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"Je prends le bien où je le trouve."

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The Diagnosis (Physical and Differential) of Phthisis Pulmonalis. A Clinical Lecture, delivered at the City Hospital, Feb. 6th, 1861, before the attending Class of the Medical College of Georgia of 1860-61. By William Henry Doughty, M. D., Hospital Physician.

Gentlemen:—Perhaps, if I had canvassed the entire catalogue of diseases to which humanity is heir, no single one of them could have brought greater claims for its consideration, or have made stronger demands upon our patient and earnest attention than the one that has been selected. The history of our profession abounds in lengthened essays, learned disquisitions, and numberless memoirs upon this subject, all of which attest the profound interest that has been felt in it. The annals of the past show that some of the brightest intellects of the profession have been ardently and scientifically devoted to the pursuit of a full establishment and recognition of those features—both signs and symptoms—which might be assuredly taken as indicative of phthisis, distinct from all other diseases of the respiratory organs. I remark again, that profundity of thought, acuteness of observation, penetrating research, and logical acumen, together with most careful comparison, have been
DEEPLY EXERCISED IN ORDER TO ITS FULL ACCOMPLISHMENT. HOW FAR THEY HAVE SUCCEEDED, THE DOUBTFUL RESPONSE THAT RISES INSTANTANEOUSLY IN THE MIND OF EVERY PRACTITIONER WILL SUFFICIENTLY ATTEND. THIS RESPONSE, DOUBTFUL THOUGH IT BE, WILL NOT BE REGARDED AS THE NEGATIVING OF THE PROPOSITION, BUT SIMPLY AS EXPRESSIVE OF THE DOUBTS AND DIFFICULTIES WHICH STILL HANG AROUND SOME OF THE CASES SUBMITTED FOR EXAMINATION. IN A LARGE MAJORITY OF CASES THE LAND-MARKS, BOTH PHYSICAL AND RATIONAL, ARE SO Plain AND DISTINCT AS TO RENDER UNEQUIVOCAL THE EXISTENCE OF THE DISEASE; BUT THE REMAINING MINORITY, OFTEN REQUIRING OF US A MOST POSITIVE OPINION ARE ENVELOPED IN DOUBT AND ENCIRCLED BY THE SHADES OF OBSCURITY. THE FORMER, FROM THEIR UNMISTAKABLE CHARACTERS AT ONCE RELEASE OUR MINDS FROM FARTHER CONSIDERATION OF THEM EXCEPT IN A PATHOLOGICAL AND THERAPEUTICAL VIEW, WHilst THE LATTER, FROM THEIR INDISTINCTNESS AND SUBTLE NATURE, BECOME ANXIOUSLY INTERESTING IN A DIAGNOSTIC VIEW. PUTTING OUT OF MIND THE PATHOLOGICAL INTEREST OF ALL CASES, WE DO NOT FEAR TO ASSERT THAT THE LATTER—THE DOUBTFUL—HAVE BEEN THOSE TO AWaken THE ENERGIES OF THE PROFESSION, AND TO CONTRIBUTE MOST LARGELY TO THE PRESENT EXACTNESS OF DIAGNOSIS OF PHthisIS.

IT IS BUT COMMON EXPERIENCE AND OBSERVATION IN EVERY DEPARTMENT OF LIFE, THAT THE GRANDEST RESULTS ARE THE FRUITS OF THE HARDEST TOIL, WHILST EASE ENGENDERS SUPERFICIALITY. SO IT HAS BEEN IN THIS INSTANCE, WHERE OPENNESS OF FEATURES AND DISTINCTIVENESS OF CHARACTERS WERE WELL MARKED, IT HAS, IN A MEASURE, PARALYSED ENERGY, BUT WHERE EVIDENCES OF DISEASE WERE OBSCURE AND PATHOLOGICAL CHANGES OR MANIFESTATIONS WERE ILL-DEFINED AND MYSTIC, ALL THE POWERS OF A NICE DISCRIMINATION HAVE BEEN TAXED, AND THE HIGHEST ENERGIES OF THE SYSTEM BENT TO THE UNRAVELLING OF ITS DIAGNOSTIC PHENOMENA.

Thus the diagnosis of tuberculosis comes to us as second to no other question that appertains to the subject, and perhaps only equalled in importance by those of its pathology and curability.

I have selected this subject solely on account of its practical
importance and because of the prominence which it assumes in the case upon which I have twice endeavored to lecture. Of its practical importance you cannot be too sensibly impressed, for though it were rehearsed in your hearing daily you would still have need of assiduous attention in order to remain practically familiar with it. Of course, gentlemen, all that I can do is to repeat to you the conclusions and determinations of others whose time and labor have been almost exclusively devoted to the study of diseases of the chest, and whose ripened experience and enlarged observation, therefore, entitle them to our willing acceptance and judicious verification.

Prior to the discovery of auscultation by Laennec, and of percussion by Auenbrugger, in the early part of this century, no just apprehensions of the phenomena which characterize the various diseases of the respiratory organs could be formed by reason of which the utmost confusion existed, both in regard to their nature and their treatment. The diagnosis of these various affections was particularly obscured, insomuch that bronchitis was often mistaken for more serious pulmonary lesions, pleuritic changes were also mistaken for disease of the lung structure itself, and every form of chronic pulmonary disease confounded with phthisis pulmonalis. It did not stop even here, for affections of the heart and its membranes, as well as the larger blood-vessels, were frequently regarded as pulmonary maladies. At this period the profession was wholly dependent upon the rational symptoms of disease, and by reason of the community of action existing between the respiratory organs and their various parts, it became hardly possible for them to escape the commission of errors of diagnosis. But since the inauguration of this superior method of examining these diseases, viz: by physical exploration, a greater part of the obstructions to correct diagnosis has been removed, and the community of action to which we have referred, has been made to illuminate, instead of darkening, the path of the explorer, by developing the study of their correlative signs. Thus,
as it were, the beclouding circumstances of former periods have become, through scientific analysis, the instrument of light, the lens by whose converging rays objects of vision have been rendered bright and intelligible at this date. But you are not to suppose that the results obtained by the latter method are so grand and overshadowing as to render useless or unworthy of attention the other mode. By no means. These results, though grand, constitute but apart of that brotherhood which must necessarily exist between the signs and symptoms of disease. Were we to confine ourselves to the signs educed by physical exploration alone, we would be overtaken in numerous instances, by the most palpable and egregious errors. Yea, more: should we ignore the rational symptoms of diseases of the chest we would not only be involved in error as were our ancient brethren, but, and I am sure you will agree with me in the assertion, we should be far less excusable than the latter.

From these remarks you will at once perceive that we are not to cultivate or adopt either method of examining disease to the exclusion of the other, but to associate them together, and to interrogate both alike upon all the pathological phenomena that you may be called to pass judgment upon. Connected or related to each other in this manner, each will become an assistant to the other, and in doubtful cases, either a correlative or a corrective. The latter observation also extends to the various methods of physical exploration, each having to the other a reciprocal relation which is as steadfast as the principles of physical science themselves. In the absence of this proper correlation each also becomes a corrective of the other.

Furnished, then, with these various methods for the interpretation of diseases of the pulmonary organs, we are prepared, fully prepared, in a vast majority of instances correctly to understand them and rightly to appreciate them. Hence we can be no longer justified in the commission of those errors of diagnosis, with their evil effects in practice, which were formerly abundant. On the contrary, abun-
dant facilities for qualification being afforded us, we are bound by duty and conscience to acquire a knowledge of them in order that we may discharge, satisfactorily, the obligations which our relations to society devolve upon us. And I may be allowed to remark in this connection, that, under no other circumstances in professional life will you be enabled to experience more gratification than flows from the conscious discharge of your whole duty, than in the present particular.

But, having made these general observations by way of introduction, let us proceed now to a direct consideration of the subject. The power to diagnosticate tubercular consumption presupposes a full acquaintance with the natural history of the disease, as its hereditariness, as well as its accidental acquirement; its relations to age and sex; its mode of commencement usually insidious and almost insensible; its almost universally slow progress and development; its pathological cause and changes, viz; the tubercular deposit, its character, its changes and its results; the laws which the latter seems to observe, both in the points of its earliest deposit and its mode of progress to other portions; the relations of hemoptysis to it as evidence of tubercular deposit already taken place, and its frequency as a symptom; the products of the changes wrought in the lungs as manifested by the expectoration; its constitutional sympathies, as increased frequency of the pulse, hectic fever, dyspnoea, night-sweats, diarrhoea, chronic laryngitis, and general marasmus. Besides this, we must have a practical acquaintance with all of the physical signs that are discoverable in diseases of the respiratory organs, for, as you should not fail to remember, there are "no special pathognomonic physical signs" which belong to it. You need never expect to find a certain set of physical signs present in all cases, incident alone to the conditions of the pulmonary structure induced by this disease, for the tubercular deposit may and does vary greatly as to its place of deposit, its extent, its character, as when in an isolated, scattered manner or confined to a single spot. Again, these would vary with its location near the super-
fices of the lung or deep within its structure. For instance, let us suppose the existence of a deposit near the pleural covering of the lung, under the progressive softening and maturation there occurring, the pleura becomes ulcerated, and an admission of air allowed into the pleural cavity; we would then have the physical signs of pneumo-thorax super-added, whereas if a similar deposit existed deep within the structure of the organ, we should only have developed the ordinary signs by percussion and auscultation. Or if it existed in the form of milliary tubercles scattered irregularly throughout the organ, the physical signs would again be found to vary from those evolved from a circumscribed deposit in any portion of it.

Then again, there is nothing special in the sounds elicited from pulmonary tissue hardened by tubercular deposit, for the same or similar sounds would be produced if the solidification proceeded from any other cause, as inflammatory adhesions, etc. The signs afforded by auscultation of a tuberculous cavity wherever seated yield no distinctive differences from those given forth from a similar cavity, the result of any other species of diseased action: in other words, the physical signs are the same whether it be a tuberculous cavity or a local abscess resulting from pneumonitis. The same remarks might be extended to any of the physical signs for they represent morbid conditions whether the result of the tubercular cachexia or not. In the language of Professor Flint, "the phenomena which it embraces belong also to other affections. They represent morbid conditions not peculiar to tuberculosis, but existing in other forms of disease." He further remarks thus: "isolated from other other signs, and dissevered from symptoms, pathological laws, and associated circumstances, none of the physical phenomena which have just been considered would possess marked diagnostic importance. Nevertheless, from their combinations, their conjunction with vital phenomena and with facts pertaining to the natural history of the disease, they acquire a positive value, and are hardly less significant than if they belonged to it exclusively."
The physical signs produced by tubercles in the lungs differ according to the stage or state of the deposit. If the chest be examined during their existence in a crude state, they will be observed to differ widely from those produced during the stage of softening or after the formation of cavities. This is very apparent, and you must be prepared to meet these differences in practice, otherwise you will often be foiled in your efforts. It is common to divide tuberculous disease into several stages, founded upon the condition of the deposit itself as that of crude tubercle, of its softening, and of excavation. Connected with physical exploration, this division is not so convenient as that suggested by Professor Flint, because we are not always able to define the exact state of this product, and very often these various states are united. Some of the earlier deposit may be maturing and breaking down the vesicular structure into abscesses, whilst at other points it may be in a crude condition, and this state of things may exist, either in the different lungs or in different parts of the same lung. Besides this, the term crude tubercle simply expresses the state of the deposit itself, without regard to the mode of its distribution through the lung, whether aggregated into masses or disseminated in minute particles throughout it. It is more or less indefinite, and suggestive of few of the signs incident to its presence. Professor Flint suggests the following basis of division, viz: (1) "Small, disseminated tuberculous deposits;" (2), "Abundant deposition, involving considerable solidification;" and (3), "Tuberculous disease advanced to the formation of cavities." Size and mode of distribution are the distinguishing features in the first two divisions, and are, to a greater or less extent, reflective of the various physical signs incident to them; the third is identical with the corresponding one in the other division. When you come to apply this in practical auscultation and percussion you will then find that it is not an unimportant or trivial matter, for it will require but a limited experience to acquaint you with the material differences which exist be-
tween the physical phenomena elicited from a lung or lobes of a lung occupied in the one case by small disseminated tubercles, and in the other by an abundant deposit. In the former, the intervening portions of healthy vesicular structure, particularly if they assume a complemenal action, will modify the percussion sounds to such an extent as to render them, in some cases, almost inappreciable, certainly doubtful, whilst the auscultatory signs may be so obscure as to require the nicest tact for their detection. In the latter, however, the aggregated mass, limitable and circumscribed, affords the clearest evidences under both methods of physical examination. The correlative phenomena in the latter instance, associated with the semeiological and historical features of the case establish the diagnosis, whilst in the other, doubts only become confirmed.

