæ futurâ salute, et testamentis faciendis Theologum, et Jurisperitum consulere magis conveniat."

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[1] Diagnosis of the Diseases of the Chest, pp. 11, 12.

[2] Phthisiologia, Lib. ii. Cap. 2.

Pneumonia.

The use of direct exploration may enable us to determine the existence of this affection, when the general or local symptoms are insufficient; or it may teach us its stage, situation, extent and progress, the nature of the affection being ascertained.

Sufficient evidence of the presence of pneumonia is not always afforded by the rational symptoms. Cough, pain in the chest, febrile movement, may be owing to pleurisy, or to pericarditis, or to bronchitis. The characteristic sputa may be wanting; in the words of Andral, "at other times pneumonia passes through its different stages without having been in any way announced by the expectoration, which has been wanting, or without character."[1] In his thirty-eighth case, the expectoration was suppressed on the eighth day, and did not return during the rest of the disease. In his forty-second and forty-third observations, where the existence of pneumonia was proved by the examination after death, the expectoration was either absent or catarrhal; yet one of the patients was seen as early as the morning of the third day.

In such instances, if there are any positive signs to denote the presence of the latent disease, they must be useful and important. Let us examine the phenomena afforded by direct exploration, in the different *stages* of the disease.

A slight degree of flatness on percussion is now recognized as a sign of the first stage of pneumonia,[2] (engorgement—splenization.)

It is probable that the manner in which percussion is now performed, by means of the pleximeter, has enabled us to recognize this slight degree of flatness, which seems to have been overlooked by Andral, who remarks, "In cases of pneumonia, the sound never grows dull until about the second or third day, sometimes later."[3] He must have

[1] Clin. Med. i. p. 531. [2] Bouillaud, Dict. Med. et Chir. Article Pneumonie. Williams, Lond. Cyc. [3] Clin. Med. i. p. 530.

referred to the flatness produced by hepatization, and consequently have overlooked the less obvious diminution of resonance which precedes this condition. At this same stage of the disease the crepitant rattle makes its appearance.

Laennec asserts that this sign always exists, and from the first moments of the disease.[1] He remarks that it existed in all the cases reported by Andral, in the Clinique Medicale, (sixty-five in number,) with the exception of seven; and he adds, that at that time M. Andral was little accustomed to auscultation. Of eight cases reported in the Memoir of Dr. Jackson, five of which were fatal ones, every one offered this sign. The presence of the crepitous rattle, notwithstanding it has been also attributed by Laennec to two other affections, pulmonary apoplexy and œdema, is one of the most decisive signs of pneumonia. For, with regard to pulmonary œdema, it is rarely idiopathic, commonly accompanied with other forms of dropsy in cachectic subjects, or the sequela of pneumonia, catarrhs, or measles.[2] The rattle itself is rather a sub-crepitant than a crepitant; the bubbles are larger and moister than in pneumonia.[3] The other affection in which Laennec found the crepitous rattle, has not presented it to some observers, as in a case which occurred to M. Cruveilhier, and three cases seen by M. Piorry.[4] We must rely on the local and general symptoms to distinguish the two affections, particularly the existence of hemorrhage, and the absence of strong febrile action in the case of pulmonary apoplexy. In a disease then which has recently attacked a person previously well, and is accompanied with cough and distinct febrile movement, the existence of the two signs which have been mentioned, slight flatness on percussion, and the crepitous rattle, can leave no doubt that the substance of the lungs is inflamed. There is no question that mistakes have been committed not unfrequently with regard

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[1] Auscult. Med. i. p. 417. [2] Ibid. Vol. i. p. 336. [3] Ibid.
[4] Ibid. Vol. i. p. 373, note.

to the characters and the presence of the latter sign; and I recall one in which such was probably the case, from the observer's not being sufficiently familiar with this peculiar rattle. If the examiner is well acquainted with this rattle by having studied it upon well marked cases of pneumonia, and those which resemble it, in distinctly characterized instances of bronchitis, he will find few cases in which his ear will not at once decide on the nature of the disease from this single phenomenon. We are assisted in forming our opinion, by observing whether a doubtful rattle is heard on one or both sides of the chest; for, as Louis remarks, pneumonia is commonly confined to one side, while catarrh ordinarily exists on both.[1]

The second stage of pneumonia, that of hepatization, is distinguished by signs proportionate to the singular change of structure undergone by the pulmonary tissue. The sound on percussion is entirely flat—"tanquam percussi femoris."

The natural murmur is suppressed and gives place to the bronchial or tubular respiration; the voice is heard with unnatural force over the parts affected, sometimes with a startling proximity to the listener's ear. We have previously mentioned that the character of the increased vocal resonance may be that, which, when heard over a cavity in the lungs, is called pectoriloquy. If, as is common in this disease, there is also a slight pleuritic effusion, the voice may have something of the bleating character which is found in pleurisy; a modification designated by M. Bouillaud as bronchoægophony.[2] So constantly do the physical signs of hepatization exist in pneumonia, that I have heard M. Louis say in his lectures, he had not seen a case during five years in which the affection went on to recovery without this change having taken place. At this epoch it is difficult to confound pneumonia with any other affection excepting pleurisy. The entire absence of respiration at the points

[1] Lectures. [2] Dict. de Med. et Chir. prat. Article Pneumonie.

occupied by the effusion, the presence of marked hægophony, the dilatation of the chest in the latter, and the crepitous rattle at the edges of the parts flat upon percussion, with bronchial respiration and bronchophony over the parts without resonance in the former; such are the signs which will generally enable us to draw the distinction. Mildness of the general symptoms is strong reason in a doubtful case to suppose the existence of pleurisy.[1]

The third stage of pneumonia, purulent infiltration, has little in its physical signs to distinguish it from the second, unless it be the rattle in the bronchiæ, owing to their more copious secretions, or to the pus poured into them at this epoch of the disease.[2] We are obliged to form our opinion principally from the date of the disease and the character of the expectoration.[3] With regard to abscesses after pneumonia, as they are so rare as to form pathological curiosities, we need hardly fear mistaking them for tubercular cavities, with which their physical signs must agree substantially.

The resolution of the disease is announced by the return of the crepitant rattle at the points from which it had disappeared during hepatization, and of the vesicular murmur, with the gradual diminution of the flatness on percussion, the bronchial respiration and bronchophony. The two last phenomena sometimes persist a long time after the activity of the disease has subsided. I have indeed seen it long after convalescence was fully established. In these instances, there is probably an engorged or œdematous state of the lungs. At this period M. Louis is in the habit of applying a plaster of Burgundy pitch, which has seemed to him to hasten the resolution of this morbid state of the pulmonary tissue.

It is clear that in ascertaining the presence of the physical signs of pneumonia, we also learn its *situation*. It is a very important point to decide whether it occupy the upper or

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[1] Chomel, lectures. [2] Laennec, i. p. 422. [3] Andral, Clin. Med. i. p. 538.

the lower lobes. If it occupy the former, as was first remarked by Andral,[1] and has been confirmed by Louis and Chomel,[2] the prognosis is less favorable.

This circumstance is attributed by M. Louis to the age of the subjects, but it seems probable enough that the situation of the disease in itself should influence its issue. Some remarks of M. Bouillaud favor this supposition.[3] In the case of pneumonia complicating a tuberculous affection, it appears from my own observation, and the cases given in the Memoir of Dr. Jackson,[4] that the intercurrent affection tends to attack the superior and anterior part of the lungs. In one instance I have seen a tuberculous patient struck down at once by intense pneumonia occupying the summits of both lungs, and carried off almost with the rapidity of cholera. At the anterior and superior part of the chest on both sides was an explosion of crepitous rattle at every inspiration. Although such may be the gravity of *double pneumonia* complicating tubercles, still, according to M. Louis, under these circumstances, the patient often recovers, whereas it is generally fatal in patients previously healthy. These remarks illustrate the importance of attending to the previous state of health of patients attacked with acute diseases, by which precaution we may often arrive at the knowledge of antecedent disease, which materially affects their prospects of recovery. A circumstance which renders the utility of direct exploration more general, is that pneumonia rarely remains profound, but it arrives at the surface, where the ear can detect it.[5]

The limits to which the physical signs are confined must obviously be those of the disease. These are often pretty exact; thus, it is common to find the flatness on percussion, bounded anteriorly by a vertical line passing through the axilla. Other things being equal, the gravity of the disease

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[1] Clin. Med. i. p. 569. [2] Lectures. [3] Dict. de Med. et de Chir. Art. Pneumonie. [4] p. 329, etc. [5] Chomel, lectures.

must depend upon its *extent*, and therefore our knowledge of this extent must form one of the data for the treatment.

At the same time that we learn the situation and extent of the disease, we acquire the means of determining its *progress* by a subsequent examination. We may follow it with an accuracy which shall approach that with which we mark the progress of erysipelas. As the limits of the disease are extended or narrowed in the interval of two examinations, we shall estimate its severity, its tendencies, the effect of treatment. If the points first attacked undergo resolution, this is considered favorable by Chomel, even although other points should be seized consecutively.[1]

If such be the utility of direct exploration in pneumonia, even when affecting adults, its importance is more absolute in the same disease affecting children.

In a memoir upon this affection by M. Rufz,[2] we find ample testimony to this effect. "We have never seen young children expectorate. The valuable diagnostic sign in pneumonia, furnished by the sputa, is entirely wanting then at this age." "As to the physical signs furnished by auscultation and percussion, it is upon them that the diagnosis of the disease principally rests, and we conceive that before their employment, the study of the pneumonia of young children during life must have been very obscure."

The signs obtained by auscultation and percussion were very similar to those found in adults, in children above the age of six, but in those of early age they offered certain peculiarities which may be briefly mentioned.

As in them the pneumonia was commonly double, the sound on percussion was obscure on both sides; so that it was necessary to compare, not the sonorousness of one side with that of the other, but that of both with the healthy standard.

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[1] Lectures. [2] Journal des Connaissances Med.-Chirur. Sept. 1835.

Instead of the crepitant rattle there was commonly a sub-crepitant rattle, with large bubbles.

The bronchial respiration was rough, short, blowing, without vesicular murmur.

There was no bronchophony, properly speaking, but M. Rufz has observed, while the child was crying, a sound like that of simmering water, or like the murmur of a shell.

These results are similar to those given by Dr. Gerhard, in the work we have already cited,[1] and were derived by these two observers from the laborious studies which they prosecuted together at the hospital for children in Paris.

We have seen then that pneumonia may be but imperfectly characterized by the general signs in adults, and that its symptoms are peculiarly obscure in children. We have seen that percussion and auscultation reveal its existence by signs often unequivocal in themselves, and still more decisive when compared with the general symptoms. That the knowledge of the existence of this disease leads to important therapeutic indications will be generally allowed. The utility of blood-letting, for instance, is peculiarly insisted upon in this affection. "From the time of Hippocrates to the present day, pneumonitis has been considered as one of the disorders in which the abstraction of blood is productive of the most unequivocal good effects."[2] "Some theorists, heretics in medicine, have alone dared to proscribe this remedy."[3] The use of tartarized antimony in this disease, has received the sanction of Laennec and Louis. If such and similar methods of treatment are called for in pneumonia, the signs which enable us to distinguish it are useful and important in medical practice.

We have seen that it could be distinguished *early*, and this renders its signs doubly valuable. Thus, Cullen tells us, "blood-letting will be more effectual when practised in the course of the first three days than afterwards."[4] Andral

[1] pp. 89, 90. [2] Good, Study of Med. Vol. ii. p. 330. Cooper's additions.
[3] Laennec i. 481. [4] First lines, etc. p. 363.

directs two or three bleedings in the first twenty-four hours, if the inflammation is not arrested.[1] In the same connection he speaks of cases undergoing resolution by the use of a bleeding of sixteen or twenty ounces at the commencement. Similar testimony is borne by M.M. Broussais and Chomel.[2] That even moderate bleeding is to a certain degree more useful when practised within the first four days than afterwards, is established by the tables of M. Louis.[3] M. Bouillaud, who carries bleeding to a far greater extent, (mean term 4 lb. 9 or 10 oz.; maximum 10 lb.,) ventures to conclude, "by means of blood-lettings thus repeated one after another, to the extent of four in the course of twenty-four hours, we shall scarcely lose a single patient with pneumonia, in whom the disease is recent, of small or at least moderate extent, and has not yet reached the third stage" [4] (purulent infiltration). I introduce this statement among the rest, without meaning to stand sponsor for its exactness, hoping for the sake of humanity that there may be more in the assertions of the enthusiastic professor of La Charité, than some have been willing to allow. It will be observed that the state of hepatization does not, according to him, prevent this treatment from being efficacious. This might have been inferred from the rapidity with which the change in question takes place; sometimes in twenty-four hours of disease, as in a case I have witnessed. We need only add that whatever local remedies are employed, whether depletive or revulsive, the surest guide for their application is a knowledge of the situation and extent of the disease.

Pulmonary Œdema.

We have already had occasion to refer to this disease in speaking of the diagnosis of pneumonia. According to Laennec and to M. Bouillaud,[5] it rarely constitutes an idiopathic

[1] Clin. Med. ii. 572. [2] Dict. de Med. et Chir. prat. Art. Pneumonie. [3] Recherches sur la saignée, 2d edit. pp. 12—36. [4] Dict. etc. Art. Pneumonie. [5] Dict. de Med. et de Chir. prat. Art. Œdème.

and primitive disease. The same authors consider it as often succeeding to pneumonia. Laennec remarks, that although it commonly supervenes at the close of acute or chronic diseases, and often a few hours only before death, he has seen it in many cases last weeks or months, and in some cases seem to be idiopathic.[1] He declares that its symptoms are extremely equivocal; and the author of the article Œdema, in the Dictionary just cited, confirms, or more probably repeats his assertion. This writer tells us that by means of attentive exploration, we may pretty frequently recognize the existence of passive œdema. One of its marks is, diminution of sonorousness of the chest on percussion. But Laennec attaches little value to this sign, because the two sides are commonly both affected, and even if only one is so, the result of this method of investigation is unsatisfactory, doubtless because there is still much air in the vesicles.[2] The respiration is feeble, and a rattle is heard which Laennec calls "crepitant, or rather *subcrepitant*," the bubbles of which are "larger, and convey to the ear a more evident sensation of moisture."[3] I may observe, that Dance, the lamented author of the article Auscultation, in the second edition of the Dictionary in twenty-one volumes,[4] in speaking of the crepitous rattle says, that it is found only in a single case, that of pneumonia at the first degree, of which it forms the pathognomic sign. But, in speaking of the subcrepitant rattle, he mentions œdema as one of the affections in which it exists. "A little bronchophony is found, particularly at the root of the lung. But the long persistence of the crepitant rattle, and the absence of the general signs of inflammation, enable us almost always to distinguish œdema of the lung, from pneumonia at the first degree, even where these diseases co-exist."[5]

It is evident that the therapeutic indications in this disease

[1] Auscult. Med. i. 337. [2] Ibid. 341. [3] Ibid.
[4] Dict. de Med. ou Rep. General des Sciences Medicales. (Paris, 1833.)
[5] Auscult. Med. i. 341.

are those which arise in other forms of dropsical effusion. Whatever means may promote the absorption of effused serum, must be of peculiar importance when this fluid is deposed in the midst of organs so essential to life. Thus, although this affection is by no means one of those which from their frequency, their intrinsic gravity, and the striking character of their physical signs, would be chosen to demonstrate the utility and importance of direct exploration, yet as its symptoms are obscure, its signs capable of materially assisting us, and the indications for its treatment different from those of diseases with which it might be confounded, it illustrates the value of the information to be derived from the methods of examination whose usefulness we are discussing.

Pulmonary Apoplexy.—Gangrene of the Lung.

The utility and importance of direct exploration, are comparatively limited in both these affections. This is because both of them have certain symptoms which must to a great degree prevent them from being confounded with other affections. In pulmonary apoplexy, the existence of copious hæmoptysis will alone afford the principal indications for treatment. However interesting it may be to explore the condition of the lungs in such cases, it could add little to direct us in the course we are to pursue. On the other hand, if there exist an apoplectic centre in the lungs without hæmoptysis, the diagnosis will often be obscure and probably in some cases impossible. Laennec mentions as the physical signs, flatness on percussion when the effusion of blood is extensive, absence of respiration, and at the edges of the diseased points, the crepitous rattle.[1] M. Piorry, in three cases to which we have alluded before, found a circumscribed flatness on percussion, but nothing by auscultation worthy of notice.[2] M. Cruveilhier declares that auscultation and percussion have taught him

[1] Auscult. Med. i. p. 372. [2] Ibid. 373, note.

nothing in this affection.[1] His twenty-third proposition begins as follows. "The diagnosis of pulmonary apoplexy presents very great difficulties in the greater number of cases."

In gangrene of the lung, the characteristic fœtor of the sputa is in itself a substitute for almost all other signs.

Chomel has observed the odor of phosphureted hydrogen or of anatomical objects undergoing maceration, not only in this affection but in pneumo-thorax with communication between the bronchiæ and pleura.[2] We shall see, in treating of the latter affection, that its physical signs are very distinct from those of gangrene of the lung. Dr. Gerhard mentions, also, certain cases of bronchitis in which the sputa are fetid, and in which the rattle occasioned by mucus copiously secreted in the bronchiæ, might be mistaken for gurgling.[3] Notwithstanding these exceptions, the true gangrenous odor is so far satisfactory evidence of the existence of gangrene in the lung as to form almost, if not, as Louis has said, absolutely a characteristic sign. The signs, according to Dr. Gerhard, are a mucous or sub-crepitant rhonchus without alteration of the resonance on percussion, followed by gurgling, cavernous respiration, and pectoriloquy. The sound on percussion may become obscure over the affected part, or if a large cavity is formed, extremely resonant, as in a case mentioned by the same author.

In these two affections, which we have classed together, the use of direct exploration is, as we have seen, confined within narrow limits, yet is not to be entirely rejected, even on the ground of inutility. With regard to the first we are inclined to believe that subsequent observation will establish its physical signs with greater certainty. In the second, which has a symptom so far constant and characteristic, the study of the physical signs must always be to a considerable extent the indulgence of pathological curiosity.

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[1] Dict. de Med. et Chir. Art. Apoplexie. [2] Lectures.
[3] Diagnosis of diseases of the chest, p. 98.

Emphysema.

The term Asthma was formerly applied to a certain number of affections different in their nature, but characterized by some peculiar symptoms, particularly fits of difficult breathing. But how loose was the connection between many of the diseases thus classed together may be seen by looking over Sir John Floyer's Catalogue of "Diseases which produce the Asthma as a Symptom."[1] They are, 1. Suppression of the menstrual or hemorrhoidal evacuation. 2. Plethora. 3. Polypi in the heart and lungs. 4. Coagulation of the chyle in the lungs. 5. The obstruction caused by "the viscid serum in a pneumonia," &c.[2] 6. Stones in the lungs. 7. Pica and other cachexies. 8. A long catarrh. 9. Fevers, small-pox, &c. 10. Vomica. 11. Every external compression of the lungs. 12. "Tumors of the viscera which produce a spurious asthma, as that of the liver, spleen, kidneys, pancreas, and all hydropical tumors." He then goes on to describe those symptomatic asthmas which succeed cephalic diseases. Later authors than Floyer seem to have confounded different diseases under this title. Such was the case with Cullen, who unquestionably mistook the cause for the effect when he said, "In some young persons it has ended soon by occasioning a phthisis pulmonalis. After a long continuance it often ends in a hydrothorax; and commonly by occasioning some aneurism of the heart or great vessels, it thereby proves fatal."[3] Similar notions are expressed by Dr. Good,[4] and they are criticized in a similar manner by his editor, Mr. Samuel Cooper, who was acquainted with the labors of Corvisart and Laennec.

It is probable that errors of important consequence to the

[1] A treatise of the Asthma. London. 1717. p. 96.

[2] The author observes that "these pneumonic spitting asthmas have been observed upon dissection to have tubercula or schirrosity in the lungs; and they frequently turn to an abscess, and that into an empyema." p. 98. On the next page he says, "but all these asthmatics usually die consumptive."

[3] First Lines, par. 1387.

[4] Study of Med. i. 430.

patient, are, even at the present day, committed, from a want of proper acquaintance of practitioners with the history and signs of emphysema. M. Louis mentions a case in his lectures, in which he was consulted by a patient in whom the existence of tubercles had been so much apprehended, that he was on the point of changing his residence in the hope of arresting the disease, but in whom the disease was discovered by a careful examination to be emphysema. It is proper, then, since its symptoms have been, and may be, taken for those of other affections, to devote a little attention to its physical signs and their value. These are, first, unnatural prominence of the chest, shown by *inspection*. A good instance of this may be found in the sixth observation of Laennec. M. Louis is in the habit of examining his patients in the erect posture, taking great care that they stand in a perfectly even manner, with both arms disposed in the same position. By taking these precautions, the most delicate degrees of difference, in the formation of the two sides, may be detected. The parts particularly to be examined are the sternal edge of the cartilages of the ribs, the regions above and below the clavicles, and generally, the anterior parts of the chest. If any inequality is perceived in the region covered by the pectoralis major, we must examine if there is any difference in the size of these muscles on the two sides.

It is to be remembered that the left side of the chest is apt to be a little more prominent than the other, a circumstance which had struck me in the examination of some cases of pneumonia, presented to a society,[1] at which time I mentioned it, and one which has been remarked upon by M. Woillez in an inaugural thesis. M. Louis appears to have noticed it, but I have never heard him refer to it to my recollection. As it has presented itself to me in the cardiac region, it may possibly be in some degree the consequence of the heart's action.

At the same time that the parts corresponding to the seat

[1] Societé medicale d' Observation, Paris.

of emphysema are more prominent, they return a clearer sound on *percussion*. This is sometimes almost tympanitic.

The *respiratory murmur* at the same points is feeble; it is not uncommon to hear a sibilant or sonorous rattle, sometimes in the form of a prolonged musical vibration.

I have repeatedly observed, in cases of emphysema, that the respiratory sounds offered no interruption, but were continually going on, as if the expulsion of the air were kept up during the intervals of inspiration and expiration by a mechanism like that of a double bellows. In such cases I have heard a continuous musical sound in the chest. It must be in these circumstances that some power in the lungs themselves, either of mechanical or vital contraction, operates to expel the air while the thoracic parietes are at rest, or on the other hand, that the force of inspiration has slightly condensed the air in the obstructed vesicles, which escapes by its own elasticity during the intervals of inspiration and expiration.

Laennec considered the dry crepitant rattle with large bubbles as pathognomic of this form of emphysema when heard at considerable intervals, for some instants, and in a limited extent. In some very thin subjects he even felt crepitation on pressing with the finger.[1] Dr. Townsend has found the rattle in question repeatedly, both in vesicular and interlobular emphysema; but at other times it has been wanting.[2]

M. Louis remarks in his lectures, that the emphysematous patients are commonly suffering, at the time they enter the hospital, with the complication of catarrh; and that in these cases it is usual, as in other cases of bronchitis, to find a subcrepitant rattle at the lower and posterior part of both lungs. M. Bouillaud remarks, that it is somewhat surprising Laennec has not mentioned among the signs of vesicular emphysema, the sound of friction (or movement of ascent and descent).[3] He considers this fact established by the

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[1] Auscult. Med. i. 297, etc. [2] Lond. Cyc. Art. Emphysema.
[3] Dict. de Med. et Chir. Art. Emphys.

observations of M. Reynaud. Dr. Townsend has witnessed the same phenomenon.[1] Sometimes the hand applied to the chest, can perceive this movement of friction; and according to M. Reynaud, it may be heard by the patient or an observer at a certain distance.[2]

The signs which we have mentioned, if well characterized, could not permit us to confound the disease a moment with any other than pneumo-thorax. But in this last affection, we must remember that there is almost universally pleuritic effusion; the tympanitic sound is far more intense in the part occupied by the air, the respiration is totally absent, and there is no rattle at the same points. If the pneumo-thorax be from perforation of the lung, as in the great majority of cases, the suddenness with which the accidents come on, and the existence of the amphoric respiration, or the metallic tinkling, will render it impossible to confound the two affections. The real difficulty of distinguishing emphysema, is in those cases where the lesion is slightly marked, and at certain parts of the lungs, as at the diaphragmatic or mediastinal surfaces, it must elude the methods of direct exploration.

Still, it is useful and important in medical practice, to know that in many cases an examination of a few moments, may decide by positive evidence, that symptoms which have occasioned distress and alarm, are owing to a lesion, of which it is true we can only palliate the symptoms and perhaps delay the progress,—but a lesion which is not inconsistent with long life, and above all which does not set upon the patient and his children, the seat of the tuberculous cachexy.

Interlobular emphysema, is considered by Laennec as a traumatic lesion, developing itself instantaneously, due most frequently to forcible and long continued retention of the air inspired in long continued efforts.[3] He remarks that the

[1] Lond. Cyclop. etc. [2] Dict. ibid. [3] Auscult. Med. i. 324-7.

dry crepitous rattle with large bubbles, is always more pronounced in this than in the vesicular variety of emphysema. The sound of friction belongs also to this variety. M. Bouillaud considers the distinction of these two affections difficult, when there is projection of the air-cells in the vesicular form; but he adds, "happily this distinction is of very little practical importance."

Bronchitis—acute, chronic.

Most physicians have probably seen cases in which, at the time when they were called upon to direct the treatment of a patient, they were unable to say whether the substance of the lungs, or only the bronchial membrane was affected with inflammation. I have repeatedly seen cases, where the symptoms were so far from decisive, that it was necessary to form an opinion principally from the physical signs. A case of this kind occurred to my notice not long ago. The patient, a stout boy, had been complaining for some days; but little attention had been paid to him, and he had been doing his best to move about and take food as usual. I saw him in company with an intelligent physician, who had paid little attention to the arts of direct exploration. The boy had coughed, there was considerable febrile movement, with some pain in the chest; the sputa had not been preserved, and he did not cough in our presence. My friend, whose opinion was formed from the general symptoms, supposed the patient to be affected only with bronchitis, to which of course he attached little importance. A moment's examination by percussion and auscultation, showed that one of the lungs was not only inflamed, but that hepatization had already taken place. Active measures were immediately employed, and followed by relief and recovery. The characteristic sputa which were observed a day or two after the examination referred to, left no doubt, if such could have existed, of the nature of the disease. The confusion of in-

tense catarrh, with pneumonia, has been remarked by Dr. Williams,[1] and indeed the loose term, "inflammation in the chest," is employed to shield the inability of practitioners, sometimes to distinguish between these two affections, and sometimes to cover doubts which are still more vaguely multiplied.

The most important results afforded by direct exploration in bronchitis, are negative. "When the catarrh is simple, however intense it may be, the chest resounds well throughout."[2] In examining the respiration, we may find it absent at certain points, where it returns however, after the act of coughing has removed the secretion which obstructed the bronchial tube leading to the part.[3] The absence of bronchial respiration, and the existence of the sonorous, the sibilant, the sub-crepitous or mucous rattles at the posterior and inferior part of the lungs, commonly on both sides of the chest, are sufficient to reveal its presence. But it is necessary to say, that in a certain number of cases, probably when the disease attacks the minuter ramifications of the bronchiæ, the sub-crepitous approaches so nearly in character to the crepitous rattle, that it requires attention and habit to distinguish them. The very certainty with which the crepitous rattle indicates the presence of pneumonia, leads us naturally to refer the solution in doubtful cases entirely to the character of the rattle; and when this is done by those not thoroughly familiar with the two sounds in question, they are liable to fall into error. Dr. Williams even arraigns the accuracy of Andral on this point, and says very plainly that it may be owing "to his having neglected the efficient clinical instructions of the great inventor of auscultation,"[4]—a peculiarity in M. Andral's course, which Laennec mentions with the remark—"this method seemed to me rather singular."[5] I can add that M. Louis, who believes that Laennec himself sometimes confounded the sub-crepitous and crepitous rattles,

[1] Rational Exposition, p. 77. [2] Auscult. Med. i. p. 134. [3] Ibid. p. 136.
[4] Rat. Exp. p. 75. [5] Preface to 3d edit. of Auscult. Med. p. 12.

very rarely expresses any doubt by which title to designate sounds of this kind; and I believe that any one with attention and opportunity, may arrive at a similar degree of confidence. But it should never be forgotten, that direct exploration is but one of our means of ascertaining the character of a disease; that in some cases the most penetrating observers are obliged to wait a little for the development of more distinguishing signs or symptoms before they form an opinion; and that this is far wiser than to leap to a conclusion, trusting to the guidance of that *medical tact*, which like a dark lantern, seems to its possessor full of light, while it illuminates nothing but its narrow receptacle. Having ascertained the existence of bronchitis, the prognosis is of course more favorable, and the treatment may be much less active than in cases where the tissue of the lung itself is affected. I do not mean to say, that catarrh is never a grave disease; for it is supposed that the Peripneumonia notha of Sydenham, was only an intense bronchitis, affecting the minuter ramifications of the bronchiæ, and the epidemic influenzas have sometimes been attended with threatening symptoms; but notwithstanding the extreme frequency of this disease, under ordinary circumstances it is almost never fatal in adults, and according to Dr. Gerhard, rarely so in children, unless it be followed by lobular pneumonia.[1] However much the course of bronchitis may be abridged, and its symptoms mitigated by appropriate treatment, it recovers in the vast majority of cases in spite of neglect and exposure. But the disease with which it is especially liable to be confounded, pneumonia, is one, which of all others, calls for the employment of the most active treatment. Therefore, the signs derived from the use of direct exploration, positive and negative, affording an essential assistance in distinguishing them, are to be considered with reference to this disease, both useful and important.

[1] Op. cit. p. 71.