There is a law in tubercular consumption of which you should, at an early period, be apprised, viz: that "the deposit, in the vast majority of cases, takes place at or near the apex of the lung." This is not invariable, though exceptions to it are rare. In examining then for tubercular deposits you will first direct your attention to this point and any evidences, however slight, of solidification when not owing to the natural disparity existing between the two lungs becomes highly suspicious, and if accompanied with increased vocal resonance, and with any of the elements of broncho-vesicular respiration, may warrant a positive opinion. If occurring in a patient liable to its inheritance and accompanied with symptomatic manifestations, however slight, it may be regarded as certain. Usually this deposit occurs "at the summit of the lung on one side before the other lung is attacked," though the other is subsequently invaded. Hence it is observed that "in the bodies of persons who have died with tuberculosis, the two lungs almost invariably are found to be diseased, but the deposit is most abundant or the ravages are more extensive on one side." If you remember, the case in connection with which these remarks are made presented this feature or rather conform-
ed to this law, and this fact becomes presumptive of tuberculosis. By reference to the notes of examination, I find the following statement: Percussion over apex of left lung anteriorly and posteriorly, gave appreciable dulness; of right lung, over apex, marked dulness, extending in a varying degree, over the entire upper third of the lung. The correlatives of auscultation were, in the left lung, broncho-vesicular respiration, and increased conduction of sound; in the right, bronchial respiration, the expiratory murmur being greatly prolonged, and much greater conduction of sound than was observed on left side.

Here, then, we have the evidences of structural disease at the apices of these organs, more advanced and prominent than in any other portion of them, and farther advanced on one side than the other, thus, according to the law of tuberculosis to which I have adverted, affording strong presumptive evidence of tuberculous solidification.

In regard to the normal disparity between the right and left lungs, it is said that "distinct dulness, however slight, on the left side, is highly significant, while on the right side, if slight or moderate, it is to be taken as a morbid sign with considerable reserve." And again, "distinct dulness at the left summit, be it ever so slight, in connection with the diagnostic symptoms of tuberculosis, may almost suffice to establish the fact of the existence of the disease, when, if situated on the right side, other corroborative evidence is requisite." In our patient above, unfortunately all of the diagnostic symptoms of tuberculosis are not present, notwithstanding the evidence of extensive solidification in both lungs, so that the diagnosis is not in every particular confirmed. But few diagnostic symptoms are present, and they are not such as you would expect from the advanced appearance of the case. They are pain in the chest rather obtuse than lancinating, slightly increased respiration, paroxysmal cough with mixed expectoration, scanty and tight, and general emaciation, with loss of muscular strength. Those absent are hectic fever, night-sweats, diarrhoea,
chronic laryngitis, and the thick suppurative expectoration common to consumption. About thirty years ago he recollects having "spit blood," but his subsequent history rather militates against the supposition that he was then tuberculous. He is not hereditarily predisposed to the disease, and, until thirteen months since, was as hearty and robust as any one. At that time he contracted a severe acute disease of the chest, probably pneumonia, and has been declining ever since.

But let us return to the division which we have adopted and pursue the course there marked out. What physical signs may we expect to find when the tuberculous deposits exist in a small, disseminated state? Of course we can expect little or no aid under this state of things from any of the collateral methods of physical exploration, as inspection, palpation and mensuration; for the lung maintains, to a great extent, its natural resiliency and elasticity, thereby abolishing all evidences usually afforded by them. In this condition of the deposit, our resources are limited chiefly to the two modes, percussion and auscultation, and in order that the signs elicited by these be diagnostic, they must establish their proper correlation, and must be conjoined with the symptomatic phenomena however obscure. Percussion usually affords what is termed appreciable dulness or simple dulness, or technically diminished vesicular resonance. If the deposit though small, be confined to the apex or a single lobe of the lung, as the upper, this diminution of resonance will extend only over that particular region, or if it be disseminated throughout the entire lung or lungs, as it occasionally is, it will be found to embrace the entire superficies of the chest. The dulness will correspond to the degree of encroachment of the masses upon the vesicular structure or the relative size of the masses. If the encroachment be small, the variation of the vesicular resonance will be slight, and vice versa. But sometimes the vesicles immediately surrounding these small deposits become emphysematous or assume an increased action, and acquire an
increased capacity, in this case instead of appreciable dul-
ness on percussion, you will or may have an increased sonor-
ousness, but not of the normal vesicular quality—it is called
tympanic resonance. This abnormal clearness need not be con-founded with the normal vesicular resonance, if at-
tention be paid to its quality and pitch. It is non-vesicular
and high in pitch. The normal vesicular resonance has a
certain timbre or tone, and is low, grave in its pitch, whilst
tympanic sonorousness is always high in pitch and its
quality has a type in the sounds elicited by percussing over a
hollow organ. This sound is one of the characteristic signs
of emphysema of the lungs, and when evidence of tubercu-
lar disease is most apt to be found over the left lung on
account of its anatomical relationship with the hollow ab-
dominal organs. Of this relation you should at all times be
mindful, since the gastric sounds are frequently transmitted
over its surface, and under numerous circumstances are
found modifying the percussion resonance.

Sometimes you will find instances in which the normal
vesicular resonance is not abolished, and yet there are some
of the indications of tympanic resonance present. It is
neither strictly vesicular nor non-vesicular, but a combina-
tion of the sounds of each. This modification is called
vesiculo-tympanic resonance, and is entirely compatible
with certain relations of the solid deposits to the adjoining
pulmonary structure.

In the next place let us consider the signs elicited by aus-
cultation from a lung occupied by this species of deposit.
In a large majority of cases they consist in simple modifi-
cations of the healthy respiratory sounds. And your ability
to detect them necessarily depends upon the degree of your
familiarity with the latter. The chief of them, the most
important because most frequently met with, have types or
representatives in the healthy respiration to which they are
referred and with which they are compared. Thus we have
a certain abnormal respiration characterized as bronchial
respiration—a sign which is constantly present in extensive
solidification of the lung whenever occurring—because its characters have a more or less exact resemblance to those sounds produced by the rush of air to and fro through the larger bronchial tubes in health. The normal vesicular respiration has certain distinguishing features, the absence or modifications of which become the signs of disease. I would impress you, gentlemen, with the importance of this great truth as the first requisite to skilful and accurate auscultation, the absolute necessity of a knowledge of the characters of normal respiration in each and all of its branches. Possessed of this knowledge, you will find physical auscultation comparatively an easy task, whilst in its absence, you will often be involved in error and darkness.

The most commonly observed modification of the healthy respiration is that called broncho-vesicular respiration—by some called rude, and by others, harsh and dry respiration. The former we adopt because it presents the types with which it must be compared, and also because it suggests the particular place whence it must be evolved—the smaller bronchial tubes, and the vesicular portion of the lungs. But what is the broncho-vesicular respiration, or how may you recognize it? In the language of Prof. Flint, who first proposed it, if all of its characters are present, "we shall have an inspiratory sound, neither purely tubular nor vesicular in quality, but a mixture of both, (broncho-vesicular,) the duration somewhat shortened, (unfinished) the pitch raised; a brief interval followed by an expiratory sound, prolonged, frequently longer and more intense than the inspiration, and higher in pitch." It includes, then, modifications both of the inspiratory and expiratory sounds, and implies a substitution of certain features of bronchial respiration (normal) in certain parts of the vesicular structure of the lungs—sometimes a few only of its features may be recognizable. The normal features of the vesicular murmur, may not be obliterated, yet they are so far obscured by those which belong to the other, as to have its low-toned, soft, expansive murmur supplanted by a rude, harsh sound. This kind of dis-
ordered respiration is always heard when the encroachment is but slight, or has not extended to a great degree of solidification of the parenchymatous structure; when the latter is accomplished well-marked bronchial respiration is produced.

Sometimes the expiratory murmur presents the very earliest indication or becomes the earliest cognizable physical sign of tuberculosis. In health, there is but a small proportion of individuals—one-third—in whom a well-marked expiratory sound may be heard, when, therefore, it exists in an appreciable degree and possesses any of the characters which pertain to broncho-vesicular respiration, it may be taken in connection with associated symptoms as evidence of disease. The most usual changes which it undergoes in the early period of tuberculosis are a prolongation and elevation of pitch, in these respects occasionally outstripping the sound of inspiration. It is not difficult to understand the reason of its prolongation, for the elastic recoil of the lung is impeded by the presence of these deposits, consequently the escape of air from it is retarded. The expiratory sound is, upon an average, only one-fifth the length of the inspiratory, therefore, any material prolongation of it becomes at least suspicious, and justifies us in attaching great importance to it when other corroborative evidence exists.

Another modified respiratory sound occasionally discovered in this condition of the tubercular deposits is exaggerated vesicular respiration. It is rather significant of disease at neighboring points to the region over which it is heard, and is not essentially abnormal. It is synonymous with puerile respiration, and exemplifies what I have alluded to as the complementary action of a part. This sound is not so frequent an attendant upon disseminated tuberculous deposits as upon abundant deposit of circumscribed dimensions. In the former, it is obscured by the presence and universality of the broncho-vesicular respiration.

A very important physical sign usually available also is
increased vocal resonance—an increased conduction of the sounds of the voice into the ear of the observer. In auscultating the healthy chest over the vesicular pulmonary structure, the act of speaking is attended with a peculiar vibration not, however, possessed of much intensity. It varies greatly with individuals, and in the two lungs, and in different parts of the same lung. There seems to be no direct transmission of the sound, but a widespread diffusion of it over the porous structure. It is too extensively diffused to obtain much intensity, but when, from any cause, the vesicular structure becomes solidified, it acquires an increased conducting capacity, and this latter corresponds with the degree of solidification. Therefore, increased vocal resonance becomes an important physical sign of tubercular deposit, whether aggregated or disseminated; in the latter instance, being the correlative of diminished vesicular resonance and the broncho-vesicular respiration.

But, again, if these scattered deposits have become oftened and are being discharged by expectoration, you will have superadded to these various signs, some of the adventitious rales, i.e., such as have no natural type in the healthy chest. It may be, that in one part of the lung they are being discharged, whilst in another they are still in a crude state, under which circumstances some one or other of the moist rhonchi will be heard, most probably the subcrepitant. You are aware that these rales are produced in the bronchial tubes, and are most generally treated of in connection with bronchitis. If the time and occasion warranted I should be glad to digress at this point and make further allusion to them.

Let us briefly recapitulate: the percussion sounds are diminished vesicular resonance or dulness—or "tympanitic dulness"—or the vesiculo-tympanitic variety: the auscultatory signs are broncho-vesicular respiration, increased vocal resonance, perhaps exaggerated vesicular murmur, and some of the adventitious rales, as the subcrepitant.

There is a manifest tendency in such deposits as we have
considered, ultimately to become consolidated, both under the usual progress in deposit and the resultant softening of the pulmonary structure. Hence the physical signs here enumerated would become gradually intensified, and finally merged into those of the second division of our subject which I will now proceed to discuss.

In cases of abundant tubercular deposition, involving extensive solidification, most of the auxiliary methods of physical examination become available, and the evidence adduced by them is by no means unworthy of notice. If you remove the patient's clothing and inspect the chest you will very probably discover some depression either in the post-clavicular or sub-clavicular regions, caused by the diminished expansion of the lung beneath, and also be able to detect diminished respiratory movements on the diseased side or at the diseased point. Palpation will reveal to you an increased sense of resistance over the solidified portion, abnormal vocal fremitus, and diminished elasticity of the thoracic walls. Mensuration will also disclose deviations from the natural dimensions, and thereby assist, although this method is much less needed in this disease than in some others.

Percussion over an abundant deposit yields much greater dulness than in the other division—marked dulness is the term used to express it. If the bronchial tubes included in it remain open, especially if they be at all dilated or enlarged, or if the surrounding vesicular structure be highly emphysematous, it will partake, more or less of a tympanitic sonorousness.

The signs commonly afforded by auscultation are well marked bronchial respiration occupying the seat of the deposit, broncho-vesicular respiration, and some of the adventitious rales in the immediate vicinity of it; exaggerated vesicular respiration may also be present at some points. The crepitant rhonchus may be heard, indicating circumscribed pneumonitis, or the sub-crepitant, indicating capillary bronchitis or the presence of the softened tubercular
materials in the smaller tubes, or any of the moist or dry rales may be present. The latter only become diagnostic of phthisis when heard at the summit of the chest in the vicinity of a tuberculous deposit. They are incidental and depend in most instances upon the existence of circumscribed bronchitis or pneumonitis. "Their value is enhanced by association with other phenomena, physical and vital, pointing to tuberculous disease."

The correlatives of the voice are also well developed—there is well-marked bronchophony over the solidification, and in many instances, pectoriloquy. In the latter there is a transmission of the articulated voice—it is "articulate through indistinct speaking." There may be also an abnormal transmission of the heart sounds in addition. Another sign that frequently accompanies abundant tuberculous solidification is a bellows sound attendant upon whispered words. It is said that "this sign may be present in a notable degree, when the bronchial respiration, bronchophony, or exaggerated vocal resonance are not strongly marked."