In *chronic* bronchitis, the absence of flatness on percussion, of bronchial respiration and bronchophony, show that the tissue of the lung has not undergone induration. These negative signs, with the presence of subcrepitant or mucous rattles at the posterior and inferior parts of the lungs, serve to distinguish this disease from phthisis. When we look at the rational signs, we find that it would often be absolutely impossible to distinguish the two affections by means of them alone. Instances may be found in the works of Bayle[1] and Andral,[2] in which the symptoms had all the aspect of those of a tubercular affection, and yet the tissue of the lungs was found entirely free from disease. Now although chronic bronchitis may produce death with all the appearances of phthisis, yet the prospects of benefit from treatment are immeasurably greater in the former. Laennec mentions different means as having been successful, among which are repeated emetics, spirituous remedies, and particularly *punch*, the balsamics, and the vapor of tar. If the two affections are confounded, we may on the one hand distress a patient, whose lungs are already disorganized to a great extent, with remedies which may aggravate, but cannot remove his disease, and on the other hand content ourselves with simple palliatives in a disease capable of recovery under the use of certain agents, but one which "far from tending naturally to a cure, on the contrary becomes aggravated in proportion to its duration and the progress of age." It is therefore in the highest degree important to determine whether a disease which presents the symptoms of phthisis is in reality tuberculous or catarrhal. If the physical signs of the first kind of disease are proved absent by repeated examinations, if on the contrary those which belong to the latter are present, however formidable may be the general symptoms, there is still much to be done and to be hoped for.

I will only advert to a single example to enforce the

[1] Recherches sur la Phthisie Pulmonaire, Obs. 48, 49. [2] Clin. Med. Vol. i.

necessity of caution in drawing conclusions from symptoms. The fifty-third observation of Bayle contains a most interesting history of his own disease. It began in 1802, and presented the symptoms of phthisis to such a degree that he himself and the physicians around him looked forward to its speedy and fatal termination. About two months from its commencement, there took place a violent chill followed by the most profuse sweating. A few days after he was convalescent, and in a month from the apparent crisis his health was entirely re-established. From that time until 1810, when the work which contains this observation was published, he had no symptom which resembled phthisis, and was then enjoying good health. The observation is entitled "Chronic pulmonary catarrh, having all the appearances of pulmonary phthisis, cured spontaneously." He died soon after, of pulmonary phthisis.

In looking over the symptoms, it is rational to suppose that the phenomena which he has recorded were due to the same lesion which terminated his life so many years afterwards, but as there is no mention of the employment of percussion, the only method of direct exploration then practiced which would have afforded information, our belief must result wholly from analogy.

Dilatation of the Bronchiæ.

It is not very uncommon to find a slight dilatation of the bronchiæ in patients in whom it had not been suspected during life. Much more rarely, a patient who had presented the symptoms of phthisis is found on examination not to have been tuberculous, but affected with the lesion in question. The disease being an organic change not susceptible of cure, and capable of producing death with the general symptoms of phthisis, it is a matter of less consequence to distinguish these two affections than many others. And it is in this very case that the physical signs are most apt to be insuffi-

cient to establish the diagnosis. For in both affections there may be formed extensive cavities, which shall give rise to similar phenomena of the voice and respiration. Percussion generally gives a flat sound over a tuberculous cavity, due to the condensation of the pulmonary tissue around it. In dilatation of the bronchiæ, the compression of the pulmonary tissue may, according to Laennec, diminish the sonorousness on percussion, but this sign he says is commonly little marked.[1] Dr. Williams[2] mentions the regions principally affected in this disease as the scapular, mammary and lateral,[3] while, as we have seen, the seat of tubercles is most commonly about the subclavian and acromial. The absence of flatness on percussion to any considerable degree, and the situation where the signs of disease are found, may sometimes enable us to draw the distinction between these two diseases. In the only case of fatal dilatation of the bronchiæ which I remember seeing in the wards of la Pitié, M. Louis had long recorded a correct diagnosis, founded in a great measure on these circumstances. The eleventh observation in his work on phthisis, entitled "Dilatation of the Bronchiæ at the summit of the Lungs, taken for a tuberculous excavation," is one in which the diagnosis must have been very difficult; but even in this instance the perfect sonorousness under the clavicles left some doubt in the observer's mind, as it seemed probable to him that a tuberculous disease of so long standing would have produced some induration, and consequently flatness on percussion. The mistake was committed however; it may be committed again, but it cannot be very often; for, as Louis remarks, such cases are rare, and many years will probably elapse before the observer will meet with one entirely resembling it. I have seen a patient with regard to whom M. Louis had long hesitated whether to consider her affection as dilatation of the bronchiæ or tubercles. He

[1] Ausc. Med. i. p. 203. [2] Lond. Cyc. Art. Bronchitis.
[3] See 'Rational Exposition.'

was much inclined to favor the first supposition from the existence of the physical signs of disease at the posterior and inferior parts of the lungs. The patient proved to be affected with tubercles, but it was one of those exceptional cases, in which the disease had been more fully developed in the lower than in the upper parts of the lungs.

While I have been writing this dissertation, an intelligent physician from a neighboring town mentioned to me a case in which he and his brother auscultators had diagnosticated a tuberculous disease, although the physical signs were not found in the common region of this lesion; but on examination, they found the disease was dilatation of the bronchiæ.

We are justified then in insisting upon extreme caution in giving an opinion in doubtful cases of this nature; not on account of the patient, so much, who may die of either affection, and can hardly be cured of either, as for the sake of the physician, and the art, which suffer from all such errors.

We conclude that direct exploration is useful in this affection, because it may distinguish it from phthisis, and at any rate is capable of revealing the presence of the cavities formed by the dilated bronchiæ, which at once shows the patient to be affected with a disease which we must not expect to overcome by the use of remedies, as we may do in certain catarrhs having the same general symptoms.

Diseases of the Pleura.

Pleurisy.—Empyema.—Pneumo-thorax.

We arrange these diseases together for these reasons. The notion that *Empyema* is formed by a collection of matter which has escaped from a vomica, is entirely exploded. A tubercle or a tuberculous cavity does indeed not unfrequently open into the pleura, but the collection of matter which follows in the chest is the consequence of the pleurisy excited by the presence of the tuberculous matter, or of the

air, which act as irritating foreign substances upon the serous membrane. *Pneumo-thorax* is almost always owing to a similar cause, and consequently complicates pleurisy.

As the general notion attached to pleurisy is that of a pretty well characterized disease, it may not be uninteresting or useless to glance at the history of its diagnosis, as found in the works of the ancients and moderns. In the first place, the ancient writers appear to have confounded the disease with pneumonia, by the characters they assign to the sputa, which are, according to several of the most distinguished authors, "bilious," bloody, yellowish, viscous, greenish, or blackish.[1] At other times they appear to have confounded it with hepatitis, the distinction between which and pleurisy is much insisted upon by Trallian and Paul of Ægina,[2] and may be seen illustrated in the story told by Galen and known as "Hepatici cognitio."[3]

Aetius devotes a chapter to an affection resembling pleurisy, the consequence of indigestible food, ("De ea quæ pleuritis esse putatur quum tamen non sit."[4]) Among the authors of more modern times, Boerhaave tells us that the fever is sometimes masked by the difficulty of respiration, "unde sæpe turpiter fallitur medicus."[5] Baglivi attributes the greatest consequence to the kind of pulse as a diagnostic sign, and even begins his chapter on pleurisy with these words—"Si vis cognoscere pleuritidem, præcipuam curam in natura pulsûs reponito, pulsus durities est signum fere infallibile omnium pleuritidum."[6] And it is on the very next page, and speaking of this same affection, that he makes the often quoted exclamation on the difficulty of treating, and the still greater difficulty of diagnosticating and foreseeing

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[1] Vide Aretæude, Caus. et Sign. Acut. Morb. Lib. i. Cap. x. Alex. Trallian. Lib. vi. Cap. i. Paul. Ægin., Lib. iii. Cap. 33. [2] Loc. Cit. [3] De Locis Affectis, Lib. 5. Cap. 7. [4] Tetrabibl. ii. Sermo. iv. Cap. 69.* [5] Aphorism, 882. [6] Prax. Med. Lib. i. Cap. 9.

* He says in this chapter, "Unde quidam medici errore seducti, vena cubiti incisa, multo que sanguine evacuato, mortis causam ægris præbuerunt."

the issue of diseases of the lungs. With such tests as he relied upon, well might he acknowledge, "Fallunt vel peritissimos ac ipsos medicinæ principes." One of the authors quoted in the Sepulchretum of Bonetus, tells us that in many post mortem examinations of patients supposed to have been affected with pleurisy, he has found the *lungs* with the pleura investing them in a state of disease, and therefore concludes that pleurisy is rarely solitary.[1] No better commentary on the deficiency of the long established diagnostic signs of pleurisy can be found than in the commencement of the sixth chapter in the second book of Cullen's First Lines; "Of pneumonia, or pneumonic inflammation." "Under this head I mean to comprehend the whole of the inflammations affecting either the viscera of the thorax, or the membrane lining the interior surface of that cavity; for neither do our diagnostics serve to ascertain exactly the seat of the disease; nor does the difference in the seat of the disease exhibit any considerable variation in the state of the symptoms, nor lead to any difference in the method of cure." In the Memoires de l'Acad. des Sciences for 1789, is a memoir of M. Portal, entitled, "An observation proving that pleurisy is not a disease essentially different from peripneumony."[2]

One would have supposed that the presence of fluid in the pleura would be denoted by symptoms which could hardly admit of mistake. But experienced observers have supposed that there was fluid in the chest when there was none, and overlooked it when actually present. "Sed quae tamen, ut veræ sunt, ita non faciunt, quin illæ pariter veræ sint quas opposuit Reimannus, eaque præsertim quæ medicum exercitatissimum Jo. Jacobum Vicarium eo adduxerat ut ob istud imprimis signum, *jurare* se posse, crederet, *infallibiliter ægrum hydrope pectoris laborare*, cujus mortui aperto thorace cum in dextero, sinistroque hujus cavo *nec drachmam unam aquæ; aut seri inveniret;* nunquam satis laudanda ingenuitate

[1] Vol. i. p. 620.

[2] Laennec, ii. 283. Note.

mirabundus exclamavit, *quam fallacia sunt subinde diagnostica!*"[1] "But it is rare that all these symptoms coexist; commonly a greater or less number of them are wanting, and sometimes there are scarcely any. The diagnosis is then difficult or even impossible. Consequently, there are many examples of *empyema* which have only been recognized at the examination of the body after death, and whose existence had not even been suspected during life."[2] "The opposite error is more difficult and more rarely committed; still there are examples of persons supposed affected with empyema, and in whom an opening has been made into the chest without finding any fluid in this cavity. Dionis informs us that in his time a surgeon, and a skilful one, practised the operation for empyema upon the duke of Mortemart, and found nothing in the chest."[3] The author goes on to say that the result of this operation was not mentioned, but that we can conceive it might have dangerous consequences in a disease which could be taken for empyema. I have been informed, upon the highest authority, that a similar operation was performed many years ago by a practitioner, then celebrated in this part of the country, upon a patient laboring under phthisis, under the vague notion of getting rid of matter contained in the lungs. It so happened, that he opened upon their most healthy portion, so that collapse of the lung and pneumo-thorax must have been the immediate consequence. Symptoms of the most threatening nature instantly declared themselves and death occurred in a very few days.

I have, perhaps, occupied too much space to show the insufficiency of the general signs to distinguish pleurisy, and its consequence, empyema, with certainty. Let us now examine the physical signs which characterize the different changes that take place in the cavity of the pleura in conse-

[1] Morgagni, de Sed. et Caus. Morborum, Epist. xvi. P. ii.
[2] Boyer, Traité des Mal. Chirurg. Tom. vii. pp. 369, 370. (4th edit. 1831.)
[3] Boyer, Op. Cit. pp. 371, 372.

quence of or in connection with inflammation. These consist in the presence of false membranes, the accumulation of fluids, liquid or gaseous, and in certain changes which follow the absorption of these fluids.

The most remarkable sign which indicates the existence of false membranes on the pleura, is the *bruit de frottement*, the motion of ascent and descent, or, as Dr. Forbes translates it, the sound of friction. This sign, first observed by M. Honoré, and attributed by Laennec to interlobular emphysema,[1] has been since found by M. Reynaud[2] to exist in this condition of the parts in pleurisy ; a fact often since confirmed by other observers.[3] I remember a patient in whom it existed a considerable time, and was attended by a consciousness, on his part, of the jerking motion which accompanied the sliding of the roughened laminæ of the pleura over each other.[4] The other lesions which are sometimes accompanied with this sign, vesicular and interlobular emphysema, being characterized by symptoms very different from those of pleurisy, will rarely be confounded. There ought, in these cases of *dry pleurisy*, as they have been called, to be a certain degree of obscurity upon percussion, perhaps some modification of the respiration and voice, but it is more common to find liquid effusion at the same time that there exists membranous exudation.

For the diagnosis of pleurisy, with fluid effusion, direct exploration offers more resources than for that of any other affection. All its different methods in fact are applicable.

Inspection reveals to us either the dilatation of the chest or its immobility. The first circumstance had been observed by Hippocrates. "Quibus latus sublevatum in tumorem ac calidius est——his pus ex una parte est."[5] Laennec remarks, that this has been observed by all the authors who

[1] Auscult. Med. i. 119, 120. [2] Id. Note. [3] Vide Auscult. Med. ii. 319. Note. [4] Since this dissertation was submitted to the committee, I have seen a case in which the sound of friction was perceptible at the foot of the patient's bed, or at a distance of about five feet. [5] Coacæ Prænotiones, Vol. i. p. 564. Edit. Vander Linden.

have treated of empyema, but adds, from his own observation, that it exists in recent pleuritic effusion.[1] He even says, "I have seen the chest manifestly dilated in the space of three hours"[2] (from the invasion).

The *immobility* of the chest, in a case of pleurisy with effusion, is thus mentioned by Stoll. "Thorax dexter in inspirando vix attollebatur, cum totum ferme respirationis negotium perageretur pulmone sinistro; ubi dexter thorax levissime solum, et nonnisi ob nexum cum thorace sinistro, modicissime elevaretur. Hæc inequalis utriusque thoracis elevatio et visu poterat observari, et imposita utraque ad utrumque thoracem manu."[3]

Mensuration, which is only mediate inspection, is a means of verifying the apparent dilatation of the chest, rather undervalued by Laennec, who says that half an inch of difference in the circumference of the two sides of the chest is sensible to the eye, and that when the difference is less than this we cannot trust to the accuracy of our measurement.[4] To render this method more exact, M. Chomel makes use of a measure like that of shoemakers, which like many other cumbrous contrivances will probably be only employed by the inventor.[5]

Palpation, like inspection, shows us the dilatation of the affected side, if it be considerable, or the fluid tends outwards—("prominens collectio sentitur"[6])—and the immobility of the affected side. We may learn by this means also the change of position of the heart, by its pulsations heard out of place, and the depression of the liver or spleen, by feeling them beneath the ribs—circumstances which happen in very copious effusion.[7] M. Reynaud first called the attention of observers to the absence of the natural thrill as perceived by the hand upon the chest while the patient is

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[1] Auscult. Med. ii. 318. [2] Ib. p. 292. [3] Ratio. Med. Part iii. p. 105, 6. [4] Aus. Med. i. 19. [5] Vide Piorry, Procedé Oper. p. 65. [6] Cælius Aurel. Acut. Morb. 6, Lib. ii. Cap. 17. (Pleuritica passio.) [7] Vide Piorry, op. cit. p. 67.

speaking, at the part corresponding to the effusion.[1] Fluctuation may sometimes be detected,[2] which must be carefully distinguished from that of a superficial abscess.[3] Senac, Corvisart, and Pinel had observed an undulation in the intercostal spaces, which neither Laennec nor M. Piorry however were able to detect in the cases they witnessed.[4] The sign discovered by Mr. Tarral, and called by him "fluctuation peripherique"[5]—peripheric or superficial fluctuation, might be advantageously sought after by employing the process which will be mentioned hereafter.