When the tuberculous deposit has advanced to the stage of excavation it is exceedingly difficult to be able at all times to diagnose it. Indeed it is not always possible because the varying size, position and relations of the cavities often prevent the evolution of those signs distinctive of their existence. Repeated examinations are frequently necessary to settle the question of their presence or absence. More or less solidification always remains in connection with these cavities, hence the most of the physical phenomena which we have just considered still remain though combined with those peculiar to cavities. Cavernous respiration is the technical name for the latter. The features of this sound are different both from those of bronchial respiration and the vesicular. Thus Professor Flint describes them as follows: "They consist of an inspiratory sound, non-vesicular or blowing, but compared with the bronchial inspiration, low in pitch, hollow, more slowly evolved; and
of an expiratory sound if present, lower in pitch than the sound of inspiration."—(page 481.) All of these characters may not be distinguishable; you may have only the inspiratory sounds present; the distinguishing characteristics are lowness of pitch and absence of the vesicular quality.

Bronchial respiration generally exists in the vicinity of the cavity, with which you may compare it, and for which you should not mistake it. Recollect that the chief elements of the latter are tubularity of sound and highness of pitch. Cavernous respiration is a variable sign, and may be present at one examination and absent at another. This variableness depends, to a great extent, upon the amount of fluid matter contained in it at different times, and also upon the rigidity of its walls. Thus if it be filled of course it will disappear, and with the discharge of its contents by expectoration will re-appear. Hence it is recommended in the examination of patients for cavities in the lungs, not to do so shortly after rising in the morning, but to wait some hours so as to permit the discharge of the matter accumulated during the night. This sign is much more available when one large cavity exists than when a number of small ones are scattered throughout the lungs. In the latter case, their size prevents its perfect formation, and it is often or apt to be, obscured by the co-existing bronchial sounds. Under the act of coughing sometimes in a large cavity, a gurgling may be detected. This is conclusive of the existence of a cavity when heard; they are rarely so large, however, as to render it of much value.

Pectoriloquy is a vocal sign supposed by some to be indicative of a cavity, but by others said not to be exclusively so. It may accompany solidification of tissue either with or without an excavation. You will recollect that this sign was quite prominent at the posterior angle of the scapula in our patient, on the right side: it may or may not be indicative of a cavity there. I was unable to detect the cav-
ernous respiration at that point. When associated with the latter in any case it may be regarded as diagnostic.

Metallic tinkling is another incidental sign produced as a vocal or tussive phenomenon, supposed to be produced when a cavity of some size is partially filled with air and fluid. I can only mention it and pass to the physical signs educed by percussion. As in auscultation, those of solidification still remain with modifications or superadditions. Thus if the cavity be full of fluid it will be remarkably dull on percussion, perhaps flat; or, if empty and of some size, it will give a circumscribed tympanitic resonance, or sometimes a modification called amphoric resonance (a metallic sound) or a cracked metal sound (bruit de potfele.) The first "may be imitated by striking the cheek when the jaws are moderately separated and the integument rendered somewhat tense," and the second "by folding the palms of the hands loosely and striking the dorsal surface on the knee, in the manner frequently done to amuse children, producing a sound as if pieces of money were placed between the palms." "The production of this sound is now generally attributed to the air being suddenly and forcibly expelled from a cavity communicating with the bronchiae by several free openings, precisely as the blow on the knee expels the air between the palms in the experiment mentioned by which the sound may be imitated."—(Flint, page 120.)

Thus, gentlemen, I have viewed in detail the three divisions adopted, imperfectly, but I trust truthfully. And wherever the combination of signs and sounds here mentioned occur, or whenever these various correlative physical signs are present associated with the usual symptomatic phenomena which belong to tuberculosis, your diagnosis is positive and complete. But in some cases, the symptomatic evidences are few and dubitable, and then the importance of the physical signs becomes greatly enhanced and demand on your part a most skilful survey and judicious consideration. Under these circumstances, the differential diagnosis of tuberculosis acquires almost exaggerated import-
ance because the same physical signs may be common to other affections, as dilatation of the bronchial tubes—the ultimate result of bronchitis—or chronic pneumonitis. The latter is so rare as scarcely ever to give rise to discussion but the other is not so infrequent. When the diagnosis devolves mainly upon the physical signs it is exceedingly difficult, if not impossible, always to discriminate between tuberculosis and dilatation of the bronchial tubes. I confess my inability in the patient up-stairs. The difficulty originates in the fact that has already been mentioned, that there are no physical signs peculiar to tuberculosis, but any or all of them may be attendant upon the physical conditions giving rise to them, however produced, whether from tuberculous changes or any other diseased action. It is only in the exceptional cases, however, that such difficulties arise; for, as a general rule, the diagnosis is plain and satisfactory. But you must be prepared to meet these exceptions, for come they will in practice, and it may be that the only test of your opinions will be found in the results of your practice.

When I conceived this lecture, gentlemen, it was my intention to confine it to the differential diagnosis of tuberculosis, and dilatation of the bronchial tubes. But upon reflection I thought it would be of more interest to you to dwell upon the simple diagnosis of the disease, without special reference to any other. If, however, you will indulge me I will give a brief summary of the chief points involved in the differential diagnosis.

Bronchophony, increased vocal fremitus, and bronchial respiration are physical signs of dilatation of the bronchiole; and in its saccular variety, you may have superadded cavernous respiration, gurgling, and "in some instances pectoriloquy." If there be any degree of bronchitis present as there usually is, more or less of the moist rales will be found also. Bronchial dilatation usually affects the upper lobes, though not especially the apex like tuberculosis. The bronchial voice and respiration are due more to the enlarged
calibre of the tubes than to the solidification of tissue, and hence are not so intense as in tuberculous solidification. Dilatation of the bronchiæ is not progressive, in the sense in which that word may apply to tuberculosis, and usually exists on one side. But, says Prof. Flint: "the point to which most importance is to be attached is the absence of the rational evidence of phthisis derived from the history and symptoms. In cases of dilatation, cough and expectoration generally have existed for a long period. If the affection be tuberculous, certain events are to be expected which, if the affection be dilatation, the case will not be likely to present. Among these events and results the most prominent are progressive and marked emaciation, loss of muscular strength, pallor of the countenance, hemoptysis, lancinating pains in the chest, diarrhœa, marked acceleration of the pulse, hectic paroxysms, night perspirations, chronic laryngitis. If all these are absent, the fact favors the supposition of dilatation being the pathological change giving rise to physical phenomena which, associated with more or less of the symptomatic phenomena just enumerated, would devote unequivocally the existence of tuberculous disease. Occasionally, however, it happens in cases of phthisis, that nearly all these rational indications are wanting. Hence, under these circumstances it is not safe to decide positively from their absence that tuberculosis may not be excluded." How shall I determine that this is not one of those occasional cases of tuberculosis, in which "nearly all these rational indications are wanting?" The most important ones wanting are acceleration of pulse and respiration, hectic fever, night sweats and chronic laryngitis. Thirty years ago he had hemoptysis, but never had a cough until thirteen months since, at which time he contracted some acute disease of the chest, probably pneumonia; he is not hereditarily predisposed to consumption. The history of his cough and expectoration furnishes no light. Finally, gentlemen, following the admonition of the learned professor to whom I have referred, I consider it unsafe to declare that tuberculosis does not exist.
A Case of Paralysis of the Upper Extremity induced suddenly by a blow upon the Shoulder. Reported by L. A. Dugas, M. D., &c., Professor of Surgery in the Medical College of Georgia.

On the 18th of January last Mr. James Gaines, of Darien, in this State, brought his man servant (Reed) to me for professional advice, and gave me the following history of the case:—Reed is a negro about twenty years of age; of fine constitution, and well developed muscular system. He was out with some friends hunting at night about two months ago, when they "trod a coon." While Reed held up a torch for his comrades to cut down the tree the blows of the axe caused a large dead limb to fall, which prostrated him. His friends ran to him and found him unconscious and apparently insensible. They removed the branch which still rested upon him; lifted him up, and in a short time he recovered his consciousness and was carried home. His master examined him and found that he had entirely lost the use of the right arm, and that it was insensible to any degree of pinching. Medical aid was obtained as soon as possible, and it was found that the blow had been sustained alone by the right shoulder. This was considerably bruised and somewhat swollen; the skin over the deltoid muscle and just beyond the extremity of the acromion process was abraded; but the most careful examination could detect neither fracture nor dislocation of any of the bones. The pulse at the wrist was normal, the surface of the limb was cold, the insensibility complete from the fingers to the upper part of the arm, and the patient unable to move any muscle of the limb. There was no injury to the head nor any other part of the body.

The fore-arm was put in a sling, lotions applied to the shoulder, and stimulating frictions made to the limb for a month without a mendment. Electric shocks and currents were then resorted to for some time, and it was found that he could feel the shocks above the elbow, but not be-
low it. They did not seem, however, to excite any muscular contractions, and were discontinued.

It is now just nine weeks since the accident. On stripping the patient and examining him in the erect posture no inequality of height can be detected in the shoulders, and the only visible difference between them is the partial atrophy of the deltoid and scapular muscles on the affected side. The entire right limb is smaller than the left; it is perceptibly cooler than the other; the pulse is normal; severe pinching can be slightly felt above the elbow, but not at all below this; he can move neither finger nor any muscle of the limb and shoulder. I now proceeded to make a most careful examination of the scapula, clavicle and humerus and joint without being able to detect any fracture nor any displacement whatever. The roughest manipulations were painless and not the least crepitation could be induced. Everything was in its proper place and position. The ulnar nerve was insensible to pressure at the elbow. The limb dangled by the side of the body as if dead.

Now what could have occasioned this paralysis if not an injury to the axillary plexus by being suddenly and violently jammed against the ribs by the shoulder joint? And yet there are some who deny that this is possible.

This case derives additional interest when taken in connection with several others I have had occasion to report within the last few years. (See Southern Med. & Surg. Journal for 1857, p. 323, and for 1859, p. 741.) It is worthy of remark that in the two first two cases I published, and in which the drooping of the shoulder consequent upon fracture persisted, the patients continued to suffer much pain in the limb; whereas in the third and in this (the fourth I have seen) they suffered none after the subsidence of the immediate effects of contusion. In the former cases the axillary nerves continued to be pressed upon and irritated—in the latter they suffered only at the time of the blow.
Lectures on the Theory and Therapeutics of Convulsive Diseases, especially of Epilepsy. By Charles Bland Radcliffe, M. D., Fellow of the College, Physician to the Westminster Hospital, etc.

LECTURE I.—CONCLUDED.

In the able hands of Prof. du Bois-Reymond,* the galvanometer has recently brought to light certain facts which appear to be essential to the full interpretation of the mode in which muscle is affected by electricity.

Of these facts those which require to be mentioned first in the present inquiry are these:—that there are electrical currents in living muscle and nerve; that these currents die out pari passu with the irritability of the nerve and muscle; and that they have finally disappeared before the occurrence of rigor mortis.

The next fact to which I would prominently direct attention is this, that the electrical currents of muscle and nerve are weakened during ordinary muscular contraction.

In the beautiful experiment by which this weakening of the muscular current during contraction is demonstrated by Prof. du Bois-Reymond, use is made of the gastrocnemius of a frog, with a long portion of the sciatic nerve attached to it. The muscle is placed upon the cushions of the galvanometer, and the nerve is laid across the poles of an induction coil, which coil is not then in action. On placing the relaxed muscle upon the cushions of the galvanometer, the muscular current transverse the coil, and the needle is deflected to a considerable distance from zero. Passing a series of alternating induction currents through the nerve, and so producing a state of tetanus in the muscle, the needle swings back, and for a moment or two passes to the other side of zero. Under the current of the relaxed muscle, that is to say, the needle passes from zero; when contraction is produced, the needle passes towards zero. How, then, is this? Is the needle acted upon by a reverse current during contraction, or is it left free to oscillate back to its point of rest in consequence of the cessation of the current which had previously kept it away from this point? To answer this question, the experiment just described is modified in the following manner:

Having first ascertained the point to which the needle is

deflected by the current of the relaxed muscle, the current of the coil is broken, and the needle allowed to return to rest at zero. Then, throwing the muscle into a state of tetanus, the circuit of the coil is closed. In other words, the experiment is so conducted as to test the current of the contracted muscle. And what is the result? It is this: that the needle moves in the same direction as that in which it moved under the current of the relaxed muscle, but not to the same distance from zero. That is to say, the current of the gastrocnemius is found to be weakened during the contraction, not reversed. I have often verified this fact, and I shall be happy to show the experiment after the lecture to any who may be sufficiently interested in the subject to remain.

In showing the corresponding weakening of the nerve-current, the ischiatic nerve of a frog is divided in the ham, and dissected out for a sufficient length towards the spine. This being done, the divided end of the nerve is bridged over the cushions of the galvanometer, so as to touch one cushion with its end and the other with its side, and a note is taken of the degree to which the needle is deflected by the nerve-current. The frog is then poisoned by placing a little strychnia under the skin, and when the tetanus occurs, the needle is seen to recede three or four degrees nearer to zero; and this not only during the principal attacks, but also during the more transitory shocks which are produced on touching the animal. It is seen, further, that the needle again diverges from zero when the spasms pass off. For this fact also we are indebted to Professor du Bois-Reymond.