Succussion, or the sudden agitation of the patient's body in order to produce the sound of the liquid in motion, is a physical sign long recognized as useful and important. Among the ancient authors, it was repeatedly mentioned by Hippocrates,[6] as also by Galen,[7] by Aetius,[8] and among the Arabian authors by Avicenna.[9] Laennec speaks of several more modern authors who relate cases in which they heard the sound of fluctuation during the spontaneous movements of the patient, among whom are Ambrose Paré, Willis, and Morgagni.[10] Mr. Samuel Sharpe, as is stated by Cooper[11] had observed this phenomenon. He compares the sound, as did Paré also, to that produced by shaking a vessel half full of water. But notwithstanding such ancient and respectable authorities; notwithstanding that Laennec had observed it himself nearly forty times,[12] M. Begin complains that this element of diagnosis is too much neglected,[13] a neglect probably owing to the greater constancy of the signs afforded by auscultation and percussion. In fact, in order to produce a sound upon succussion, the effusion must be in considerable

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[1] Laennec ii. 319. Note. [2] Warner's Cases in Surgery, cases 31, 32. [3] Lond. Cyc. Art. Empyema, (Dr. Townsend,) Art. Pleurisy, (Dr. Law.) [4] Piorry, op. cit. p. 65. [5] Ibid. [6] De morbis ii. 45. Coacæ prænot. (Vol. i. p. 565, Ed. Vander Lind.) [7] De Locis affectis Lib. iv. Cap. 8. [8] Tetrabiblos ii. Sermo. iv. Cap. 65. [9] Lib. Canonis. iii. Fen. 10, Tract 4. [10] Ausc. Med. ii. 443. [11] Surgical Dict. Art. Empyema. [12] Auscult. Med. ii. 449. [13] Dict. de Med. et Chir. (Art. Empyema.)

quantity, and some aeriform fluid must exist in the cavity of the pleura at the same time. This coincidence is not found every day in walking through a hospital, but on the other hand it is not so rare as might have been supposed. I have myself seen two cases at least in which it existed, one of which will be again alluded to.

Percussion.—It is a matter of wonder that the old physicians and surgeons, who would "swear," as Morgagni says, that there was fluid in the chest, when in reality there was not "a single drachm," or perform paracentesis of the thorax upon a duke for an empyema which did not exist, and at other times overlook the existence of large effusions in the pleura, should not even by accident, and particularly in examining the bodies of their unfortunate patients, have observed that the side of the chest containing fluid, on receiving an accidental blow, did not return the natural clear resonance. When I have seen an ignorant patient detect by her own sensations the vibratory thrill occasioned by the voice in an indurated part of the lung, a sign which has only been known to medical observers for a few years, it has seemed unaccountable, that phenomena so much more striking, should have remained so long unnoticed.

But the first application of percussion to diseases of the chest, upon record, is to be found in the Inventum Novum of Avenbrugger. Among the few writers whose attention was attracted by his invention, was Stoll. In a case of pleurisy reported in the Ratio Medendi,[1] remarkable as being perhaps the best case with regard to the exact description of the physical signs before the days of Laennec, he says, "Thorax quoque dexter methodo Avenbruggeri pulsatus, illo sonitu caruit, quem aliàs sana thoracis cava, præscripta methodo pulsata, edunt." The treatise on mediate auscultation brought this method of exploration into notice, and its utility in pleurisy with effusion, is now so familiar to most

[1] Part iii. p. 106.

well educated physicians, that it is hardly necessary to bring forward evidence to prove its constancy. Laennec, who showed a tendency to underrate the value of percussion, compared with his own invention, auscultation, and M. Piorry, who makes a graven image of his pleximeter, have estimated differently the relative importance of the two methods.[1] I do not think it necessary to attempt to settle the rival claims of two modes of exploration, which should be used to assist each other, and considered also in the light of the general symptoms. Laennec himself remarks, that although the absence of sound on percussion might be owing to pneumonia as well as pleurisy, yet the general and local signs will enable us to distinguish them.[2] On one point it appears to me evident that Laennec is wrong, and M. Piorry right,—with reference to percussing the patient in different positions, and thus demonstrating the existence of a fluid by the change of level which must take place, and be rendered plain by the variations of the sound in the same points of the chest. I certainly remember an instance, exceedingly obscure in its symptoms, and in which I was unable to come to a conclusion, until this experiment settled the existence of an effusion. Laennec attaches more consequence to the great extent and the rapid supervention of the flatness upon percussion. "Not unfrequently," he says, "after some hours of disease, the sound is flat all over the side affected, or in its lower half, which never, or almost never happens in pneumonia."[3]

With regard to the quantity of fluid which it is possible to recognize by percussion, M. Piorry assures us that he is able to detect two or three ounces in the right side of the chest, and that if the natural sonorousness is wanting over the lung between the spleen and the spinal column, it is sufficient to excite suspicions of a pleuritic effusion.[4] I am willing to allow

[1] Auscult. Med. ii. 311. Procedé Op. p. 59, etc. [2] Loc. cit. [3] Ausc. Med. ii. 312. [4] Procedé Op. p. 69, 70. He mentions a case in which he announced a diagnosis of this kind, which was verified, notwithstanding the incredulity of his students.

that the refinements into which the ardor of prosecuting a new invention has carried M. Piorry, are too subtle in some instances for senses of common acuteness and common education. But that any considerable quantity of fluid cannot exist without manifestly changing the resonance on percussion, unless it were bounded by adhesion to the space between the lung and the diaphragm or mediastinum, or between the lobes, is so evident from *a priori* considerations, that the authority of Avenbrugger and Stoll, of Bayle and Corvisart, and the innumerable confirmations which this fact has received from Laennec and his successors, are an unnecessary luxury of evidence, except for those whose scepticism must be combated by the weight of illustrious reputations.

When, in consequence of tubercles or gangrene, a communication has been formed between the bronchiæ and pleura, there is a short interval during which the disease might be considered simple pneumo-thorax. But as the irritation produced by the foreign substances and the air, which suddenly come in contact with the serous membrane, is a necessary cause of pleurisy, within a very short space of time it becomes complicated with effusion of liquid. In the first transient state, the sound on percussion is of course generally tympanitic in the side affected, and the signs offered by auscultation, with the sudden supervention of the peculiar symptoms attending this accident, can leave no doubt of its nature. When there is liquid effusion at the same time, the region which it occupies is flat on percussion, as in other cases, while the tympanitic sound is obtained over the parts occupied by air. In the cases where aeriform fluids are developed by an effusion of long standing, the same signs will be found on percussion, but the character of the symptoms, with the absence of some auscultatory phenomena, will draw the line of distinction.

Auscultation.—Laennec considered the diminution or suppression of the respiration, and hægophony, or the bleat-

ing character of the vocal resonance, as the signs of pleuritic effusion derived from this method of exploration.[1] Andral remarked in certain cases, the existence of bronchial respiration and a vocal resonance, not very dissimilar to bronchophony.[2] Cruveilhier, who applies the term "tubaire"—tubular, to the respiration, voice, and cough, both of pleurisy and pneumonia, remarks, that the respiration and voice are jerking (saccadées) in the former, while they are full and distinct in the latter[3]—one of the principal characters by which Laennec distinguished hægophony from bronchophony.[4] Laennec affirms that this sign is never wanting at the commencement of pleurisy in a patient, where the serous membrane was previously free from disease.[5] He declares that he has found it in all the cases which he saw during five years, excepting such as had been chronic and were tending to recovery, or such as were very slight; and that he had even found it where there was effusion of only three or four ounces.[6] He remarks on the same page however, that this phenomenon ceases as soon as the effusion becomes very abundant, and especially when copious enough to produce evident dilatation. Thus this characteristic sign ceases just at the time that the results of inspection and percussion become so marked as to render it unnecessary.

In the complication with pneumo-thorax, the respiration and vocal resonance are wanting at the points corresponding to the collection of air, as well as those corresponding to the liquid; the lung being compressed backward so that only traces of respiration are to be found at its root, where also there may be hægophony.

If there is communication between the pleura and bronchiæ, the sound called by Laennec, "bourdonnement amphorique," or "utricular buzzing," may be heard. The

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[1] Ausc. Med. ii. 312. [2] Clin. Med. Vol. ii. 609—12. [3] Dict. de Med. et Chir. Art. Pleurisie. [4] Ausc. Med. vol. i. p. 70. [5] Op. cit. vol. ii. p. 320. [6] Ibid. vol. i. p. 73.

metallic tinkle is found in the same circumstances; but this phenomenon may exist without the communication of the bronchiæ and pleura.[1] The last sign may be met with in one other circumstance—the case of a vast tuberculous excavation.

While these phenomena are found on the affected side, the lung of the other side being obliged to perform its function with increased activity, the respiratory murmur acquires greater force, and becomes like that found in children, whence it is called puerile respiration. Pleurisy is not attended with rattles, unless accompanied with some other affection. Although it is frequent in pneumonia to find a layer of coagulable lymph on the pleura, yet according to Chomel,[2] this secondary pleurisy does not constitute a serious complication, and it is rare to find any considerable effusion co-existing with the same disease. The same author asserts that it is rare to find pleurisy in connection with bronchitis.

The question which presents itself most frequently, is to determine whether a patient presenting flatness upon percussion, on one side of the thorax, is affected with pleurisy with liquid effusion, or whether there is hepatization of the lung.

This question is almost always susceptible of resolution by careful examination. So many elements indeed go to decide the matter, that it is highly probable some among them will prove applicable to the difficulty. Thus, if percussion return a flat sound over one whole side of the chest, or to a great extent, and the general symptoms be very slight, this is, according to Chomel, evidence of the existence of pleurisy. Some signs are in themselves characteristic; as the dilatation and immobility of the chest, the sound upon succussion, the sense of fluctuation obtained in the common or more novel method, or the presence of distinct hægophony. On the other hand, the characteristic rattle of pneumonia may almost

[1] Auscult. Med. vol. i. p. 113, etc. [2] Lectures.

always be obtained by making the patient cough; and the bronchial respiration and voice are found on a level with the part flat upon percussion.

There is an exceedingly rare disease which may from time to time lead even a careful observer to announce the existence of pleurisy. I remember the case of a boy in the wards of M. Louis, who presented great dilatation of one side of the thorax, entire flatness on percussion, and absence of the respiratory murmur. It was supposed that all these signs were occasioned by the effusion of fluid, and that the patient was suffering under chronic pleurisy complicating a tubercular affection. The disease proved fatal; and on examination, it was found that the physical signs had been occasioned by an *encephaloid tumor*, which had gradually compressed the lung, and occupied the cavity of the pleura. Similar cases have been observed by others. Corvisart reports one which he witnessed,[1] and mentions two which were seen by Boerhaave and by Lallemant. Perhaps the barber mentioned by Fabricius ab Aquapendente had fallen on a similar disease. "Unde barbitonsor dixit, exire cerebrum, mirabatur enim veluti substantiam cerebri, tanta erat ejus crassities."[2] Laennec refers to instances of tuberculous and melanotic matter developed in the pleura, and of cysts in one instance between the intercostal muscles and the pleura, and in another occupying both sides of the thorax. But all these morbid productions in the pleura in the shape of voluminous tumors are extremely rare, and the case which I saw was thought worthy of being exhibited to the Academy of Medicine.

To illustrate many of the phenomena found in pleurisy with effusion, I will sketch the outline of a case which I saw a few years since, from notes taken at the time.

** ** Æt. 22, entered a public institution, Oct. 29, 1832.

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[1] Translation of Avenbrugger, p. 49.

[2] Opera Chirurgica, p. 243. (Patavii, 1666.)

He had been sick six months, and attributed his disease to a cold. The chief symptoms had been cough, dyspnœa, soreness in the chest, palpitations, anorexy, uneasiness after food. At his entrance the respirations were 35, the pulse 100 in a minute, the skin warm and dry, the decubitus on the left side. The patient was emaciated, but could sit up, and I think, move about.

The results afforded by direct exploration were as follows:

Inspection.—Very marked dilatation of left side of chest.

Mensuration.—Right side of thorax nearly 16½ inches in circumference, left side nearly 19.

Palpation.—Impulse of heart very strong—felt in right side of chest as well as left.

Percussion.—Flat below level of third rib in sitting posture.

Succussion.—The fluctuation of the fluid in the chest can be heard throughout the apartment, on the patient's moving the trunk backwards and forwards.

Auscultation.—Respiration absent or almost entirely so in the left side of the chest. Hægophony at one time about angle of left scapula.

Paracentesis of the thorax was performed on the 15th of December, and *nine pints* of purulent fluid evacuated. On the 18th another pint, and on the two subsequent days additional quantities were drawn off by introducing a director. On the 20th the patient died. The left lung was found condensed into a small ball at the upper part of the mediastinum, its substance solidified and tuberculated. The pleura was covered with false membranes, and contained three or four pints of purulent fluid, the rest of the cavity being filled with air. The heart was pressed quite into the right side of the chest, and the pericardium contained pus and false membranes.

Partial Pleurisies.

In some of these cases it must be granted that the physical signs are insufficient to decide the diagnosis. Laennec, who passes very lightly over the signs of these affections, says they may be recognized by flatness on percussion, absence of respiratory murmur, or even hægophony if sufficiently extensive. At the same time he allows that if there were no hægophony, and if there had been no pain in the chest at the commencement, it would be *pretty difficult* to distinguish a partial pleurisy from a voluminous tumor developed in the lung.[1] In the cases reported by Andral,[2] where the effusion was between the lung and diaphragm, sensibibity to pressure on the side affected, slight depression of the ribs and depression of the liver, and feebleness of the respiration were the only physical signs. In a case of interlobular effusion related by the same author,[3] no physical sign revealed its existence. These affections still remain then among the diseases whose diagnosis may present most obscurity. I am not aware that the error of Desault has been repeated, since the invention of percussion and auscultation, but it would be more pardonable than many others. Intending to puncture the pericardium, he plunged the trocar into a circumscribed empyema at the base of the left side of the thorax.[4]

We may remark that the physical signs of *hydro-thorax*, must be like those of pleurisy with liquid effusion. We could not expect to find the sound of friction, as in this affection no false membranes are effused. It is important to remember that essential dropsies of the serous membranes are excessively rare.[5] Hydro-thorax does not commonly make its invasion with striking symptoms, and it is generally found on both sides, so that an effusion being found on one side only, it should be presumed to be pleuritic.[6]

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[1] Ausc. Med. ii. 375, 76. [2] Clin. Med. ii. 494. [3] Observ. 23.
[4] Dict. de Med. et Chir. Art. Empyème. [5] Louis, Lectures. [6] Ibid.

Contraction of the Chest after Pleurisy.

Laennec first called distinctly the attention of observers to this remarkable phenomenon, investigated its history, and determined its signs. One of the most striking is the evident diminution of capacity of the side which has been the seat of pleurisy, shown by inspection or by mensuration, which frequently makes known a diminution of an inch or more. The resonance on percussion is lessened, for two reasons, the contraction of the limits of the cavity of the side, and the presence of thick, adherent false membranes. The respiratory sound is diminished or absent.[1] Laennec remarks that he has often found this change of form even in a high degree in patients who had never perceived it themselves.[2]

We have seen the obscurity that rested over the diagnosis of pleurisy as late as the days of Cullen and Portal. We have seen that direct exploration offers all its resources to enable us to detect its presence, among which are three phenomena, dilatation of the chest, audible fluctuation, and hægophony, more truly pathognomic than almost any other signs of disease.

It remains to show that the knowledge of its existence modifies our views of the prognosis and treatment.

Contrast the prognosis of this affection with that of pneumonia, as given by two of the most competent observers.

"*Pleurisy* is rather a slight affection, the febrile movement of little intensity, and the secondary phenomena rare."[3]

"Scarcely any patients die of pleurisy but such as are tuberculous."[4]

"*Pneumonia* is of all acute diseases that which carries off the greatest number of mankind."[5]

The peculiar indications of *treatment* which may result from the diagnosis of a questionable disease as pleurisy, by the aid of the physical signs, are the following.

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[1] Ausc. Med. ii. 338. [2] Ibid. p. 335. [3] Louis, Lectures. [4] Ibid.
[5] Laennec, Ausc. Med. vol. i. p. 392.

1. The depletive system will not require to be carried to the extent necessary in pneumonia; yet it will often be employed, which it might not be, if the disease had been confounded with bronchitis or tubercles.

2. All local remedies will be applied with a knowledge of the seat of the disease.—(Cupping, leeching, blisters, stimulant plasters, etc.)

3. The use of diuretics, or purgatives, will be indicated, to get rid of copious effusion.

4. The pain sometimes produced by the friction which gives rise to the *bruit de frottement*, may be prevented by a bandage around the chest. (Louis.)

5. The peculiar utility of a very powerful and dangerous remedy—tartarized antimony in large doses—is not generally recognized in pleurisy, while its employment in pneumonia stands upon the highest authority.

6. No indication is offered for the use of expectorants.

7. The operation of paracentesis of the thorax, an operation which was followed by recovery in eight out of ten cases of simple empyema, performed in London of late years,[1] although coming within the province of surgery, must often be undertaken by the advice of a medical practitioner.

The indications in hydro-thorax are those of other dropsical effusions, but it is obvious that any considerable quantity of fluid in the pleura, must produce much greater interference with the vital functions than the same quantity in the abdomen or in the cellular membrane, and that consequently it is doubly urgent to produce its absorption.

Contraction of the chest after pleurisy is rather a deformity than a disease. It is of course beyond the reach of treatment, and it is principally important to ascertain in order to guard against errors in the diagnosis of other diseases.

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[1] Lond. Cyclop. Art. Empyema.

Diseases of the Circulating System.

Pericarditis.—Hydro-pericardium.—Pneumo-pericardium.

In looking back upon the history of pericarditis, we cannot but be struck with the manner in which it has been forced to unmask itself under the eye of direct exploration. Morgagni, who endeavors with much industry and patience to determine the symptoms of "Hydrops pericardii," which, as he used the term, included pericarditis, in alluding to the necessity of proving the existence of accumulated fluid in the pericardium, before performing paracentesis, uses these expressions. "Necdum enim, Ars, quantum video, adeo proficit, ut id certissime, et evidenter cognosci queat. Utinam liceret, sæpius repetitis observationibus, si non alia signa animadvertere, at ex iis quæ proposita sunt, quæ sæpius, quæ rarius tum inter initia, tum saltem prope morbi finum, ipsum comitentur, statuere."[1]

If we look at some of the most celebrated systematic writers, we shall find this disease left in great obscurity. Thus Cullen says, "An acute inflammation of the pericardium, is almost always a part of the same pneumonic affection, I have been treating of; and is not always distinguished by different symptoms."[2] This he says at the end of the chapter on *Peripneumonia Notha.*

According to Dr. Good, Frank and Vogel concur in the testimony of Cullen, and he quotes this sentence from the latter—"Cordis inflammatio feré ut in peripneumonia."[3] Notwithstanding the attempts of Dr. Good to draw the distinction between pericarditis and other affections, his editor Mr. Samuel Cooper remarks, that "the obscurity in the diagnosis of pericarditis, is still generally acknowledged." He quotes Ribes as still asserting that it has no group of

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[1] Epist. xvi. p. 49. [2] First lines, p. 383.
[3] Study of Med.—Empresma Carditis.

distinguishing symptoms. Dr. Gregory, in the course of a single paragraph, has the two following observations. "The diagnosis of pleurisy and pericarditis, is often a matter of difficulty."—"This symptom, (anxiety, paleness of face,) however, fails as a diagnostic mark between this disease and bronchitis, which has often, I believe, been mistaken for it."[1]

Thus, the student who shall rely upon these popular authorities, will be able to justify himself in mistaking inflammation of the pericardium successively, for that of the bronchiæ, or of the tissue of the lungs, or of the pleura. And without making a rigorous application of the mathematical proposition, that two quantities which are equal to a third, are equal to each other, we may here remark that the different diseases thus confounded with pericarditis, must have been none too accurately determined as to their characters in the minds of those who confounded them with this affection.

It is singular that Laennec should have left the diagnosis of this disease in so much obscurity. He uses the following language. "I have sometimes seen others *divine* its existence, and I have sometimes *divined* it myself; for I cannot employ the word *recognize* when there are no certain signs, and when it happens as often that we are deceived, as that we are correct." It was reserved for M. Louis, by bringing into light more fully the value of the signs derived from inspection and percussion, to reduce this evasive disease into the rank of those which may be confidently diagnosticated. The additional information afforded by auscultation, has within a very few years been more clearly illustrated by Messrs. Latham, Stokes, and Hope in Great Britain, and by M. Bouillaud in France.

Signs derived from *Inspection*. An unnatural prominence in the præcordial region might have been anticipated on finding the large quantity of fluid frequently effused in the pericardium—from one to four pints in some of the cases analyzed

[1] Practice of Physic, vol. i. p. 444.

by M. Louis,[1] and from remembering the facility with which the thorax is dilated in copious pleuritic effusion. Besides, it is just at the yielding cartilaginous portion of the ribs that the fluid must exert its pressure. This phenomenon was actually noticed in one of the two cases reported by M. Louis in his essay on Pericarditis,[2] but not being willing to draw a conclusion from a single fact, he noticed the circumstance, leaving it to future observation to determine whether it was an accidental coincidence, or whether it was a character of effusion in the pericardium. Long after M. Louis's observations had convinced him that the projection of the walls of the chest was in reality occasioned by the effusion;—a year after he had mentioned in a public lecture[3] eight new cases of pericarditis, all of which presented this projection, it seemed proper to M. Bouillaud to advance this connection of cause and effect between the morbid state and the external sign, as resulting from facts which were "his own property."[4] Whatever claims M. Bouillaud may have in discovery, this certainly does not belong to him, any more than a picturesque description of the symptoms in disease of the valves of the heart in his "Traité des Maladies du cœur," published in 1835,[5] entitles him to the praise of eloquence; for the most striking parts of the passage to which we refer, may be traced at least as far back as Dr. Hope's Essay on the Diseases of the Valves of the Heart, published in 1834,[6] if not to his work on Diseases of the Heart, which I am unable to refer to at the present moment. I hope this digression relating to an author who has written much that is valuable, and to whom we shall have, and have already had, frequent occasion for referring, may be excused on the ground that these facts came in my way incidentally, while investigating my proper subject. At any rate it is proved that both ob-

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[1] Recherches Anat. Path. p. 281. [2] Ibid. [3] June, 1833. [4] Dict. de Med. et Chir. Art. Pericardite. (The last volume published in 1834.) [5] Vol. ii. pp. 119, 20. [6] See London Cyclop. of Pract. Med.

servers agree in the fact of the projection of the walls of the chest. In a case quoted from M. Reynaud, by M. Piorry, the thoracic parietes projected in a space of five and a half inches in length, and three and a half in breadth. The irregular pulsations of the heart and their increased force, are sometimes evident on inspection.[1]

By laying the hand upon the præcordial region, we may also perceive the changes which take place in the rhythm, force, and extent of the heart's pulsations,[2] but we learn these characters perhaps more accurately while employing the stethoscope. A redoubling of the second sound, accompanied by a kind of *crackling*, mentioned by M. Bouillaud as a new sign, may be perceived in the same manner.

Percussion.—Laennec had already remarked that in some cases the sound in the præcordial region was flat, but added, that generally, this sign was not very evident.[3] The two cases reported by Louis, in his memoir on Pericarditis, in which the diagnosis was founded, in a great degree, upon the presence of flatness on percussion in the præcordial region, and the remarks made by him,[4] were sufficient to produce the belief that this phenomenon would be generally found if sought for with sufficient accuracy. Four of the cases reported by Andral in the Clinique Medicale, in which the existence of pericarditis was proved by the autopsies,[5] presented this sign. In the eight cases analysed by M. Louis, in a lecture in 1833, as all of them presented a prominence in the præcordial region, there can be no doubt that all offered flatness on percussion, but some accident of the lecture room has left my notes blank just at this interesting point. In those cases which I have seen diagnosticated in his wards as pericarditis, projection of the thoracic parietes and obscurity on percussion have been the two most constant signs, and I believe invariably present. M. Louis considers an effusion

[1] Bouillaud Traité des Maladies du cœur. Paris, 1835. vol. i. p. 454.
[2] Ibid. [3] Ausc. Med. Vol. iii. 263, 64. [4] Rech. Anat. Path. p. 281.
[5] Vol. i. Cases, 2d, 3d, 6th, 54th.

of eight ounces sufficient to produce flatness on percussion.[1] The two most important signs hitherto mentioned, prominence in the præcordial region, and flatness upon percussion, may be produced also by hypertrophy of the heart. The former of these signs was first observed in hypertrophy, by M. Bouillaud.[2] We must have recourse then to the use of auscultation, and to the date, the manner of invasion, and the symptoms of the disease.

The use of *auscultation* may reveal to us either changes in the frequency, force, rhythm, or sound of the heart, or the existence of some unnatural sound superadded to those of the healthy action. In eleven cases, two of which are from the memoir of Louis, and nine from Andral, the action of the heart, as observed by auscultation, presented the phenomena here mentioned.

	Extent.	*Frequency.*	*Force.*	*Rhythm.*	*Sound.*
Louis.	Impulse sometimes in small extent.	—	Unequal, confined impulse, occasionally.	Tumultuous, sometimes regular after reposo.	——
"	——	—	——	——	Dull, distant, often doubtful. Respiration absent in cardiac region.
Andral.	——	Very frequent.	Irregular.	Tumultuous, intermittent.	——
"	——	—	Very feeble.	Confused, the two sounds undistinguishable.	——
"	Heard throughout whole front of chest, sometimes regular.	—	——	Tumultuous, irregular.	Heard very slightly.
"	Heard in small extent.	—	Without impulse.	Intermittent.	——
"	——	—	Impulse slight.	Regular.	(Vague rustling felt by hand.)
"	——	—	——	——	——
"	——	—	——	——	——
"	Natural.	—	Natural.	Intermittent.	——
"	——	Extreme freq.	Nothing else remarkable.		

[1] Lectures. [2] Traité, etc. Vol. ii. p. 441.

In examining this little table, which I have carefully made out from the original cases, it will be seen that of the nine cases in which the signs given by auscultation were recorded, every one offered something unnatural. In six there was disturbance of the rhythm, in five of the force, in two of the sound, and in two of the frequency. But on looking at these descriptions, it seems probable enough that the authors were contented to note the most remarkable phenomena found by auscultation, and that they omitted certain less obvious derangements of the heart's action. Thus in the fourth case, if the sounds were confused and undistinguishable, it is probable that both the frequency of the pulsations, and the quality of the sound were more or less altered. Again, the necessity of repeated examinations is illustrated by a circumstance noted in the first case, namely, that the rhythm was sometimes regular after repose. If the observer had been contented with a single examination, and had fallen upon one of these intervals, an important element in the diagnosis would have been wanting. But in addition to the signs detected by auscultation in the cases of Louis and Andral just analyzed, to which we may add the *increased jerking impulse*, and the unusual *sonorousness* of the ventricular systole, on the authority of Dr. Hope,[1]—other signs have been added of late years.

In the third volume of the treatise of mediate auscultation[2] Laennec mentioned a sound heard in the præcordial region like "the creaking of the leather of a new saddle under the rider." This sign he had supposed to belong to pericarditis, but he had relinquished this idea at the time he wrote. His clinical assistant, M. Collin, with another student of La Charité declared positively to have observed this sign in two cases of pericarditis, and the former mentioned it in a thesis

[1] Lond. Cyc. of Pract. Med. Art. Pericarditis and Carditis. I am rather surprised to see the last of these two characters assigned to pericarditis. M. Bouillaud speaks of the *obscurity* of both sounds in the stage of effusion. (Traité des Mal. du cœur, vol. i. p. 458.) [2] P. 64.

published in 1823. However, Laennec said nothing of it in treating of pericarditis in his second edition published in 1826, nor did he mention any other accidental sound as belonging to this affection.[1]

In the article Pericarditis, in the London Cyclopedia of Practical Medicine,[2] Dr. Hope mentions the bellows murmur as constantly accompanying the first sound of the heart when the jerking impulse exists.

The character of the accidental sounds belonging to this affection not being so generally understood as many other of the auscultatory phenomena, I shall give them as stated in the Traité des Mal. du cœur of M. Bouillaud[3]—condensing his account as much as possible.

The sound of the creaking of new leather he has only recently observed—two or three times within five or six months. But nothing is more common, he says, than to observe a sound of friction or of grazing[4] more or less characterized. In certain cases the sound resembles that of the rasp or saw, and in six or eight cases he had observed a true bellows sound. To distinguish the bellows sound from the sound of friction, he observes that the last, which is more diffuse and superficial, is accompanied by a grating, scraping, or rasping motion not found in the purest bellows sound. The sound of friction in pericarditis is analogous, he says, to that found in pleurisy in its cause—that is, it is due to the movement of parts made rough by false membranes, over each other. It is isochronous with the heart's pulsations, more pronounced commonly during the systole than during the diastole, and in some cases resembles the crackling of taffeta, bank notes, or parchment. But the bellows sound he attributes to the swelling of the valves, to the formation of coagula, or to the compression exercised by effusion, either as a primary or an accessory cause. The sound like

[1] Ausc. Med. vol. iii. p. 262. [2] June, 1833. [3] Paris, 1835, p. 456, etc. vol. i. [4] *Bruit de frottement, bruit de frolement.*

the creaking of new leather, he attributes to the frictions and tractions exerted by the opposed false membranes upon each other, but in this case he supposes they are more dense, elastic and leathery.

M. Louis is in the habit of pointing out the absence of the respiration in a larger extent than natural about the præcordial region.