And thus in ordinary muscular contraction as well as rigor mortis, the phenomenon of contraction would seem to be coincident with the absence rather than with the presence of the natural electrical currents of muscle and nerve.

The influence of artificial electricity in muscular action is a difficult problem; but even here there are facts which show that the full solution may be hoped for before long.

When the hind limb of a frog is attached by means of its sciatic nerve to the conductor of an ordinary electrical machine, and the conductor is in turn charged and discharged, the limb is seen to be at rest in the former period and to be convulsed in the latter. Now, in this experiment, the limb as part of the conductor, must participate in all the changes
of charge or discharge which pass over the conductor; and in this case therefore the muscular contraction would seem to be related to the disappearance of ordinary electricity from the muscle, and not to the presence of ordinary electricity in the muscle.

The muscular movements resulting from the action of a galvanic current are not a little complicated, and their full interpretation is proportionately difficult.

The muscular movements, resulting from the action of a galvanic current upon a motor or mixed nerve, provided nerve be divided and its end lifted up are divisible into periods of double, alternate, and single contraction. In the first period—that of double contraction—there is contraction at the beginning and end of the current, and the only point to be noticed is, that the contraction at the beginning of the "direct" current* is the strongest. In the second period—that of alternate contraction—the contraction occurs alternately at the beginning of the "direct" and at the end of the inverse current. In the third period—that

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*The current is spoken of as "direct" when it passes towards the muscle, as "inverse" when it passes from the muscle. In other words, the current is "direct" when the positive pole is furthest from the muscle, and "inverse" when nearest to the muscle.
of single contraction—there is, first of all, contraction at the beginning of the direct current, and at this time only; and, later still, there is apparent irregularity. Later still, that is to say, contraction may attend upon the beginning of the inverse current, after it has ceased to attend upon the beginning of the direct current; and not only so, but it may return to the beginning of the direct current after it has ceased to attend upon the beginning of the inverse current.

Ney, these alternate revivals of contraction, which are known as "voltaic alternatives," may occur several times in succession upon thus reversing the current.

The muscular movements resulting from the action of a galvanic current upon a loop of nerve are found to be divisible into the same three periods of double, alternate, and single contraction; but the movements themselves occur in very different order within these periods. In the period of double contraction, the contraction at first is strong at the beginning of both currents direct and inverse; and then, a moment or two later, it is strong only at the beginning of the inverse current. In the period of alternate contraction, the time of the contraction is at the end of the direct and at the beginning of the inverse current. In the period of single contraction, the contraction, first of all, is at the beginning of the inverse current; and afterwards, without any apparent regularity, now at the beginning

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of the direct, and now at the beginning of the inverse current. It is only, indeed, in this final stage of apparent irregularity, or "voltaic alternatives," that the movements correspond with those which result from the action of a current upon a nerve which has been divided and lifted up at its end. All this may be seen at a glance by comparing the above table with one preceding it.*

In commenting upon these phenomena, it is convenient to consider them as belonging to the three groups in which they have been arranged. And first, of the movements belonging to the first period—that of double contraction.

In looking at the movements belonging to the first period, it is not difficult to find a reason which will, in some degree, explain how it is that contraction is confined to the beginning and end of the current, and to these times only. It is not difficult to see that the beginning and ending of the galvanic current in the nerve may involve certain changes in the strength of the nerve-current, and that these changes may in their turn give rise to momentary induced currents in the nerve and in its neighborhood; for such momentary currents are induced, not only when a current begins to pass and when it ceases to pass, but also at the moments when it undergoes any change of strength. It is not difficult to see, also, that the muscular fibres to which the nerve is distributed may be the seat of some of the secondary currents thus induced, and that these fibres may on this account be made to contract. Nor is it difficult to see—if the contraction be thus connected with the induced current—that there will be no contraction in the interval between the beginning and ending of the inducing galvanic current; for if this latter current passes steadily there is no induced current in this interval. It does not follow, however, that the contractions are caused by the presence of the induced

*Professor Claude Bernard has recently stated that a period of single contraction precedes the three periods of which mention is made—a period which is distinctive of the undisturbed and perfectly unexhausted nerve and of which the characteristic feature is contraction at the beginning of the two currents, inverse as well as direct. On further inquiry, however, I think Prof. Bernard will perceive that these phenomena are not entitled to this precedence and significance; for, as stated in a recent communication to the Royal Society, I find that they are producible at will in the the period of double contraction by using a feeble current under particular circumstances.
currents which are thus developed. On the contrary, these currents are no sooner communicated to the muscle than they are with drawn from the muscle, and it may be that the contractions are really due to this withdrawal. At any rate, it is in connection with the induced currents of which mention has been made that we seem to have a reason which will, in some degree, explain why it is that contraction is confined to the beginning and end of the galvanic current, and to these times only.

In considering the movements belonging to the second period—that of alternate contraction—the first thing to be done is to ascertain how it is that the order of contraction as set down in the first table is reversed in the second table and this thanks to Dr. Rousseau, of Vezy, is no very difficult matter.*

When the current acts upon a loop of nerve, it is not enough to suppose that the only current is that which passes directly between the positive pole and the negative pole. On the contrary, there is a more roundabout way—a way which is made up partly by the portions of nerve beyond the poles, and partly by the intervening muscles of the thigh; and along this more roundabout way another current will pass in a contrary direction to that of the other current. In this case, that is to say, in addition to the first current, which is distinguished by the name of primitive current; there is a second current, which is known as the derived current.

Where, on the contrary, the galvanic current acts upon a nerve which has been divided and lifted up at its end, the only current acting upon the nerve is the primitive current. In this case, indeed, the circuit of the derived current is broken, and for that reason there can be no derived current.

Now, it is in the action of the derived current that Dr. Rousseau has found an explanation for that reversal in the order of alternate contraction which takes place in the case where the galvanic current is made to act upon a loop of nerve through ordinary poles.

One proof of this is afforded by an experiment in which the galvanic current is passed through a rheophore bifurque—a rheophore, that is to say, in which one of the poles (say

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On the negative is forked and so arranged as to receive the other pole (the positive) between its prongs. It is seen, in the first place, that the portion of nerve which lies across the poles is acted upon by two primitive currents, and that these currents pass in opposite directions from the central positive pole to the outlying negative poles. It is seen, also, that there is no outer or derived current, and that there can be no such current in this case, inasmuch as the two out poles are both of the same character—both negative. It is obvious, moreover that there will be no difference in the result where a nerve which has been divided and lifted up at its end is laid across the rheophore bifurque; for where there is no derived current it cannot matter whether the circuit of this current is interrupted or not. What, then, it may be asked, is the result of using this arrangement of the poles? Will the two primitive currents neutralize each other, and produce no action in the muscle? Theoretically, such a conclusion is not improbable; for it is a well-known fact that opposite currents of equal value do neutralize each other. Practically, however, the muscle is found to contract; and not only so, but the order of contraction is found to be one and the same in the case where a loop of nerve is acted upon, and in the case where the nerve acted upon is divided and lifted up at its end. It is found, also, that the muscle responds to the current which passes in the portion of nerve nearest to the muscle to which the nerve is distributed. In other words, it is found that the reversal of the order of alternate contraction which occurs where a loop of nerve is acted upon by the ordinary poles of the galvanic apparatus is due to the action of a derived current; for on excluding this derived current by means of the rheophore bifurque, this order of alternation is made to merge in that which occurs where a nerve divided and lifted up at its end is acted upon, and where there can be no derived current.

Nor does Dr. Rousseau content himself with this negative proof. On the contrary, he shows very clearly that the action of the derived current will reverse the order of alternate contraction in the case where a loop of nerve is acted upon by ordinary poles.

Passing through ordinary poles, the inverse primitive current gives rise to contraction at the moment when the circuit is closed. It acts, that is to say, as the direct current acts when there is no derived current to complicate its action. Now, if the order of alternate contraction is reversed by the
action of a derived current, and if two opposite currents (as is seen in the experiment with the rheophore bifurque,) it is that which passes through the portion of nerve nearest to the muscles which acts upon the muscles. It may, also, do this by because the current acting upon the muscles acting upon the portion of nerve nearest to the muscles, is not the primitive inverse current, but a portion of derived current the course of which is diametrically opposite—that is, direct. In other words, the acting current, under these circumstances, is one which ought to be attended by contraction at the closure of the circuit, for it is a direct current.

We are now enabled to see why the direct primitive currents acts like an inverse current, when this current is made to act upon a loop of nerve through ordinary poles; and this it may do because it will show that the current acting upon the muscles, by acting upon the portion of nerve nearest to the muscles, is not the direct primitive current, but an inverse portion of derived current. In a word, the acting current is inverse, not direct; and, therefore, we should expect to have the result of the action of the inverse current—contraction at the end of the current.

In this period of alternate contraction, then, there would seem to be one and the same law for the muscular movements resulting from the action of the galvanic current upon nerve—a law by which the muscle is made to contract at the beginning of the direct and at the end of the inverse current.

In the period of alternate contraction, then there would seem to be one and the same rule for the muscular movements resulting from the action of the galvanic current upon nerve—a rule by which the muscle is made to contract at the beginning of the direct, and at the end of the inverse currents.

How, then, is this? Why is it that muscle contracts thus alternately? It is, perhaps, too much to expect a full answer to this question at present; but a partial answer, as it seems to me, may be found in the collation of the three facts which follow.

The first fact is this—that the direction of the nerve-current in the sciatic nerve of a frog (except in those last moments in which the action of the galvanic current upon the nerve gives rise to the "voltaic alternatives") is inverse or centripetal. In these last moments the nerve-current may be sometimes inverse and sometimes direct; and this change
may take place more than once, but, except in these last moments, the direction of this current is, as I have said, always inverse.

The second fact is furnished by Professor du Bois-Reymond in an experiment in which the two ends of a long portion of nerve are placed upon the cushions of two galvanometers and the middle of the same nerve is laid across the poles of a galvanic apparatus. Looking at the needles of the galvanometer before passing the galvanic current, these needles are seen to diverge under the action of the nerve-current, and from the direction of this divergence it is evident that this current sets from the end to the side of the nerve; looking at these needles while the galvanic current is passing, one needle is found to move still further from zero, the other is found to return towards zero.

The third fact, which has been recently furnished by Professor Eckhardt,* is to be found in an experiment which may be illustrated as follows:—In this experiment the nerve of the leg of a frog, properly prepared for the purpose, is placed, one portion (that nearest to the leg) across the poles of an induction coil, another portion across the poles of a galvanic apparatus. Having done this, the leg is first thrown into a state of tetanus by passing a series of induction currents, and then, the tetanizing influence still continuing in operation, the continuous current of the galvanic apparatus is transmitted in turn to and from the leg. This is the experiment. The result, which is not a little remarkable, is: that the tetanus ceases when, the inverse current passes, and continues when the direct current passes. Nor is this result altered by inverting the order in which the continuous and induction currents are made to act upon the nerve. Thus applied after the direct current the induction current produce contraction, but not so if they are applied after the inverse current. Nay, it would even seem as if the direct current is actually favorable to the production of tetanus; or, with this current passing, a solution of salt, which of itself is too weak to cause tetanus, will have this effect. In observing this fact, Professor Eckhardt proceeds as follows—First of all, he tetanizes the limb by placing the portion of nerve nearest to it in a strong solution of salt;
after this, he adds water until the strength of the saline solution is no longer sufficient to provoke this state of contraction in the muscles; and then, all things being as they were, he passes the direct current. The result is that the tetanus immediately returns.

Now, on comparing this last fact with the two previous facts, we may have, as it seems to me, some insight into the mode by which the galvanic current acts upon the nerve in the period of alternate contraction. On the one hand, it is seen that tetanus is prevented or arrested by the inverse current. Tetanus is prevented or arrested, that is to say, when (as the first and second facts show) the galvanic current coincides in direction with, and imparts power to, the nerve-current. On the other hand, it is seen that tetanus is not prevented or arrested by the direct current. Tetanus is not prevented or arrested, that is to say, when (as the first and second facts still show) the galvanic current differs in direction from, and diminishes the power of the nerve current. The one result, indeed, is in harmony with the other; for if contraction is counteracted by imparting power to the nerve-current, it is to be expected that contraction will be favored by detracting power from the nerve-current. And this result, moreover, is not at variance with the premises. For has it not been seen that ordinary contraction is coincident with the discharge of ordinary electricity, and with weakening of both nerve and muscular currents? And has it not been seen that rigor mortis is associated with absolute and permanent annihilation of the two last named currents?

And if this be so—if in this manner the inverse current antagonizes, and the direct current favors, contraction—then it seems to be possible to apprehend, in some degree, why it is that contraction occurs alternately at the beginning of the direct, and at the end of the inverse current.