If the authority of Hope and Bouillaud, the two leading writers on diseases of the heart, is of any value then, auscultation has added new light to the diagnosis of a disease which had baffled Corvisart and Laennec, but which the labors of M. Louis had already so far illustrated that his scholar, M. Legallois, could say in 1830, "At the present day we do not divine, but we diagnosticate pericarditis!"

It is unnecessary to devote many words to *hydro-pericardium*. If the effusion were copious, it would be recognized by signs similar to those of inflammatory effusion, but the absence of false membranes would prevent our finding the sound of friction which may exist in pericarditis. In cases where there is general dropsy, the examination of the pericardium and pleura should not be forgotten. *Essential hydro-pericardium*, which Laennec considered as very rare,[1] is designated by M. Louis as an imaginary disease.[2]

In the more exceptional case of the existence of aeriform fluids in the pericardium—*pneumo-pericardium*—Laennec tells us that there is generally effusion of liquid also. He affirms that he has sometimes recognized it by a clearer resonance at the lower part of the sternum, or by "a sound of fluctuation determined by the pulsations of the heart, and by strong inspirations." The author of the thirtieth case in M. Bouillaud's treatise (M. Fournet) observed a sound of fluctuation in the præcordial region, which M. Bouillaud, in opposition to the opinion of the author of the observation, refers to the movement of the liquid in the stomach or

[1] Ausc. Med. iii. 272. [2] Lectures.

bowels. As it is perfectly possible that there was aeriform fluid as well as liquid in the pericardium, I can see no propriety in the peremptory assertion contained in the note of M. Bouillaud.[1]

A sentence of Morgagni, alluding to fluctuation in the pericardium, is remarkable as containing a hint upon *auscultation* which, from the days of Hippocrates to those of Laennec, seems, with this exception, to have been scarcely ever, if ever alluded to. (Note D.)

The signs attributed by Saunders to the adhesion of the heart and pericardium, namely, a depression under the false ribs of the left side during the ventricular systole, followed by a little elevation at the same point and below it, during the diastole, not having been confirmed by the observation of the two authors by whom it is mentioned,[2] is probably of little constancy.

A few practical remarks will close what we have to say upon this disease. That it has been frequently overlooked, is proved by the comparative rarity with which it has been diagnosticated during life, contrasted with the frequency with which adhesions between the heart and pericardium are found upon the dead subject—one in twenty-nine cases, according to Louis. That its severity has been overrated is proved by our finding not very unfrequently, universal adhesions in patients dead of diseases other than pericarditis. M. Louis is in the habit of speaking of pericarditis as a disease which generally terminates favorably in patients otherwise healthy. According to his estimate some years ago, it is fatal only once in six times.

The general *treatment* of this affection is analogous to that of pleurisy. M. Bouillaud asserts that by means of blood-letting, carried to a great extent, almost all the cases of pericarditis which he has met with have yielded.[3] It is obvious that the proper application of our local remedies must here

[1] Traité des Mal. du cœur. vol. i. p. 500. [2] Laennec, vol. iii. p. 268. Bouillaud, Traité, etc. i. p. 467. [3] Traité, etc. vol. i. p. 479.

also depend upon our knowing the seat of the disease. If the disease was confounded by the practitioners who relied on the symptoms merely, with bronchitis, with pneumonitis, with pleurisy, in such cases was it to be supposed that remedies would be applied particularly to the præcordial region? What was to become of those cases in which there was no pain, or in which it existed not merely in the seat of the disease, but in other parts also,[1]—what was to be the practice of those, in short, for whom this affection had "no group of distinguishing symptoms?" Now, with regard to the use of local bleeding in this affection, men who differ immensely among each other with regard to many things are agreed—such men as Lerminier, Chomel, Louis, and Bouillaud. The remarks upon the utility of *diuretics* in the stage of effusion in pleurisy, may apply also to this affection. The use of *sedatives*, particularly digitalis, which controls to so extraordinary a degree, the undue action of the heart, will in some cases be indicated, when if the disease had been taken for bronchitis or pneumonitis, we might have been stimulating the patient with acrid expectorants. Nor, as we have said, in speaking of pleurisy, shall we submit the patient to the antimonial treatment under the idea that we are dealing with an inflammation of the lungs in a manner sanctioned by the best authorities. Finally, if the operation of paracentesis is applicable to the pericardium, its propriety must be established in every instance by the signs afforded by direct exploration.

The history of *carditis* is too obscure to entitle it in this place to more than an allusion. M. Bouillaud, who has been long engaged in studying the diseases of the heart, says expressly, "I have never met with a case of carditis which was not complicated with pericarditis, or endocarditis, (inflammation of the internal membrane of the heart,) and I own that

[1] Andral, Cases 2d, 3d.

the signs of these two last affections were all that attracted my attention."[1]

Diseases of the Valves of the Heart.

I am aware that M. Bouillaud, the most recent writer on the diseases of the heart, treats of these affections as the result of a pre-existing inflammation, that disease to which he has given the name of endocarditis. But this is not the place to examine the evidence in proof of, or against the truth of this proposition. And with regard to *endocarditis*, it is enough to say, that he assigns as its characters pulsations of increased violence and extent, superficial and visible, sometimes with perceptible vibration to the hand, rapid, irregular, or intermittent, attended with the bellows sound, and sometimes with a metallic tinkle isochronous with the ventricular systole. According to the same author, this disease often coexists with pericarditis, cannot always be distinguished from it, and requires essentially the same treatment. A case of this affection may be found in the work of Dr. Gerhard. I do not consider it necessary to follow M. Bouillaud into the detail of the various anatomical lesions of which the valves may be the subjects, or to enumerate with Dr. Hope the minute distinctions which may indicate that the cardiac, or the arterial valves, of the right or of the left side, are singly or in common affected with disease. The only one of these affections which demands our attention is the induration of the valves with contraction of their orifices, the diagnosis of which, according to M. Bouillaud, is as certain as that of induration and contraction of the rectum or urethra by a skilful surgeon.[2]

The application of the hand gives the sensation described by Corvisart as a thrill or an undulation, and by Laennec in the terms which have been translated purring thrill, or tremor. It makes known also the different irregularities in the heart's action.

[1] Traité, etc. vol. ii. p. 302. [2] Traité, etc. vol. ii. p. 213.

Percussion can only reveal the existence of complications of the primitive disease, the different forms of hypertrophy and dilatation.

Auscultation shows the presence of some of the modifications of the bellows, rasping, or sawing sound. M. Bouillaud insists on the constancy of this phenomenon. In more than a hundred cases of disease of the valves, he says, there was only one where he did not find it; and more careful and frequent examinations, he believes, would have detected it even in that instance. The sound which presents one of the characters mentioned may be single or double, sudden or prolonged, feeble, or of sufficient intensity to be heard at a certain distance from the chest.[1] The general conclusion of M. Bouillaud with regard to the diagnosis, is as follows. "When we find in a patient a permanent bellows, or rasping or sawing sound over the præcordial region, and the vibrating thrill; if palpitations, or tumultuous, irregular, intermittent pulsations of the heart exist also, it is almost certain, provided that the disease has lasted several months or years, that there is induration of the valves with contraction of one or more orifices."

As the differential diagnosis of disease of the heart was scarcely thought of before the days of Corvisart, who himself employed palpation and percussion, I need hardly refer to those classical writers unacquainted with the methods of direct exploration to show the confusion into which they have fallen. Dr. Good, whose nosology is the best puzzle with which I am acquainted, speaks of several of these diseases under the same head, but in the last place where one would have looked for them, among the "diseases of the nervous function."[2] Atrophy and hypertrophy, inflammation and dropsy, disease of the valves and nervous palpitations, are all jumbled together side by side among the diseases of the

[1] Ibid. p. 215. [2] Class Neurotica, Order Cinetica, Genus Clonus, Species Palpitatio.

nervous function! Dr. Gregory says, "It is, I believe, quite impossible to ascertain with any degree of precision, during life, the existence of diseased valves, as separate from every other variety of disorganization of the heart."[1]

Although this affection is in itself incurable, yet if we may by prophylactic measures avert some of the consequences of valvular disease, as hypertrophy and dilatation, or at any rate retard their progress, it cannnot be a matter of mere curiosity to ascertain an organic lesion which may at one time be mistaken for emphysema, and at another for chlorosis. It is peculiarly when contrasted with the latter disease, that the importance of drawing the line of distinction is to be seen; for while certain tonics, and the use of exercise, are almost a specific for the one, if similar symptoms were due to disease of the valves, we should prescribe sedatives and repose. That this distinction is sometimes difficult, may be seen by a case mentioned in the Manual of M. Raciborski, in which he had supposed the existence of an organic lesion, while M. Bouillaud diagnosticated the disease as chlorosis.[2] The last author remarks that this mistake occurs every day, that the similarity of the symptoms renders it easy to confound them, and that he was formerly unable to make the distinction himself, which he has at length traced between them. In chlorosis, he says, there is commonly no well marked bellows sound, but the large arteries, especially the carotids and crurals offer on examination a rumbling, or whistling, or moaning sound, etc.[3] Within three years, he has observed this phenomenon at least a hundred times.

Hypertrophy of the Heart.

With regard to the uncertainty in the diagnosis of this disease from the general signs, we need not repeat what we have said in speaking of disease of the valves. The principal symptomatic disturbances of the circulating system, are

[1] Practice of Physic, vol. ii. p. 232. [2] Nouveau Manual, p. 294.
[3] Traite des Mal. du cœur. vol. ii. pp. 485, 486.

irregularity in the heart's action and change of character in the pulse. But the first of these symptoms may be owing to many other causes besides hypertrophy, and the pulse may be disguised by valvular disease, which frequently complicates this affection, or rather is its cause. The symptoms on the part of the lungs, and some of the principal morbid phenomena of the capillary and secretory systems, are either common to other diseases, or only found at the advanced stage of this.

Those practitioners who do not make use of direct exploration, may indeed declare a patient affected with disease of the heart whom they find suffering with violent palpitations, his limbs infiltrated, his countenance mottled with purple veins, and all his muscles straining to draw in air enough to redden the black blood stagnating in its vessels; but will they venture to assert the existence of hypertrophy, in cases where the only general signs are "a little shortness of breath on exertion, and occasional feelings of slight palpitation?"[1]

The physical signs which characterize hypertrophy, are all of them such as might have been anticipated on observing the increased volume and extent of the organ.

M. Bouillaud, I believe, was the first to point out the existence of a projection in the cardiac region.[2] *Inspection*, which reveals this sign, may also show the increased violence and extent of the heart's pulsations. The point of the heart, according to M. Bouillaud, may be seen to strike the intercostal spaces to the left of its natural position.[3]

Palpation.—The information which this means of exploration affords us, being obtained also by auscultation, it need not be described separately.

Percussion.—The immense increase in the volume of the heart which is sometimes met with, and which has given rise to the expression "cor bovinum," must evidently increase

[1] Hope, Lond. Cyclop. [2] Traité, etc. ii. 441. [3] Ibid.

the natural flatness on percussion, found in the præcordial region. In comparing the maximum weight of the heart in eleven cases of hypertrophy, (688 grammes,) with the mean weight of the same organ in fourteen healthy subjects, (350 grammes,)[1] we can perceive how far this difference on percussion must sometimes be carried. Thus in the 119th case of M. Bouillaud, the præcordial region was flat on percussion in an extent of from twelve to sixteen square inches.

Auscultation.—According to M. Bouillaud, the pulsations of the heart are not increased in frequency except when accidental causes induce palpitation; they are sometimes even slower, and unless in cases of complication with nervous or valvular disease, they are regular.[2] According to the same author, the sounds are dull when the hypertrophy is very great, (twelve or fifteen lines or more,) and the cavities diminished in size. But when the hypertrophy is moderate, the cavities of natural size, or dilated, he says the sounds of the heart are stronger, more sonorous and clearer, and heard in a considerable part of the chest, even over its posterior surface.

Dr. Hope considers "a strong, slowly heaving impulse," as the principal sign of simple hypertrophy, and the sudden sinking back of the heart afterwards, which he calls the "back-stroke," as proving the affection more developed. Both these signs may exist in hypertrophy *with contraction*, but less distinctly, and may be absent if the disease is slight. In hypertrophy *with dilatation*, the impulse is sharp and smart, and the sounds are increased; sometimes the ventricular contraction is accompanied with a bellows murmur.[3]

When we compare the physical signs of this affection with those of pericarditis, we cannot but be struck with their correspondence. In both there may be flatness on percussion in the præcordial region, increase of impulse, dullness of

[1] Ibid. vol. i. p. 72. [2] Traité, ii. 442.
[3] London Cyclop. of Pract. Med. Art. Hypertrophy of the Heart.

sound; and the existence of complications may give rise to the bellows sound or similar phenomena in hypertrophy; sounds which we have seen exist in pericarditis. Still, there are points of difference that must often be sufficient to render most probable one or the other affection; as the sound of friction in pericarditis, the tumultuous action of the heart in the same affection, the extent of the projection of the thoracic parietes, the sound of undulation; and in hypertrophy, the regularity of the pulsations and the very great force of the impulse, like the "blow of a fist,"[1] or the stroke of a hammer.[2] But after all, it is to be remembered that the question commonly is, whether a disease is pericarditis or some other *acute* disease, or whether it is hypertrophy or some other *chronic* disease, because the history of the symptoms is sufficient to decide pretty satisfactorily to which of these two categories belongs the disease in question. Consequently, as no other *chronic* disease offers physical signs like those of hypertrophy, these signs, even if in themselves actually such as might be found in pericarditis, will, and frequently do, enable us to form a just diagnosis.

Is this a matter of any practical consequence? I can only answer this question by referring to the best authorities on these diseases. Laennec, who pursued the rigorous method of Valsalva and Albertini, in conjunction with some other means, says he could cite a dozen cures of several years' standing. Dr. Hope and M. Bouillaud reject this extreme course, but both employ repeated bleeding, general or local, during the treatment, with rest, mild diet, and sedatives. The first of these authors thinks that purgatives and diuretics are useful, even when there is no effusion. Such are the principal means, by the employment of which M. Bouillaud tells us, that in "pretty numerous cases" he has seen "remarkable diminution, if not complete disappearance, of hypertrophy," and the English author has "found it to effect cures

[1] Bouillaud, Traité, etc. ii. 441. [2] Hope, Art. Hypertrophy, etc. Lond. Cyc.

in a considerable number of instances, some of which were advanced even to the second degree."

We have referred in the course of these remarks to the case in which *hypertrophy* is complicated with dilatation. The existence of dilatation of the cavities of the heart with *atrophy*, or thinness of their walls, is so rare, that of forty-five cases of disease of the heart, observed by M. Louis, at La Charité, not one presented it; and in mentioning this fact, he added, that he had not subsequently met with it. We shall therefore not occupy ourselves with this affection.

Aneurism of the Aorta.

The insidious progress of this disease; the insufficiency of the general symptoms to prove its existence, are mentioned in strong terms by Laennec,[1] and by Dr. Hope.[2] The first of these authors declares, that "frequently the first indication of its existence is death, as sudden as if from a musket ball." "I have seen," he says, "men die in this way, who were supposed in the most blooming health, and who had never complained of the slightest indisposition." We need not add other authorities to those just quoted, for it is evident in itself, that the symptoms must vary according to the point from which the aneurismal tumor is developed, to its volume, and to the organs on which it presses; and it is also clear, that most of the functional disturbances, occasioned by this cause, as dysphagy, or dyspnœa, or serous effusions, might arise from some other causes.

Dr. Baillie, who has endeavored to enumerate all the established symptoms and signs of the lesions he has described, enumerates among the physical signs of this affection, only the presence of a tumor with strong pulsations.[3] These pulsations, he observes, are commonly perceptible to the eye when the chest is exposed, but this morbid action he had observed in several other complaints.

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[1] Ausc. Med. iii. p. 321. [2] Lond. Cycloped. [3] Morbid Anatomy, p. 36.

Corvisart considered the diagnosis always obscure if there was no external tumor, and evident when the tumor could be seen and felt.[1] In the first case, he remarks that most of the signs may be confounded with those of other thoracic affections. The other physical signs to which he attributes importance, are, 1. The whistling produced during respiration and in speaking by compression of the trachea, which may be owing to other causes than an aneurismal tumor; as to disease of a bronchial gland in a case which he reports. 2. A rustling which may be felt in the præcordial region; the purring thrill of Laennec. 3. Obscurity on percussion at the upper and middle part of the chest.

Laennec left this affection among those for which he had found no pathognomic sign. He depreciates the value of the purring thrill and of percussion.[2] He did not decide how far the stethoscope *might* be found useful in the diagnosis of this affection, but he tells us that facts had proved to him that a voluminous aneurismal tumor might exist without giving any stethoscopic signs. Still, he attached a certain value to the existence of simple pulsations, commonly much stronger than those of the heart, which he thought, however, frequently wanting. But if an impulse isochronous with the pulse, and evidently stronger than that of the ventricular systole as explored in the præcordial region, was heard under the right clavicle, constantly, in repeated examinations, he considered this circumstance as evidence of the existence of an aneurism.

The article of M. Bouillaud in the Dict. de Med. et de Chir. is meagre, and contains little that is new and important. He notices the clearness of the sound of the pulsations in an aneurismal tumor, and believes that Laennec had overlooked this circumstance when he spoke of large aneurisms offering no stethoscopic signs. He remarks that the sound of the aneurismal pulsation may be double, an ob-

[1] Maladies du Cœur, p. 351. [2] Ausc. Med. iii. p. 323 et sequent.

servation, the truth of which I have seen in a case diagnosticated by M. Louis as aneurism of the aorta, and proved to be so upon subsequent examination. Among the stethoscopic phenomena he quotes M. Reynaud's observation, that hægophony may exist when the trachea and bronchiæ are compressed.

The article of Dr. Hope, in the London Cyclopedia, is much more elaborate and complete, so far as regards the physical signs. He begins with the encouraging declaration, "Taking the part of auscultation against its immortal discoverer, we hope to show that there is now little difficulty in the diagnosis of the three affections in question."[1] The work in which this article is contained being extensively circulated in our country, I shall merely mention the signs given by him, referring to the original essay for many valuable details.

The resonance on percussion, he says, is seldom impaired unless the tumor be very large.

The pulsations may be either single or double.

The characteristic signs are,

1. Loudness of the first sound, (if double).

2. This loudness of the first sound decreases as we approach the cardiac region.

3. The loudness of the second sound, on the contrary, (which is only the second sound of the *heart* transmitted to the region of the tumor,) increases as we approach the præcordial region.

4. In addition to loudness, the characters of the aneurismal sound are its hoarseness, resembling that of rasping a sounding board, its abrupt beginning and end, and its short duration.

5. The purring tremor above the clavicles, is valuable as a sign of dilatation of the arch, but unfrequent and imperfect in sacculated aneurisms.

6. Pulsation at the points corresponding to the tumor.

[1] Aneurism of the Aorta, Pericarditis, Concretions in the heart before death.

The author remarks, that the sacculated aneurism of the abdominal aorta is comparatively so easy of detection that he has not thought it necessary to enter into detail respecting its signs. He does observe, however, that it is to be recognized by a constant, strong impulse; by a loud, brief, abrupt bellows sound, not so hoarse as that of aneurisms in the chest, sometimes audible in the back. The pulsations are single, and we may sometimes, by forcing the stethoscope in different directions down upon the tumor, obtain an idea of its position and dimensions.

Such are the principal signs which characterize aneurism of the aorta. For their exact application to the different sources of fallacy, our limits compel us to refer to the original essay. Whether the confidence which Dr. Hope expresses in them as diagnostic marks be well founded is not easily to be decided by the personal experience of common observers. I have seen but two autopsies of patients dead of aneurism of the aorta. The first was never thoroughly examined by the stethoscope to my knowledge, but the presence of an immense pulsating tumor in the lumbar region had long revealed the existence of an aneurism, which proved, on examination, of most extraordinary dimensions. The other case was in the wards of M. Louis, and in this instance the existence of a tumor at the anterior part of the right side of the chest, flat upon percussion, offering double pulsations, and the purring thrill, had long induced M. Louis to announce an aneurism of the aorta, which was found true after the fatal termination of the disease. In one of my last visits to his wards I saw two patients in whom he had announced the existence of the same disease, but I do not know the end of their history.

Thus we see that even Laennec left this disease in obscurity, and that if, as we have very high authority for declaring, its diagnosis is now attended with "little difficulty," it is owing to the greater attention paid to the signs afforded by auscultation.

The diagnosis of this disease is important both with regard

to the prognosis and the treatment. With regard to the prognosis, for the physician at least should be aware that he is treating a disease which may strike down a patient apparently suffering from slight disease, at a moment when neither himself nor his friends anticipate it.

The celebrated treatment of Albertini and Valsalva has been more peculiarly appropriated to this affection. To reduce the amount of circulating fluids, to quiet as far as possible the disturbances of the circulation by regulated habits and repose, are the general indications. The circumstances in which the rigorous method just referred to should be employed, and the modifications it may require, are treated of in the essay of Dr. Hope from which we have borrowed so largely. Life may be long maintained while this deadly lesion is gradually advancing to its fatal termination. In the case to which I referred, of a patient in the wards of M. Louis, the woman had noticed the tumor seven years before her entrance, and M. Louis, who had seen her four years before her entrance, had then observed it, that it was flat on percussion, and presented double pulsations.

Affections of the Abdomen.

There are two reasons why this class of diseases should be considered in far less detail, with regard to their physical signs, than was requisite when treating of those of the thoracic organs. First, because inspection, palpation, and even percussion, have been very long recognized as useful and important in these affections; and secondly, because the use of auscultation has hardly been applied to the organs of the abdominal cavity, with the exception of the aorta, and of the impregnated uterus. We have already spoken of the first, and we cannot consider the physical signs of pregnancy as coming within the scope of our question. If we were to discuss the value of auscultation applied to the diagnosis of this condition, there would be no reason why we should

not introduce also a disquisition upon the pelvimeter, and the practical usefulness of examinations of the neck of the uterus by the finger or the speculum, and the importance of the sign which the French call "*ballottement*." Now, as all these subjects are treated of in works upon midwifery, and as they relate to a healthy function, however useful and important these signs may be, they must not, evidently, be considered as belonging to medical practice.

Effusion in the Peritoneum.

The information afforded by inspection, and the common method of detecting fluctuation, are too well known to be here insisted upon. It is only requisite to mention the advantage to be derived from two processes less commonly employed.

The first is the "fluctuation peripherique," or as Dr. Forbes has translated it "superficial fluctuation," a sign due to Mr. Tarral, an English gentleman residing in Paris. The process for obtaining this sign, as described in the work of M. Piorry, is as follows. Both hands are to be placed upon the abdomen, two or three inches apart, and so that the two forefingers may be parallel; a slight impulse being then given by the forefinger of one hand, will be immediately perceived by that of the other, if there is fluid to transmit the shock. Some prefer, says Mr. Tarral, another method, which is to place the left hand only on the abdomen, and to strike the parietes with the forefinger of the other hand, obliquely, and as it were grazing the surface.[1] By means of this experiment, Mr. Tarral says he has often detected very trifling effusion in the depending parts of the abdomen.

The other method of exploration is *percussion*, which M. Piorry has described with all its applications with such minuteness, in the work to which we have often referred.

[1] Piorry, Proc. Op. p. 137. Forbes, Lond. Cyc. Art. Abdomen, Explor. of.

The following, according to this author, are the principal marks of moderate effusion afforded by percussion.

1. Increased sonorousness in the umbilical region, (explained by the specific lightness of the intestines, containing gas which causes them to float above the liquid.)
2. Flatness on percussion, presenting a *line of level*, at the lower parts of the abdomen, and becoming more marked in proportion as we percuss lower.
3. The existence of the sound which he calls *humoric;* a sound produced by percussion upon a cavity where aeriform and liquid matters are in juxtaposition.
4. Change of level in the fluid upon varying the patient's posture.

The author owns that much habit is necessary to appreciate the difference of sound in the depending parts, when the effusion is very slight. The flatness is to be distinguished from that produced by matters in the intestines, by the absence of the line of level in the last case, and their not changing place with the patient's position. The experiment should be often renewed; in the right iliac fossa, we should begin by finding the natural sound of the cœcum, and then turn the patient so that the liquid may flow to this part. If there is œdema of the abdominal parietes, they must be pressed with some force with the pleximeter.

When there is copious effusion, the signs afforded by inspection and percussion, and the presence of fluctuation, leave no doubt upon the nature of the disease.

M. Piorry assures us, that mediate percussion is not painful, if skillfully performed, even in peritonitis. But in this disease, the presence of adhesions and false membranes, or the thickness of the fluid, may so far prevent the displacement of the liquid with change of position, that M. Piorry himself speaks with less confidence than usual of the assistance afforded by his favorite method. Still, he is of opinion

that in the majority of cases it will make known the presence of effusion in peritonitis, and as he declares that the general symptoms of this affection are sometimes scarcely manifested, his conclusion must be in favor of the utility and importance of percussion in this disease.

In estimating the value of the two methods thus briefly described as applied to the diagnosis of ascitic and inflammatory effusion in the abdomen, whatever interest they may have as contributing to a minute diagnosis, they appear of altogether secondary practical importance. For ascites is of little consequence in itself, when it requires these subtile processes to detect it, and if it be a symptom of some organic affection, a few days more would probably render it evident to less delicate methods of exploration. Still, like œdema of the eyelids or ankles, though trifling itself, the very limited effusion detected by the two processes described, may occasionally afford assistance in obscure cases.

In peritonitis, it is so rarely that the common signs and symptoms, when properly sought for, are insufficient, that we have less reason to regret the circumstances which interfere with the certainty of the more novel methods of exploration.

The existence of aeriform fluids in the cavity of the peritoneum, constituting the *tympanites abdominalis* of nosologists, being almost problematical, and at any rate exceedingly rare, we pass to another subject.

Affections of the Liver;—the Gall-bladder.

I need waste no time in showing that the differential diagnosis of the organic affections of the liver, is impossible by means of the symptoms.

Certain of the changes of structure or form in this organ, may be recognized by means of direct exploration.

The employment of *palpation*, shows us that in many cases of phthisis, the liver passes to some extent beyond the edges of the false ribs, beneath which it is not commonly

to be felt. This affords the presumption of its having undergone the fatty degeneration; a lesion belonging peculiarly to tuberculous disease; and almost always accompanied with hypertrophy;[1] so that its presence may become a valuable element of diagnosis in cases where the other symptoms and signs leave it doubtful whether a patient is affected with phthisis.

Sometimes, according to M. Piorry, we may feel the inequality of the surface of the liver produced by tumors. Fluctuation may be sometimes detected over abscesses in this organ.

By means of *percussion*—the limits of the liver may be determined with singular accuracy. By means of lines traced upon the skin we may follow its changes of volume from day to day, as a surgeon follows those of an external tumor. M. Piorry states that he has seen the liver, in a case of jaundice, increase in volume as the yellowness became more intense, diminish as this decreased, and again increase with the yellowness. The patient died; the ductus choledochus was obliterated by a scirrhous tumor; the liver had been exactly circumscribed.[2] I have seen him percuss the liver in a case of jaundice, and announce as the result of his examination that the liver was six inches in thickness at one point, three and a half at another, four and a half between these points, and that the presenting part of the gall-bladder was two inches by one and a half in its dimensions! He allows that deep-seated tumors of the liver may elude the search of the pleximeter, but mentions a case in which an abscess of this organ was discovered by the want of resistance which it offered on percussion.

A peculiar phenomenon which happens on percussing over a cavity containing hydatids—and called by him "*fremissement hydatique*,"[3] or hydatic thrill, may be looked for in

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[1] Louis, Recherches sur la Phthisie, p. 115. [2] Procedé, etc. p. 164.
[3] Procedé, etc. p. 37, et seq.

the liver, in which this rare affection is comparatively frequent.

If the affection which led us to explore the liver were complicated with effusion in the pleura, we might still appreciate the extent of this organ, by placing the patient in such a position that the fluid should leave the part of the organ we were examining, but if very great effusion existed, we should perceive that the liver was depressed, without being able to determine its volume. If there were pneumonia with great induration, we must rely on the bronchial respiration and bronchophony in the hepatized portion to distinguish from each other two parts, both of which would be flat on percussion. If there were ascites, we must vary the patient's position while percussing the different parts of the organ.[1]

The exploration of the liver is important in one other circumstance; that is, when effusion in the abdomen or in the thorax, or meteorism, has elevated or depressed the organ from its natural situation. In the first case, if the displacement were not ascertained, we might be led to suppose that there was hepatization of the lung, or effusion in the pleura, and in the second case, to apprehend the existence of a tumor of new formation. These errors may be avoided by percussing in such a manner as to circumscribe the limits of the liver as accurately as possible.[2]

According to M. Piorry, congestion of the liver and hepatitis are accompanied by increase of volume in this organ. As these two affections require the use of blood-letting, and as the increase of volume may be determined by percussion, he concludes, that "the treatment of diseases of the liver receives important light from this method."[3]

The practise of opening abscesses in the liver has long been established in surgery; but if the physician does not suspect the nature of the disease, the patient will not have

[1] Procedé, etc. p. 37, et seq. [2] Vide Piorry, op. cit. p. 162.
[3] Ibid. pp. 167, 68.

the chance of benefit from the operation; it is therefore of some consequence that he should use those methods of exploration which alone can show its existence.

"The fact of recovery in a case where there existed a cyst filled with acephalocysts, (hydatids) in consequence of its being opened by M. Recamier, proves of what utility the knowledge of the hydatic oscillation may be in therapeutics."[1]

Finally, in the case of displacement of the liver, especially from meteorism, we are prevented from committing serious errors in the treatment by understanding the true cause of the morbid phenomena.

Enlargement of the Spleen.

The two diseases in which this circumstance has been most frequently detected, are typhus and intermittent fever. (Note E.)

The size of the spleen is increased in a large proportion of the cases of typhus. Thus, in seventeen of Louis's forty-six cases, it was three, four, or five times more voluminous than natural, and in all but ten of the others, double, or more, of its natural volume.[2]

In almost all cases, according to Chomel, this organ is increased in size, and in about half his own cases he had found it doubled.[3] The same author has not observed any remarkable difference in the size of the organ in those who died after some days of disease, and those who died a little later.