When the inverse current passes, the influence upon the nerve current is one which antagonizes contraction, and hence it is not to be wondered at that there should be no contraction at the beginning of the current; when the inverse current ceases to pass, there is an end of the influence which antagonized contraction, and contraction may therefore follow as an equally natural consequence. When, on the other hand, the direct current passes, the influence upon the nerve current being one which favors contraction, the occurrence of contraction at the beginning of the current
may be accounted for; when the direct current ceases to pass, the influence which favored contraction is at an end, and therefore the absence of contraction at this time is not to be wondered at.

In the third period—that of single contraction—the muscular movements resulting from the action of a galvanic current upon nerve are at first sight somewhat perplexing, but with a little thought it may be seen that the same key will apply to their interpretation.

If, as has just been seen, contraction attends upon the beginning of the direct current because this current is found to favor contraction, it is not difficult to find a reason which will explain, not only why in the first period of double contraction the contraction at the beginning of the direct current is strongest, but also why in the first part of the period at present under consideration—that of single contraction—there should be contraction at the beginning of the direct current, and at this time only. Nor are the apparent irregularities in contraction—the "volaic alternatives"—which occur in the latter part of this third period of single contraction entirely inexplicable; for it may be that these apparent irregularities—this apparent shifting of contraction from the beginning of the direct to the beginning of the inverse current, and so backward and forward once—may be nothing more than the natural consequence of the changes which at this time have taken place, and are taking place, in the direction of the nerve-current.

Looking back, then, at the arguments which have been advanced in the present section, there would seem to be little reason for supposing that any vital property of contractility has been called into action during contraction by the "stimulus" of electricity; for has it not appeared that rigor mortis is coincident with the utter extinction of the nerve and muscular currents?—that ordinary contraction is attended by weakening of these two currents?—that contraction attends upon the discharge of statical electricity? and that contraction is favored when the action of the galvanic current is to detract power from the nerve-current? Nay, has it not appeared that contraction is antagonized when the action of the galvanic current is found to impart power to the nerve-current? Looking back, indeed, it would seem as if muscular elongation was coincident with the presence of electrical action, and contraction with the
absence of this action. In a word, it would seem as if muscular motion was nothing more than a physical process; for it is quite in accordance with what we know of the physical action of electricity that should mark the impartation of this action, and that contraction should attend upon its abstraction.

It would seem, also, that this view of muscular motion under the action of electricity is one which tallies well with what has been already said concerning muscle under the action of nervous influence and blood. Indeed, knowing what we do of the action of electricity, and knowing also that the nerve-current is a component part of, and the only intelligible idea in, nervous influence, is there not some difficulty in supposing that nervous influence can do otherwise than counteract muscular contraction? And with respect to the blood, is there not some ground for believing that this fluid must counteract contraction by keeping up those chemical changes in the muscle and nerve upon which the electrical currents of muscle and nerve may be supposed to be based? At any rate, the view of the action of electricity upon muscle, which has been advanced in the present section, is one which appears to support and explain the view already arrived at respecting the action of blood and nervous influence upon muscle.

IV. In constructing a theory of muscular motion, there are many facts which still remain to be considered, and some of which must not be left unexplained. How is it for example, that muscle undergoes no change of volume in contracting; that contraction is brought about by "mechanical irritation;" that muscle contracts with diminished power as it contracts upon itself; that the waste of muscle is proportionate to its contraction; and so on? Are these facts to be explained without the aid of a vital property of contractility and a doctrine of stimulation?

The fact that muscle contracts without undergoing any change in volume—the gain in breadth being precisely equal to the loss in length—has been often appealed to as an argument that the process of contraction is beyond the scope of any physical explanation; but, in point of fact, this change in muscle has its strict parallel in the change which passes over a bar or iron under the action of magnetism. The experiments of Mr. Joule* are quite conclusive upon

*Philosophical Magazine, February and April.
the latter point. In one of these the bar of iron to be magnetized was placed in the axis of a coil of insulated copper wire. One end of this bar was fixed; the other end was attached to a system of levers by which any change in length was multiplied 3000 times. The bar itself was of rectangular iron wire, one-fourth of an inch broad, one-eighth of an inch thick; the coil was twenty-two inches in length, and one-third of an inch in diameter. On traversing the coil with a current capable of magnetizing the bar to saturation, or nearly so, the index of the multiplying apparatus sprang from its position, and vibrated about a point 1-10th of an inch in advance—a distance giving 1-300000th of an inch for the actual elongation of the bar. After a short interval the index ceased to vibrate, and began to advance gradually in consequence of the expansion of the bar under the heat radiating from the coil; and so it continued to do until the circuit was broken and the bar demagnetized, when it immediately vibrated about a point exactly 1-10th of an inch lower than that to which it had previously attained. In order to show that the bar underwent no change of volume in thus elongating, Mr. Joule placed a bar of annealed iron, one yard long and half an inch square, in a glass tube forty inches long, an inch and a half in diameter, and surrounded by a coiled conductor consisting of ten copper wires, each 1-20th of an inch in diameter and 110 yards in length. One extremity of this tube was closed; the other was fitted with a stopper, the centre of which was pierced with a graduated capillary tube, of which each division was equal to 1-4500000th part of the iron bar. This being done, the tube was filled with water, the stopper adjusted so as to force the water to a convenient height in the capillary tube, and the coil alternately connected and disconnected with a Daniell's battery of five or six cells—an apparatus of sufficient power to magnetize the iron bar to the full. This was the experiment. The result was, that no perceptible change occurred in the level of the fluid in the capillary tube, either on making or on breaking contact with the battery, and this equally whether the level was stationary, or whether it was rising or falling from any change of temperature accompanying the magnetization of the bar. The experiment, indeed, is one which affords most conclusive proof that the bar underwent no change of volume on being magnetized or demagnetized; for if the elongation of the bar which takes place on magnetization
had not been accompanied by a corresponding loss in breadth of the water would have been forced through twenty divisions of the capillary tube whenever the circuit of the battery was completed.

Under the influence of magnetism, therefore, there are changes in a bar of iron which are strictly parallel to those which take place in muscle; and this parallelism extends also to that point which is so characteristic of muscle, viz.: the suddenness with which the contracted and elongated states may alternate one upon the other; for, in Mr. Joule's first experiment, the bar was seen and heard and felt to jump suddenly from the longer to the shorter form, or from the shorter back again to the longer, according as the electricity was communicated to, or withdrawn from, the coil.

Nor is a vital property of contracility at all necessary to explain the next fact—the contraction which is brought about by what is called "mechanical irritation." On the contrary, it is very possible that this phenomenon may be nothing more than the natural consequence of the mechanical interference with the electrical currents in nerve and muscle. It may be supposed, as in a previously related case, that a certain interruption in the nerve-current will be a result of the pressure which is implied when a nerve is subjected to a "mechanical irritation;" and that, consequent upon this interruption, momentary currents will be induced in the nerve and in the neighborhood. It may be supposed, further, that the muscular fibres to which the nerve is distributed are the seat of some of the secondary currents thus induced, and that these fibres are thrown into a state of contraction by the disappearance of these currents. And so, also, when the muscular fibre is directly subjected to mechanical irritation, it may be supposed that there has been some interruption of the muscular current in the part pressed upon, that this interruption may give rise to momentary induced currents in the neighboring muscular fibre and that the disappearance of these induced currents may similarly bring about contraction in the fibres included within the circuit of the currents. And, surely, after what has been said, it is easy to believe that the contractions referring to "mechanical irritation" are thus due to definite and intelligible changes in the nerve and muscular currents as it is to ascribe them to an unintelligible "irritation" of a not very intelligible vital property of "irritability" in nerve and muscle.
Nor is the fact that muscle contracts with diminished power as the muscle contracts upon itself an argument that the law of muscular contraction is different from any known physical law of attraction. It is no doubt true, as M. Schawm pointed out that the force of muscular contraction decreases as the muscle contracts upon itself; but herein is surely no argument for asserting that the law of muscular contraction is essentially different from the law of all physical attractive forces! Indeed, elastic bodies, in shrinking after elongation, behave in every respect as muscle behaves in this experiment, and here undoubtedly the contraction is a physical process.

And, certainly, appeal cannot be made to the fact that the waste of a muscle is proportionate to the amount of muscular action, in order to show that muscular contraction is the sign of functional activity in the muscle; for, after what has been said, who shall say that this waste has not been incurred in restoring the relaxed state? At any rate, it is certain that the electrical condition of nerve and muscle which, according to the premises, is connected with the state of relaxation, and not with the state of contraction, is one which cannot be kept up without a corresponding chemical change— that is, waste—in the tissues concerned.

What then, I ask, in conclusion, (for though much evidence remains behind there is no time to bring it forward) is the tenor of the preceding argument? Is it not this—that elongation rather than contraction is the chief peculiarity of muscle? Is it not this—that transitory contractions, which are said to belong to that form of contractility which is called irritability, occur in transitory lulls of the action of certain agents, electrical and other; and that the persistent contraction of rigor mortis, which is referred to that form of contractility which is called tonicity derives its characteristic persistency from the fact that the actions which antagonized contraction during life are then at an end? And if so, what need is there of a vital property of contractility and of the doctrine of stimulation which is founded thereon?

Now it is, no doubt, a difficult matter to abandon an idea which has been so long fixed in the mind, as that which ascribes a vital property of contractility to muscle, and which supposes this property of contractility to be stimulated into action when the muscle contracts. It is difficult, I say, to believe that the final purpose of a muscle—its con-
traction, and particularly that form of contraction which is obedient to the mandates of the will—instead of being brought about by the infusion of more life into the muscle, is brought about by the induction of a change which is realized to its fullest extent in rigor mortis. But this difficulty, such as it is, is one which diminishes when it is steadily looked in the face. So far as the will is concerned, the theory under consideration requires one to suppose that voluntary muscular contraction is brought about, not by imparting something to the muscle, but by removing something from the muscle which had previously antagonized contraction. The idea changes with reference to the muscle, but not with reference to the vital activity of the will, for in either case and equally the will is a living acting power. And as to the rest, it is surely as easy to suppose that the will acts through the instrumentality of a force which must belong to muscle as a physical structure, as it is to suppose that it requires the super-addition of a vital property of contractility, and a special provision for stimulation. It is, I repeat, a difficult matter to abandon old views, and, turning round completely, to regard muscular contraction as a process which is most fully realized in rigor mortis; but we have at least this advantage in so doing—that we gain an explanation which is physical and intelligible—an explanation, moreover, which applies to rigor mortis as well as to ordinary muscular contraction. For what is the case with respect to rigor mortis? The case is simply this: that as long as there is any sign of "irritability," or any trace of nerve-current or muscular current, so long is there no rigor mortis. If these signs and traces die out speedily, as in persons in whom the vitality of the frame has been exhausted by long life, or by chronic disease, such as consumption, the muscles become speedily rigid; if these signs and traces are slow in dying out, as in persons who have been cut down suddenly in the full glow of health, the muscles are equally slow in passing into the state of cadaveric rigidity. Once contracted, moreover, the muscles remain contracted until the supervention of putrefaction—an event which happens most speedily in the case where the muscles retain their physical integrity least perfectly. The facts, indeed, which are utterly unintelligible upon the hypothesis that contraction depends upon the stimulation of any vital property of contractility, are precisely what they ought to be according to the premises; for according to the
premises, all that is necessary to the commencement of rigor mortis, is the dying out of that action in muscle and nerve, of which the electrical current is one of the signs; and all that is necessary to its continuance is the absence of this action, and the physical integrity of the muscular structure. According to the premises, indeed, there is no difficulty in explaining the unexplained, and hitherto contradictory, characteristics of this form of muscular contraction; and this being the case, it would seem that rigor mortis may be accepted as the type of muscular contraction in general, and as the experimentum crucis in favor of the theory of muscular motion of which I have had the honor of sketching the broader outlines in the present lecture.

Historical opinions opposed to modern denunciations of the use of Mercury in the Treatment of Syphilis. By Dr. H. Haeser. Prof. at Griefswald.

The contention concerning the admissibility of mercury in the treatment of syphilis (Die Nachtheile der Murkuriakur. Vienna. 1859. 8) recently excited by Dr. Hermann—a contention which, like that of the advantages resulting from vaccination and blood-letting, must be witnessed at least once in each generation, has virtually, in my opinion, been set at rest by the teachings of Virchow and Waller (Prag. Viert. Jahrschr. 1859. III.) The following lines are intended only as a supplementary examination of the historical supports adduced by the opposers of mercury to sustain their opinions.

The very first lines of Hermann's preface prove that the compiler happily belongs to that class who are fully conscious of "the glorious progress we have made." "The injurious results of mercurial treatment were but little known until our times: indeed, ancient physicians scarcely had an indistinct misgiving that mercury incorporated into the body remains many years in the organism, and may produce, long afterwards, various destructive and often incurable diseases. This fact has, for the first time, been verified by the exact investigation of the present time; a whole host of diseases, often of the most important kind, are unquestionably due to the operation of mercury."