In cases of intermittent fever, enlargement of the spleen is very common, if not universal; an author, whose name I do not recollect, has even considered the disease as due to this lesion. In two cases, seen by M. Piorry, it was distinctly observed, that during the access the spleen was two inches

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[1] Procedé, etc. p. 41. [2] Traité de la Fièvre typhoide, i. 289.
[3] Leçons de clinique medicale (Fièvre typhoide) p. 264. Paris. 1834.

larger and longer than during the intermission. After the use of the sulphate of quinine, a great diminution was observed in its dimensions, a diminution which did not appear to follow the use of blood-letting or abstinence.[1]

We are very frequently able to detect the projection of the spleen beyond the false ribs by means of *palpation*. But it is remarked by M. Piorry, that this organ is sometimes developed in an upward direction, so that it eludes this method of exploration.[2] In such cases its increased volume may be detected by percussion. In making the examination it is important that the patient do not take food or drink for some time before, in order that the stomach may be clearly distinguishable by its resonance, which could not be the case were it distended by liquids or solids.[3] M. Piorry owns that when there exists pneumonia or pleurisy (of the left side) or ascites, it may be difficult to circumscribe the spleen.

The importance and utility of ascertaining the enlargement of the spleen, consist in its application as an element of diagnosis. In very many cases of typhus fever it may be felt with the greatest facility, as I have often had opportunities of observing. To those who have seen the obscure general symptoms and progress of this affection in many cases, this simple additional sign will suggest its own value. For the same reasons percussion will be of assistance when this method is insufficient; and it is to be remembered that typhus fever being one of the two acute affections[4] in which meteorism is commonly found as a symptom, we must expect that the spleen will be often pressed upwards so that it would be felt with difficulty even if enlarged. The signs produced by enlargement of the spleen must be seldom required for the diagnosis of intermittent fever; they might sometimes, perhaps, serve to distinguish the quotidian form from the hectic paroxysm.

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[1] Procedé, etc. p. 178. [2] Op. cit. p. 177. [3] Ibid.
[4] Typhus and peritonitis (Louis, lectures.)

Two circumstances are mentioned by M. Piorry as rendering exploration of the *kidnies* by percussion of little value; its difficulty, and the fact that their gravest diseases are generally unaccompanied by hypertrophy.

Diseases of the Stomach and Intestines.

Changes in the volume, consistence, form, or situation of the stomach may be recognized by the aid of inspection, of palpation, or of percussion. A case which I formerly witnessed illustrated the application of all these methods of exploration. The patient, a woman of fifty-three years, had been sick, or had considered herself so, for five months. The principal local symptoms had been vague pains in the abdomen, eructations, vomiting some hours after eating, becoming more frequent, and amounting sometimes to six or seven pints in a day. The form of the stomach could be traced by *inspection*, forming a relief on the walls of the abdomen, extending beneath the umbilicus and even as low as the immediate neighborhood of the anterior superior spine of the ileum. By *palpation* a tumor was detected in the situation of the pylorus. On *percussion*, the prominence supposed to correspond to the stomach was at one time flat, and at another resonant. A movement of fluctuation was easily impressed upon its contents. At another time it evidently changed form while we were looking at it, being at one moment divided into two sacs, as it were, by a partial contraction in the middle, and then resuming the common outline of the stomach.

When this patient was examined after death, the stomach was found so dilated that it occupied almost the whole anterior part of the abdomen, its muscular membrane hypertrophied, as is usual in such cases, phenomena due undoubtedly to a change of structure about the pyloric orifice, which scarcely allowed the little finger to pass through it.

But it is not always that the diagnosis of cancer of the

stomach has been fixed with such accuracy as in this case. The disease which occasioned the death of Napoleon, or contributed much towards it,[1] in which the stomach was extensively ulcerated without the presence of any voluminous tumor, displayed in no very favorable light the powers of diagnosis either of his attendants, or of the consulting physicians of Rome and London.[2]

M. Andral has recorded his opinion, that except when there is a tumor which can be felt through the external parietes, there is no certain sign by which we can distinguish that which is called in common medical language, cancer of the stomach, from that which is called chronic gastritis.[3] M. Bouillaud, although he attaches more value to the symptoms than the author just cited, depends in a considerable degree on the presence of a tumor for the diagnosis, and allows that there is no other certain sign when the disease does not affect one or the other of the orifices.

The signs which reveal the accumulation of air in the intestines, *tympanites intestinalis*, or meteorism, are so familiar to every one that we might dismiss them with this allusion. The prominence, the tension, and the resonance of the abdomen are so striking that the most careless observer could hardly overlook them. I remember when I was a child seeing an animal dead of some obstruction in the intestines, upon whose body, with my companions, I performed *inspection*, *palpation*, and *percussion*, (by means of kicks,) without dreaming that I was making a scientific diagnosis in declaring that the creature's bowels were full of wind.

The presence of hardened feces in the intestines has sometimes led to the erroneous supposition of the existence of tumors, or to symptoms of nephritis, or of sciatica, or to œdema.[4] M. Raciborski, who presented a thesis on the

[1] Tubercles and excavations were found in one of the lungs; suppuration in some of the bronchial glands, &c. &c. Vide Broussais, Exam. des doct. Med. iii. 331, etc. [2] Vide Broussais, Exam. iii. 304.

[3] Clin. Med. iv. 107. [4] Raciborski, Manuel, etc. p. 224.

subject of stercoral concretions to the faculty of medicine of Paris, tells us that the true cause of these various symptoms may be detected by means of direct exploration. Sometimes the concretions produce an external prominence, which of course may be seen and felt. By means of percussion upon the tumor and the surrounding parts, we may distinguish the flatness and resistance of the one from the sound belonging to the neighboring organs.[1]

M. Chomel attaches some value to a gurgling produced by sudden pressure in the right iliac region as a diagnostic sign in typhus.

The importance of ascertaining the existence of organic disease of the stomach, is rather in preventing us from employing remedies, under mistaken ideas of some disease which requires active treatment, than because it offers any peculiar indications. No better illustration of the wild empiricism with which an incurable disease may be treated, can be found than the treatment of the prisoner of St. Helena. Half the resources of the materia medica were promiscuously applied to his irritated organs, comprehending different forms of tonics, anodynes, stimulants, purgatives, emetic preparations, anti-emetics, and antacids. Well might he exclaim, "Laissez moi avec vos medecines! Je vous ai dejà dit cent fois qu'elles ne me valent rien; je connais mieux que vous ma maladie et mon temperament."[2]

As we have had occasion to mention already, *meteorism*, according to M. Louis, is peculiar to two acute febrile affections, typhus and peritonitis. With reference to the diagnosis of the first, it is frequently valuable, and it adds certainty to that of the second, which could hardly be confounded with typhus. M. Louis suggests the employment of alkaline or mucilaginous enemata, or of magnesian water as a drink, in cases of meteorism, with the hope of producing

[1] Ibid. [2] Exam. des doct. Med. iii. 526.

the absorption of a part of the gases, and perhaps of acting favorably on the mucous membrane, if that is the source of these gases, or on the matters with which it is in contact,[1] (to prevent their development.)

The obvious indication presented by determining the existence of stercoral concretions, is to get rid of them by means of enemata or purgatives; an indication very different from that which would be offered were the tumor taken for an abscess,[2] or the symptoms occasioned by it confounded with those of other affections.

Exploration of the Bladder.

The state of the intelligence being often such during disease that the patient is unable to give information with regard to the state of the urinary function, and the use of the catheter being an operation which should be avoided merely as a test, if we have simpler methods, it becomes proper to explore the hypogastric region by palpation and percussion. The first of these methods is generally acknowledged useful, and is employed. The circumstances which, according to M. Piorry, render it often inapplicable are, the distention of the intestines by gas,—great sensibility of the parts,—obesity,—infiltration of the cellular tissue,—or flaccidity of the bladder, even when it contains much liquid, as occurs in old paralytics.[3]

In such cases M. Piorry recommends practising percussion. This should be performed from above downwards, on the median line, and at the sides; for the bladder, according to the same author, is often developed in this direction. The percussion should be at first slight, afterwards with more force, and continued as far into the pelvis as possible. The signs which indicate the position of the bladder, are flatness on percussion over the organ, the *humoric* sound at its edges, and tympanitic resonance of the intestines around it.

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[1] Rech. sur la Fièvre typhoide, ii. 520. [2] Raciborski, op. cit. p. 223.
[3] Piorry, Op. cit. p. 195.

The operation indicated by the accumulation of urine in the bladder, is often, as every one knows, both useful and important.

Tumors of the Abdomen.

The large tumors which affect some of the abdominal organs, as the mesentery and ovary, are often obvious both to inspection and palpation. M. Piorry remarks, that, in percussing these tumors, the finger meets a degree of resistance which may give some notion of their degree of solidity and their structure.[1] The circumscription of a tumor by means of percussion, sometimes determines that it is independent of an organ to which it was supposed to belong, as in two cases reported by M. Piorry.[2] The same rules should be observed in exploring abdominal tumors as are directed for ascites; the results, of course, will distinguish the two cases from each other—a distinction of importance, on account of the utility of active medical or of surgical treatment in the case of liquid effusion.

According to Chomel,[3] when a tumor is found in the abdomen of a woman, rounded, smooth, and having begun on one side of the abdomen, which it has subsequently filled up, and presenting fluctuation, this tumor is due to the development of a cell of the ovary. If there is little or no fluctuation, if the tumor is irregular, as if by the agglomeration of several others, it is multilocular, and the cells contain liquids of different degrees of consistence.[4]

It is evident that the prospect of advantage from paracentesis must be much more considerable in the first case than in the second. By employing this remedy in the proper cases, "the life of the patient may be prolonged, and considerable ease and comfort may be thus obtained under a complaint which sooner or later must terminate unfavorably."[5]

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[1] Op. cit. p. 150. [2] Ibid. pp. 152, 153. [3] Lectures. [4] Ibid.
[5] Dr. Lee, Lond. Cyc. Art., Diseases of the Ovaria.

The existence of air or liquids in the cavity of the unimpregnated uterus is so far from being common, that we need only say that the existence of these conditions may be ascertained by palpation and percussion, and that the indication is clearly to produce the discharge of the fluid, by the introduction of the finger or of a trocar.

Diseases of the Brain.

The accumulation of large quantities of fluid in the cavity of the cranium may be appreciated by inspection and mensuration. I am not aware whether the attempt has been made or not in these cases to obtain fluctuation, by the common process, or by that of Mr. Tarral. The interesting discovery of Dr. Fisher, of the existence of the bellows sound in this disease may prove of some service as a diagnostic sign.

I believe that direct exploration of the brain has been employed only in this affection, in which it is not altogether without utility.

NOTES.

Note A. p. 193.

We need only allude generally to a few additional signs revealed by direct exploration; as change of color over an inflamed part, œdema, sensibility to pressure or percussion. Among the methods of investigation which have not been generally adopted, are the abdominal pressure of Bichat, and the pulmometry of Mr. Abernethy. The sphygmometer, or pulse measurer of M. Herisson, is a new invention, the value of which has not, to my knowledge, been determined. A curious passage of Avicenna has been erroneously stated by Dr. Forbes. (See London Cyclop. of pract. Medicine, Art. Chest, Explor. of.) He mentions it in this manner. "For this purpose he *proposed* to apply wetted *cloths* upon both sides of the chest, and concluded that the side on which the cloth dried soonest, on account of the greatest heat, *was that in which the inflammation existed.*" The experiment would be less dangerous to the patient, and less tedious to the physician, if instituted in the manner related by the Arabian author. "Et *hominum sunt quidam* qui ponunt super pectus et latera ejus *filum* lineum infusum in luto rubeo dissoluto in aqua, et considerant locum qui prius exiccatur: quoniam ipse est locus *purus.*" (Liber Canonis, etc. Venetiis, 1490. Lib. iii. Fen. x. Tract. iv. Cap. 17.) If the very ancient translation from which I quote is correct, it is not true that he *proposed* this experiment, but he *mentioned* it as having been performed by *others;* he did not say *wetted cloths*, but a *thread or string* dipped in a mixture of red clay and water; and the side on which it dried soonest was not "that in which the inflammation existed," but the side *free from disease.*

Note B. p. 193.

A passage in Hippocrates, which seems to have been fated to misinterpretation, contains a comparison of a sound taking place in respiration to the crackling of parchment; a similitude often used in modern days for the crepitous or sub-crepitous rattles. We give the passage as found in three editions.

Και τριζει το πνευμα οιον μασθλης.	Vanderlinden, ii. p. 83.
Et *sanguis* stridet velut pellis.	(De morbis ii. 57.)
Και τριζει το αιμα οιον μασθλης.	Föes, Lib. ii. Sect. v. p. 482.
Sanguis velut corium stridet.	
Cutis velut corium stridet. . . .	Haller, Artis Med. principes.

Stoll has quoted the Latin version of Vanderlinden without any commentary. (Ratio Medendi, Part i. p. 97.)

The Greek version of Vanderlinden is evidently the correct one; the *breath* crackles like a skin,—as it may be translated. Any other interpretation is unintelligible. It follows that the Latin translation of this author is incorrect; indeed, it is impossible to translate πνευμα by the word *sanguis;* that both the Greek and Latin of Föes are erroneous, and it is probable that Haller, not knowing what to make of the passage, put in the word "cutis" at a venture.

Note C. p. 209.

As a means of increasing the vocal resonance, as heard by auscultation, I may suggest the plan of making the patient speak into a tube, closed at the extremity. I have never, as yet, tried this experiment except upon healthy subjects, and in them the vocal resonance was very evidently increased. Might it not render certain delicate morbid phenomena, as hægophony, or slight bronchophony, more distinguishable?

Note D. p. 261.

The sentence of Morgagni, to which we have referred, is to be found in the second book, sixteenth epistle, twenty-fourth paragraph. "Et Galenus quidem, ut supra vidimus, scripserat, palpitationem cordis, quæ a pericardii hydrope fit, fieri cum significatione quadam, quod in humore cor ipsum moveatur, liberum nobis relinquens interpretari, an ea significatio ab ægris percipienda sit, ut paulo ante dictum est accidisse nonnunquam, an a Medicis qui ad pericardii regionem, manum, *auremve* admovendo aliquid ibi fluctuationis animadvertant, egregium utique præ cæteris signum futurum, et pro pathognomico habendum, si quidem semper, et in iis quoque esse posset, quibus aut pericardium non multum aquæ adhuc habet, aut cor in aqua non vehementer agitatur, sed languido et obscuro motu vix contremiscit, sique nulla se interponere aliquando posset fallacia aut ab aquis in thorace stagnantibus, aut ab ipso palpitationis motu, aut a causa alia aliqua Medicum facile decipiente."

Note E. p. 279.

Hippocrates had noticed the enlargement of the spleen in remittent fever, as may be seen in the treatise on Epidemics. (Popularium i. Sectio 3.—Vol. i. p. 673, Vanderlinden). "Splen elevatus est orbiculari gibbositate. Sudores frigidi perpetuo. Exacerbationes diebus paribus." (Case of Philiscus.)