There is no need of proof that what we designate as constitutional syphilis was well known to the earliest observers.
of syphilis at the time of its general prevalence at the end of the 15th and during the first decade of the 16th centuries. Now Hermann asserts that this constitutional syphilis originated from the administration of mercury to cure the hitherto far milder diseuse. Hermann supposes that "constitutional syphilis" first occurred when mercury began to be used, particularly about the middle of the 16th century, by Francis I., and in the form of Barbarossa’s pills."

Although these words do not place the historical knowledge of Hermann with his subject in a very favorable light, yet his immediately following explanation as to the method by which those physicians arrived at self-deception concerning the true nature of constitutional syphilis, does so in a much less degree.

"The first physician," says Hermann, after asking the reader to "imagine" himself in their position, "treated syphilis, doubtless both chancre and gonorrhoea, with mercurials." Notwithstanding the complete ignorance evinced by these words, in regard to the earliest periods of syphilis, the recommendation is made to "suppose" one’s self in the position of those physicians, when a recommendation to study their writings, which are accessible to every one in the collection of Luisinus, Gruner, Fuchs, etc., would have been more to the point. By such a proceeding the compiler would soon have made the discovery that "primary syphilis" did not at all present itself "undoubtedly" to those physicians as gonorrhoea and chancre, and that they least of all treated gonorrhoea and chancre with mercurials.

The cardinal assertions of Hermann amount to this, that "constitutional syphilis is the product of mercury," and "this fact which has been, for the first time, verified by the exact investigation of the present time," might better be read "by Drs. Hermann, Lorinser and Kletzinsky."

Let us examine whether these assertions are founded in fact.

The earliest observers of syphilis did not determine to apply mercurial inunction until a long-continued opposition, because they feared the most injurious consequences from its "coldness," particularly in cutaneous affections, which, as the most prominent symptoms, received a very large share of attention. Besides, the powerful effect of mercury upon the mouth was well known, as it had for a long time been a common remedy in various cutaneous dis-
The success of its application observed in these diseases induced its use in this new malady also; soon becoming a remedy of general use among physicians, but opposed by many, its abuse by the profession, and the dangers of salivation being depicted in the most frightful colors. Many writers also affirm that mercury was by no means a certain remedy in syphilis; consequently, the use of guiacum became for a time the prevailing mode.

It is easy to understand that the mercurial treatment frequently produced the worst consequences, and not infrequently death, when we read in Torella, for example, that a salve weighing 54 ounces contained 4 ounces of mercury, and that inunction with this of the whole body was continued for nine days (Luisinus, p. 527). Yet the assertion that "constitutional syphilis" was produced by mercury is not found in the writings of any of the early writers. They had, as Hermann says, "no idea" of this effect of the metal.

Among the most decided opposers of mercury is Leoni. His detestation of it is as great as could be desired. "There is nothing more injurious to those affected with syphilis than to use mercury externally or internally, under the form of ointments or fumigations. From such applications persons always suffer in important organs." (Luisin. p. 904.) "Important organs" are the brain, from which was supposed to flow the material of the saliva, the lungs, the heart, the liver. Leoni likewise describes the gummata, the nodes, the pains of the bones, but he had "no idea that these might be artificial effects."

Yet even at that time such objections were not wanting. They are most definitely discussed by Fallopia, the anatomist, during the late period of the guiacum method of cure. Fallopia designates the gummata, tophi, etc., of the majority of cases, as the effect of mercury, and puts the greatest

*Notices of the use of mercury, before the period of the general spread of syphilis, are, it is true, difficult to find. The following is one of the earliest and most important: Magister Bartolomaeus, a Salernian, in his "Practice," recommends for scabies and pruritis, a salve of lime-water, oil, sheep-tallow and mercury; the latter "ad libitum." "Cave tamen ne hoc magnimento unguis habentes quaedam apostemata livida in tibi et coxibus, quod quidem vulgus consuevit appellare malam mortum. Invidia enim, gulam et saecus, funde quidam suffocantur." (Collectio Salernitana, ed de Renzi. Naples, 1856. 8. vol. iv. p. 370.)
stress upon this opinion. "The causes of the tumors," says Fallopia, "originate in the affected viscera, but, in most cases, after the inunction by mercury." (Luisin. p. 826.) Accordingly, Fallopia asserts that gummata, etc., may be produced by the disease itself, but occur most frequently after the use of mercury which has not cured the disease. He explains this process as follows: "When these parts are anointed they become enfeebled, and are thus then selected by the disease." He believes, therefore, that gummata, etc., arise because the mercury has weakened the particular part, thus inviting the disease there." (Luisin. p. 827.) But, from the preceding words, it appears that even Fallopia finds a residue of cases in which gummata are not to be ascribed to mercury. On the other hand, Fallopia attributes caries of the bones in syphilitic patients entirely to the influence of mercury. "The infection of the bones in syphilis is terrible and the more so because they are infected in such parts as do not permit of a cure, as the bones of the head which are designed to inclose and protect the brain, and these I have seen so much affected as to be all carious. I have many examples. Some times the bones of the palate are so much involved that the whole palate decays, and not these only, but the usual bones also; and it should be borne in mind that it is not in every inveterate case of syphilis that this occurs, but only in those in which mercurial inunction has been employed." (Luisin. p. 827.)

Notwithstanding, Fallopia had not the idea that mercury produced only injurious effects under all circumstances, for with all these objections, he considered mercury capable of overcoming the disease. (Luisin. p. 810.) We quote also the following, from the same source: "A third most excellent method is with pure mercury, which being absorbed overcomes the disease, expelling excrementa at the palate. For me it does this admirably." (Luisin. p. 782.)

The principal reason for the distrust with which Fallopia regarded mercury was his preference for the "cura regia," i.e., by the use of evacuants and the methodic employment of guaiacum. "Why use mercury by which health is not so certainly nor so safely secured? If it does not cure, it aggravates and the disease becomes more stubborn." Fallopia does not therefore doubt the curative power of mercury, but considers it less certain than the cura regia. Whether this opinion was well founded, we may learn from what our author says further; "I do not approve of this
medicament, but use it sometimes when I have not been able to succeed by the curia regia." The curia regia, therefore, sometimes failed, and then Fallopia had recourse to mercury, under what circumstances and with what success the following quotation will show: "I have seen a young man laboring under syphilis in which every method had ailed. An empiric cured him with mercury. Wherefore have made use of it in stubborn and desperate cases, and particularly where I have first tried all other methods." (Luisin. p. 810.) And many others after him who never grew weary of declaiming against mercury, had, like him, recourse to it in "stubborn and desperate cases." Everything else failed them, but unlike Fallopia, they did not always honorable let the world know the truth.

If the quotations hitherto given from the writings of the opponents of mercury are but little calculated to support the opinion of Hermann, that constitutional syphilis first appeared after the employment of this metal, and that the earlier physicians had "no idea" of such an effect produced by it, the assertions of other physicians, who did not participate in the opinions of those named in regard to mercury, are still less favorable to his views.

That the complaints mentioned by Hermann were not wanting in the earlier periods of the general prevalence of syphilis, is evident from the fact that several physicians defended mercury pointedly and fully against these objections. For example, Leonardo Botallo, one of the most experienced writers upon syphilis in the 16th century, says: "Why do various parts of the body become inflamed and ulcerated, the bones even not being exempt, in patients who have never used mercury? Why does their color become leaden? What produces, keeps up and increases other various severe symptoms before mercury has been used, unless it be the vitiated humors?"

Then, as now, those physicians who used mercury carefully, and by such use not only produced no constitutional symptoms, but, on the contrary, avoided them, best know how unfounded are such objections. Victorius furnishes an example of the employment of a salve in which a "little" mercury was added to eight ounces of fat. This salve cured syphilis—"tum membrorum dolores sedando, tum febres pustulas et sordida ulcerae abolendo, tum etiam gummosa tubercula et nodos gallicos annovendo." (Luisin. p. 634.)
Effects which remind me of Sigmund's process followed myself in many cases.

So much for a doctrine which, like its predecessors, v in a short time, and it is to be hoped forever, be consigned to oblivion, a place assigned to it by a non-professional writer 340 years since, when, as at the present, the most unfounded aspersions were heaped upon physicians who were at least our equals, and the "exact investigations" of the present are boasted without the examination having been made, as Waller has shown, as to whether mercury must not be found even in the urine of persons who have never been syphilitic and have never been subjected to a mercury treatment.

Physician to the Manchester Royal Infirmary.

The next case, which has only recently come under my care, is one of the best marked examples of wasting paralysis that I have witnessed. The disease is presented simple at uncomplicated, without neuralgia or rheumatic pains, without cramps or contractions of the muscles, and without the least trace of nervous paralysis. In the parts affected, it combines the two instances before related; for the atrophy has seized upon the upper segments of both the upper and lower extremities, leaving the lower segments uninjured and thereby occasioning a strange and curious deformity.

The patient is a healthy-looking man of 38 years. He was formerly a warehouseman, and subsequently he taught a school. He thinks the muscular strength has been slowly declining for 16 or 18 years, but during the last two or three years the disease has made much more rapid progress.

When he is stripped, the nature of his ailment is at once revealed, without the necessity of asking a question. The two upper arms are like those of a child—so small and thin while the shoulders above, and the forearms and hands below, are of the full proportions of a moderately muscular man. The odd appearance of the shoulder-blades likewise immediately strikes the beholder. Instead of being bourn down to the surface of the ribs in the usual way, the scapulae lie loosely beneath the skin, and on the least attempt at moving the arms, their lower angles are thrust backward and upward above the level of the arm-pits: and they pro
but under the skin so prominently as to look like a pair of
pendent wings. This singular condition arises from the
partial destruction of the muscles binding the shoulders to
the trunk, namely: the serrati, the rhomboidei, the pector-
s, the trapezius, and the lat. dorsi. In the lower extremi-
ties the atrophy has followed a corresponding course. The
legs are greatly emaciated, while the legs are stout and
long.

The muscular action is weakened in proportion to the
atrophy of the muscles. The hands and fore-arms possess
perfection all their proper movements. The patient
faces with facility, and grasps with force. The forearm
may be flexed and extended with readiness, but so feebly,
at a two-ounce weight in the right hand and a four-ounce
weight in the left, suffices to overcome the utmost resistance
the biceps and brachialis anticus.

When the patient stands erect, the abdomen is protruded
daylight: a corresponding deep concavity occupies the lumbar
region behind. He walks slowly and with evident diffi-
culty; yet he can accomplish considerable distances—three or
four miles—if permitted to walk at his ease. Ascending
stairs is a painful labor to him.

The right and left are affected almost exactly alike, and
each disease is confined to four groups of muscles on each
side, namely: in the upper limb, (a) those which unite the
shoulder to the chest, (b) those which move the elbow-joint;
in the lower limb, (c) those which move the hip, and (d)
 those which move the knee joint.

There is this singularity in the upper limb which is ab-
sent from the lower, that the scapulo-humeral muscles, com-
prising the deltoid, the supra and infra-spinatus, the sub-
scapularis and the teres major and minors, continue vigor-
ous and well-nourished, isolated between the group above and
the group below, of which the muscles have degenerated
most to the verge of annihilation.

Another very characteristic feature of wasting palsy,
here it exists, is here represented. I allude to its dissect-
ging course—the singling out of a muscle or a part of a musle
preservation amid the decay of the surrounding tissues.
other pectorals possess one fasciculus in tolerable preserv-
ation, and one bundle of each trapezius is likewise spared.

What remains of the wasted muscles is perfectly under
the control of the will. The skin is acutely sensitive, and a
cracking of cold is frequently complained of.
Concerning the determining cause of this man's complaint, the most searching inquiry has failed to elicit any thing satisfactory. The most reasonable explanation is one offered by the patient himself—who, I may remark, is a man of unusual intelligence—that it has arisen from excessive exposure to cold. When occupied as a warehouseman, he was compelled to work in rooms devoid of fire. The cold was severely felt by him at the time, and he frequently went home quite benumbed. It is from this period that he dates the first commencement of his ailment.

By far the largest number of cases of wasting palsy are produced by undue and too long continued strain on the muscles; accordingly artisans are found to be the most frequent victims of partial atrophy, and the disease falls with unerring certainty on the groups of muscles most tried. The same fact comes out with clearness when the frequency of the disease in the right arm, and the left is considered. On a comparison of a large number of cases, I found that the right arm was more than three times more frequently attacked than the left: and in the two hands the proportion was three to one in favor of the right.

Masons and mechanics, who wield heavy hammers, have the muscles of the shoulders first attacked; shoemakers, tailors, and milliners are first seized in the hands.

A Middleton silk weaver lately under my care, exhibited an example of wasting palsy, confined to a single muscle. When he was employed at the loom the index finger of the right hand was used to lift up a portion of the machinery at each throw of the shuttle. This was effected by the contraction of the extensor indicis. Now the power to elevate the index with sufficient force to lift this weight had been failing in this man for the last eighteen months. He was able to work for a time as usual, but in half an hour or so the finger was thoroughly fatigued, and he was compelled to repose. By alternate periods of work and repose he was able to do about a quarter of a day's work.

The grasp of the hand was powerful, and there was no alteration of sensation. On uncovering the forearms no difference was perceived. No doubt this arose from the small magnitude and deep position of the extensor indicis, but the nature of the case was rendered clear by its perfect analogy with corresponding ailments in writers, tailors, and other artisans, in all whom the atrophy falls on the muscles most used.
1.

Wasting Paralysis.

These cases of muscular atrophy from excessive work form a very well-marked group, easily recognized, and not uncommon. Their pathology and mode of production appears plain. The fatigued muscles suffer in their nutrition from want of due repose, and become a prey to fatty and granular degeneration of their fibres. There is no tendency to the extension of the disorder to the muscles of the trunk because the exciting cause has only a local operation. If the disease be seen early, perfect rest of the injured muscles will generally suffice to bring about restoration, but if the atrophy have existed a twelvemonth or more the case is well nigh hopeless; and even, if seen early, I have never been able to obtain success in treatment unless the patient has altogether renounced the particular work which had produced the disorder. Unfortunately it is seldom that an artisan can do this: the support of his family depends upon him, and he persists in the labor that is slowly and surely undermining all his usefulness. The best advice to give such a patient is to change his occupation at once. The Middleton weaver above-mentioned, acting under my suggestion, became a gardener, and is now doing well in that capacity. One of the tailors turned letter carrier, and he congratulates himself on the change, which appears not unlikely, if the progress he has since made continues, to lead to a complete restoration of his hand. A writer should be recommended to accustom his left hand to do the work of the right, so that the latter may rest.

A considerable number of cases of wasting palsy are produced by cold and wet. These also form a concise group, which some observers have wished to set apart under the designation of "rheumatic form of muscular atrophy." The invasion of the complaint when thus caused is often somewhat sudden, and the wasting is accompanied by cramps, twitches, and severe neuralgie or rheumatic pains; but these peculiarities scarcely warrant a separation into a distinct species; for some cases that set in with the so-called rheumatic complexion, subside soon after into the ordinary form. The history of the groom, whose case I described in the foregoing part of this paper, betrays much of the rheumatic nature. He suffered from neuralgie pains throughout the whole of his illness, yet it does not appear that cold or wet had any immediate share in producing the atrophy in the thigh. On the other hand the coal miner, whose hands were atrophied, although the members were almost
constantly immersed in water, never suffered pain during the four years that his complaint had endured.

The frequency of excessive muscular exercise, and of exposure to wet and cold as determining causes of partial wasting palsy, explains why the great majority of such cases occur in the male sex. In ten cases of this sort that I have seen only two were women: one a domestic servant and the other a factory hand.

Wasting palsy has sometimes been known to be consecutive to other disorders. The boy whose case was related first, had an attack of infantile paralysis previously to the setting in of the wasting palsy. An old pupil brought me a child about three months ago, in which the left upper arm was excessively wasted, with good preservation of the forearm and hand. The history of the case pointed unequivocally to the infantile paralysis of the whole limb as the first disorder. The forearm and hand recovered in a few months, but the muscles of the upper arm underwent a gradual atrophy until they had been completely destroyed.

It is well known that acute diseases are sometimes followed in the course of convalescence by partial or total paralysis of a very inexplicable nature. Typhus and typhoid fever, dysentery, cholera, and diptheria, the three last especially, have furnished frequent examples of such paralysis.

A very curious circumstance in the history of wasting palsy is its disposition to run in families. There has been published an account of at least ten families in which the disease has appeared hereditary. In four of these it was confined to two brothers in each. Another family, whose history has been supplied by Dr. Meryon, had four boys affected, and there were eight healthy sisters. In another family mentioned by him all boys, namely: two, had wasting palsy whilst the two sisters were sound. A sea-captain mentioned by Aran had lost two maternal uncles and a sister from the disease, but two other sisters and three brothers continued healthy. In a later instance recorded by the same observer the patient's two aunts had died of general muscular atrophy. In a family known to Oppenheimer two uncles and a cousin of the patient were already deceased, while another cousin and two brothers still suffered from wasting palsy.

Altogether, these ten families included twenty-nine indi-
vindals struck with wasting palsy, and of these only four were females. This great preponderance of males is quite inexplicable. It cannot depend, as in the previous case, on the greater exposure of one sex to the common exciting cause—cold, wet, and hard work—because in the hereditary cases the disease frequently appears in early youth or childhood, long before the sexes are unequally subjected to fatigue and exposure.

Cases of hereditary origin have another peculiarity. In nearly all of them the wasting spreads eventually to the entire muscular system, consequently they tend to a fatal termination, and offer but a small chance of recovery. Such cases are not, however, absolutely hopeless. I have recent information that, in the family mentioned by Dr. Meryon, although the three eldest sons have died, the fourth has every prospect of surviving, and for more than four years has exhibited a steady improvement.

Wasting palsy is essentially a chronic disorder. We measure its advance by months and years. Some cases complete their history in six or eight months, others linger for many years. I found the mean duration of a considerable number of cases to be a little over three years.

The disease may terminate in one of three ways, namely: in recovery, permanent arrest, or death. The second mode of termination occurs when the wasting of the muscles ceases, and the limb continues for an indefinite period in its maimed condition, neither amending nor deteriorating; the muscles, which are entirely destroyed, do not reappear, and those which are only partly consumed continue to exercise their feeble powers under the control of the will, but do not regain their former bulk or vigor. This stationary condition being once ushered in by the arrest of the atrophy the disease may be said to have reached its ultimate term, and the skeleton-like footprints it leaves behind are to be regarded not as the malady itself, but, like the scar of a healed-up wound, only as the commemoration of a morbid activity which has now altogether passed away.

Generally speaking, when the disease has fairly entered on the stationary phase, and has continued so a year or two, there is very little danger that it will resume its active career. Individuals have lived twenty and even thirty years with their crippled limbs unaltered. There are cases, however, where the malady, after lying torpid for years, has awakened to new activity. Aran has related three interest-
ing examples. One was a woman who, when a child, had atrophy of the muscles of the right hand, from which she recovered completely in her twelfth year. When forty years of age she was attacked again in the same place. In another instance, the right leg became the subject of wasting palsy, but gradually recovered. Sixteen years after the shoulders were seized, and the disease involved both upper extremities, and several muscles of the trunk. In a third case, the right leg was the seat of debility and atrophy. After remaining quiescent for eight years, the disease started into fresh activity in the left leg and right arm.

On the question of the nature of wasting palsy and its true pathology, opinions are divided under two suppositions. Some suppose that the seat of the disease is in the nervous centres, and that the muscles are affected through their nerves, while others, and I reckon myself of the number, consider the muscles as primarily affected. I will not weary the reader with a discussion at length on this point, but must refer those who are curious on the subject to my essay, where the question is fully debated. I may, however, shortly state the results of post mortem examinations where the disease has proved fatal. The wasted muscles have always, of course, been found diseased; usually there has been found fatty degeneration of the primitive fibres. In other cases the fibres have simply withered away until nothing remains but the empty sarcolemma, and, at length, even this disappears. The two conditions may be found together in the same subject. The muscles of the lower extremity appears more prone to the fatty change, while those of the upper extremity more frequently suffer simple atrophy. Hence the wasting is a more conspicuous symptom in the latter than in the former. The muscles in the calf have been known to be completely changed to masses of fat, without any material change of shape or bulk.

The state of the brain and medulla oblongata has invariably been that of perfect health. In nine out of thirteen autopsies of cases of general wasting palsy the spinal cord was sound, but in the remaining four there was softening or degeneration. Cruveilhier found, in two cases, atrophy of the anterior roots of the spinal nerves, and this has been found since, in two instances. In five other cases, where this peculiarity was especially searched for, it was not found; on the contrary, the anterior roots possessed their usual size, and showed no sign of degeneration.
The nervous branches, which supply the wasted muscles, have been examined in a few instances. Cruveilhier and Virchow found the muscular branches much atrophied. Dabonlbene, however, found no change in the peripheral branches, and Mr. Partridge, who examined one of Dr. Meryon's cases, states briefly that the tendons and nerves were unchanged. Amid this conflict of evidence, it is impossible to come to a certain conclusion regarding the pathology of the disease, but the weight of evidence inclines very strongly to the belief that the muscles are primarily affected, and that the morbid changes sometimes found in the several parts of the nervous system are secondary.

Wasting palsy is especially liable to be confounded with lead palsy and reflex paralysis, especially the essential paralysis of infancy and childhood. Lead palsy is distinguished by its comparative sudden invasion. In a day or two, or a fortnight at most, lead palsy has reached its height, and the muscles assailed are reduced to complete immobility, whereas, in wasting palsy, the waning strength keeps pace with the gradually decreasing volume of the muscle. Again, the precursory symptoms of lead palsy are very marked. These are colic, anaesthesia, tremblings of the limbs, general dyscrasia, undue mobility of the emotions, especially the depressing ones; in fine, all those anomalous symptoms and conditions embraced by the term lead cachexy. It is also usually easy in such cases to trace very distinctly the entrance of lead into the system.—London Med. Review.

The Pathogenesis of Chlorosis.

It is known that fewer colored blood-corpuscles are found in chlorotic than in healthy blood; while in the latter, one cubic millimetre contains from four and a half to five millions, the number in the former falls as low as to two and a half millions in the same quantity. It is known, too, that the colored blood-corpuscles contain iron, and chlorotic blood is, therefore, deficient in iron; and, further, that the deficiency of chlorotic blood in colored blood-corpuscles, and in iron, is the consequence of an impaired state of the formative functions (Anamorphosis), and not the result of increased waste (Katamorphosis): for the urine of chlorotic patients is poor in solid materials. Lastly, it is known that the small amount of iron which the healthy organism ap-
propriates to itself from the most varied diet—as from flesh, milk, eggs, water, etc., fully suffices for the needs of the system; especially as in the healthy state the bile is the only secretion that contains iron, and yet the ferruginous contents of the bile are in great measure re-absorbed from the alimentary canal. How, then, is the occurrence of chlorosis in a healthy girl to be explained? She receives still the same ferruginous articles of food; it cannot, then, depend upon a want of iron, or upon a withdrawal of iron from the system, for these conditions do not exist; and yet the girl, with a constant supply of the same amount of iron, becomes chlorotic, i. e., there is a failure in the formation of red blood-corpuscles. What is this owing to? The vitalist, who ascribes to the sanative power of nature a Prometheus-like contrivance and action in the preservation and restoration of health, is compelled to have recourse to a supposed error or caprice in regard to the direction that this sanative power takes, in order to explain the occurrence of chlorosis. But I am glad that the time is past in which such phrases and terms are deemed satisfactory, and in which it was fancied that an already obscure subject was to be explained by something utterly unintelligible. Now, when we ask for a substantial reason as to why chlorosis should occur with a sufficient supply of iron, the theory hitherto held is at a loss for an answer. The theory, to be sure, contains the truth, but it does not contain the whole truth; a link is wanting in the account of the origin of the disease. The organism, in fact, lacks the power to apply the iron furnished it to the formation of a hematin. Upon what does this want of power depend? We find the answer to this question in a discovery of Lehmann. Physiological chemistry has, up to this time, made various exertions the objects of its researches, and especially the urine. Its results, therefore, at best, have been of interest only as means of diagnosis. But where it has more thoroughly investigated the changes of tissue, fruitful results are to be found for practice, for pathology, and for therapeutics. I may mention, for example, the value of that beautiful discovery of Halwachs and Kuhne, that benzoic acid in its passage through the liver is converted into hippuric acid by the decomposition of the glycocholic acid. From this, Falck inferred that benzoic acid must be almost a specific against the condition known as icterus; and experience has proved it to be so. In like manner, for the explanation of the ori-
gin of chlorosis, I will show the value of Lehmann's discovery, that hematine is a glucoside.

We know from Bernard that the liver is a sugar-secreting organ; and, we know, also, that in disease the secretions of the different glands vary in amount, appearing at one time excessively increased, and, at another, diminished, or even entirely suppressed. There is no conceivable reason why this should not be the case with the secretion of sugar in the liver; indeed, we know already that this secretion is increased in many forms of diabetes mellitus, and that in all febrile diseases it is entirely suspended. We will now suppose, for a moment, and the supposition does not stand at all in our way, that the sugar-secretion of the liver has for some time been diminished; what will be the first consequence of such diminution? Inasmuch as the hematine requires sugar for its formation, (for, according to Lehmann's beautiful discovery, it is like salicin, phloridzin, tannin, etc., a combination of sugar or a glucoside), therefore, when there is a failure in the supply of liver-sugar, the formation of the coloring matter of the blood will not be accomplished, even when the amount of iron is sufficient, as before; and, consequently, the construction of colored blood-corpuseles will be stopped; or, in other words, the chlorotic condition will originate. The essential cause, then, of the occurrence of chlorosis is a deficiency or cessation of the secretion of liver-sugar; the fact that the supply of iron is not used in forming hematine, is only a consequence of the former circumstance, and it is not the real cause of the disease.

If the supposition thus made be true, viz: that chlorosis depends upon a defective secretion of sugar by the liver—a supposition, the correctness of which has, we think, been proved analytically and synthetically—three inferences may be drawn from it:

1st. Chlorosis is to be cured by means of sugar, which supplies what is wanting through the failure of the liver.

2d. Chlorosis is to be treated by every means which can restore the sugar-making function of the liver to the normal condition.

3d. The large doses of the preparations of iron with which chlorosis is empirically treated, effect the cure, not, as is universally believed, by supplying the requisite iron to the body, but because these large doses operate by promoting and increasing the secretion of sugar in the liver.
I. If the deficiency of liver-sugar is to be supplied by the ingestion of sugar, it must be a sugar like that of the liver, i.e., grape and not cane-sugar. For though the health organism may be able to convert the cane-sugar into grape-sugar, yet the question is whether the impaired digestion of chlorotic patients is equal to the task. Does grape-sugar, then, cure chlorosis? In northern Schleswick, where I practiced medicine for twelve years, and, as I have been told, in many parts of Hanover, honey is a popular remedy for chlorosis; and I can attest its efficacy from my own experience. Even though the honey may contain a small portion of iron, yet this is not the curative agent, for other articles of diet which contain just as much iron, are entirely powerless. As honey, by long-continued use, in large doses, may produce flatulence, acidity, colicky pains and diarrhea, it may be well to combine it with suitable correctives, as the bitters, carminatives, etc., and to take it fasting in the morning in the dose of a tablespoonful.

II. We are still entirely in the dark as to the means which increase or diminish the secretion of liver-sugar. There is here a wide field open for inquiry into the powers of remedial agents. But, little as we know with regard to this subject, we are yet acquainted with one agent which promotes the secretion of sugar, and we find it efficacious in the treatment of chlorosis; it is nothing else than cold water. It was shown, some years ago, by Dr. Petters, in the "Prager Vierteljahrsschrift," that the secretion of sugar in diabetes is increased by drinking cold water copiously; and the experience of every hydropathic institution proves that chlorosis may be cured by the same means.

Many physicians regard the free use of cold water as a means which acts only by powerfully increasing the waste of tissues; and, therefore, they give no credit to the assurances of hydropathic physicians, that chlorosis is cured by this means; for, according to their theoretic views, it must aggravate the disease.

In chemical processes, water at one time plays the part of an acid, at another that of a base; it has, also, a twofold action as a remedy. Acting in one way it greatly increases the waste of tissue (Katamorphosis); acting in another, it promotes its formation (Anamorphosis). Indeed, a glance at the development of the foetus throws light on the action of water in the organism, and may remove some rusty prejudices. Schlossberger has shown that in the earliest con-
dition of the foetal life, the blood is of all the parts poorest in water, while after birth it is richest. Since, then, the younger the foetus is, its vegetable life is the more energetic and the formation of tissue is more active than its waste, it is evident that this formation is increased in activity by a large amount of water.

III. Whether the last of these three inferences will be verified the future will show. What is chiefly needed in the inquiry is an accurate method of investigation, in order to measure exactly the variations observed in the secretions of liver-sugar after the employment of different agents. When such a method is found, then the question as to the effect of iron will be easily decided.

These remarks are not yet sufficient to prove beyond all doubt that a failure in the secretion of liver-sugar is the immediately cause of the disease; yet, I think I have shown the insufficiency of the prevailing opinions on the subject to explain the morbid process, and on the other hand the high probability of the new theory. The future may give sentence in the matter. Should every doubt be finally removed, it would then be shown that chlorosis and diabetes mellitus are, in their essential nature, diametrically opposite morbid processes; and experimental pathology might one day succeed in producing chlorosis artificially, as has been done in the case of diabetes, so that the means would thus be found for the radical cure of diabetes.—Maryland and Virginia Med. Jour.

Chlorodyne. By Dr. Edward Squibb, of Brooklyn.

This most extraordinary humbug does not deserve a moment's serious consideration; and were it not for the circumstance that physicians occasionally resort to it by name or by its being misrepresented, and without a due knowledge of its heterogenous composition and quackish character, it could be little else than waste of time and space to allude to it. It claims English origin, or rather to have been invented in the English East India service; and in order to secure for it the magical power of mystery and names, its composition was concealed, or indefinitely stated as a combination of perchloric acid and a new alkaloid. Then it was stated to have been analyzed by a Dr. Ogden: and the latter is represented as having given the formula
by which it is prepared. As it never could have been either invented or analyzed, it is not improbable that its whole story and career are fictitious. It mainly consists of chloroform and muriate of morphia, but contains besides, perchloric acid, oil of peppermint, hydrocyanic acid, tincture of capsicum, molasses, and tincture of cannabis.

Such a villianous mixture could never by any possibility have been invented, though it may have resulted from some uncommon degree of empirical ignorance and stupidity; and such a mixture, once made, would have defied the skill and knowledge of any analyst whatever, chemical or logical. And yet an analysis is said to have been made, and the proportions are given in drachms, drops, and grains. Then, of its properties. It is said to be twice as heavy as water, which, from its composition, is impossible. It is said to be sedative, diaphoretic, astringent, antispasmodic, diuretic, etc.; and to improve the pulse in all imaginable respects, including that of increasing it by decreasing the frequency of the beats; and finally, the sum of its impossibilities accomplished, has the accustomed climax of such cases, viz: that it cures consumption in about the usual proportion of cases, viz: eight out of twelve, and all of the usual undoubted diagnosis and gravity. That any mixture not absolutely antagonistic in its elements, containing two-thirds of its weight of chloroform, and eight grains of muriate of morphia in nine drachms, beside hydrocyanic acid and Indian hemp, should be sedative in effect, is not suprising; and the molasses, capsicum, and peppermint are so many additional shot to be fired into the bushes; but the perchloric acid is a novelty. Hitherto regarded chiefly as a chemical curiosity, it now makes its appearance in the materia medica, under circumstances most unfavorable for obtaining any definite character or classification. In the small quantity in which it enters the company of these powerful narcotics, its chance of effecting anything more than the peppermint and molasses, is remarkably small. The whole thing is, in effect, an absurd sarcasm upon the appetite for novelty and complexity, which appetite, in a proportion of the medical profession, is industriously catered to by the crowd of nostrum—or rather money—makers, who are so easily found in the ranks of all sciences and professions.—American Med. Times.
On Relapsing or Recurrent Fever. By Dr. Tweedie, Physician to the London Fever Hospital.

Relapsing or recurrent fever has been thought by some to resemble the suet or sweating fever of Normandy and by others the yellow fever of the West Indies. Dr. Wardell says: 'There were undoubtedly some considerations which led to the supposition that the epidemic relapsing fever bore resemblance to the suet, or sweating fever of Normandy. In a few instances, though these were of rare occurrence, the epidermoid tissue was raised into vesicular eminence, varying from the size of a millet seed to the section of a small pea, these vesicles containing a transparent fluid, and quite unattended with any areolar blush. On the third day they become shrivelled and opaque, and desquamated in thin, furfuraceous scales. From the occasional presence of these bullae with other more logical characters, some degree of similarity certainly was manifest between it and the suette. There were physicians who endeavored to show its near alliance to the yellow fever of the West Indies—indeed gave it as their opinion that, in some respects, there was a positive identity between the two, only that the epidemic prevalent in this country had become greatly modified by climate and other circumstances calculated to alter its general features. When we take into consideration the usual number of yellow cases, together with two or three cases of less important correspondent symptoms, we are compelled to admit that the assertion is not wholly unfounded. No trace of its importation into Scotland, however, could be found, which has generally been the case where yellow fever has been communicated from one country to another.'

Relapsing fever has always appeared to the author to be a form intermediate between the continued and periodic, but having a more close analogy to the latter. He has been led to this view by considering the suddenness of the invasion, the abrupt termination of the symptoms after a definite period by copious and apparently critical sweat, the interruption of the convalescence by a similar, though shorter paroxysm, or it may be paroxysms of nearly certain duration, and a final abrupt cessation of the disease generally after critical sweating. Even in the more severe cases, in which there was gastric disturbance with jaundice, and occasionally cerebral symptoms, the resemblance to the malignant or pernicious periodic fevers, more particularly those
included under the bilious remittents of tropical climates, is striking.

Symptoms and progress.—In relapsing fever the invasion is sudden. The patient, previously in good health, without warning, is seized with a feeling of indisposition, complaining of chilliness or shivering, acute headache, languor and lassitude, severe muscular aching and arthritic pains. The appetite fails, the skin becomes hot and dry, the tongue white, the desire for fluids constant, and the urine scanty and high-colored. Towards evening the symptoms are aggravated; the night is passed either in restless agitation or snatches of unrefreshing sleep. Occasionally the heat of the skin is relieved by irregular sweating, but still the other symptoms suffer no diminution. Vomiting of bilious fluid, often accompanied with pain at the epigastrium, is an early and nearly constant symptom. It may occur in the first or primary fever only, or it may come on in the relapse also. As the disease progresses, the patient becomes more prostrate and disinclined for bodily or mental exertion, the pulse more rapid and tense, the tongue more thickly coated, the bowels constipated, the muscular and arthritic pains more acute; and the nights are passed in restlessness and wakefulness, unless the nervous system be calmed by the aid of opiates.

About the third day a marked remission of the symptoms is often observed; but whether there be a remission or not, at a period varying from three to seven days—more commonly on the fifth day—a copious general sweat breaks out and almost immediately afterwards the fever vanishes, leaving the patient unexpectedly free from the painful symptoms with which a few hours previously he had been harassed. Dr. Cormack, who watched the phases of this singular disease, tells us that the change for the better was often sudden and complete, the patient one day moaning and groaning in pain, and the next at his ease and cheerful, complaining only of hunger and weakness.

This apparent convalescence, however, is not of long duration, for when the patient and his medical attendant reasonably conclude, from the favorable change that has occurred, that the fever is at an end, and that time only is required for complete restoration to health, a sudden and unlooked for recurrence of the previous symptoms takes place. This relapse happens at some period between the twelfth and the twentieth day (from the beginning of the disease),
or on or about the seventh after the crisis, and without apparent cause or indiscretion on the part of the patient. The relapse is indicated by the same symptoms as the primary fever—rigors, headache, muscular aching, hot skin, thirst, quickened pulse (the rapidity being often disproportionate to the other symptoms) coated tongue, and loss of appetite.

After a few days—two, three, four or five—this second attack suddenly ceases after a profuse sweat, and the patient becomes a second time convalescent. The return to health is comparatively rapid and complete in the young and vigorous, but in the aged, and especially in those who have been previously in indifferent health, the strength is more slowly gained.

Nor does the mildness or severity of the relapse appear to be influenced by the previous attack; for it has been observed that the symptoms of the second are sometimes more mild, and at other times more severe, than those of the primary fever. In some instances, for example, in which the first attack was by no means severe, the second has been characterized by delirium, deep jaundice, violent purging, and other grave symptoms. Such cases are, however, not common.

Sometimes, again, a second but mild relapse takes place, generally about the twenty-first day; and I have already alluded to the circumstance, that patients have suffered three, four, and even five separate and distinct attacks. Such frequent relapsings have been seldom noticed in the epidemics in England.

Other anomalies are, in some instances, observed. Thus, the symptoms of the relapse, instead of appearing suddenly, come on gradually and insidiously; or, instead of the ordinary well-marked progress of the symptoms, there may be only slight acceleration pulse, and a little increased heat of skin, to mark its occurrence; occasionally, in place of the abrupt termination of the attack by sweating, the crisis has apparently been connected with some other evacuation, such as hemorrhage from the nose, diarrhoea, or the menstrual discharge. In some cases, on the other hand, in which the ordinary symptoms of the first attack have been well marked, there has been no relapse nor anything approaching to a recurrence.

There appears, too, to be a greater tendency in relapsing
fever than in other acute diseases in pregnant women to abortion or premature delivery. So invariably, indeed, according to Dr. Wardell's experience, did this happen, that throughout the whole duration of the Edinburgh epidemic—a period extending over at least fourteen or fifteen months—he never discovered even a solitary instance of the impregnated uterus not expelling its contents; and the statements of others, whose opportunities of observing this fever were equally ample, confirm this statement. The same tendency to abortion was observed in the patients received into the London Fever Hospital.

The relapsing fever sometimes, however, assumes a more severe character, the aspect of the symptoms from the commencement indicating a much more serious disease. The rigors are violent; the heat of the skin is intense; the heart's action depressed, indicated by the softness and compressibility of the pulse; the patient complains of extreme prostration, and feelings of exhaustion or sinking; there is often incessant vomiting of bilious fluid, accompanied with a more or less deep-jaundiced appearance of the skin, though the evacuations exhibit no deficiency of bilious admixture, but the urine is generally loaded with bile.

In some cases, sudden collapse takes place—the pulse becomes rapid and feeble; the skin universally cold, more especially the hands and feet; the face livid; partial or complete unconsciousness succeeds; the sphincter becomes relaxed, and death takes place after a few hours.

The diagnosis of relapsing fever may be given in a few words.

It differs from other forms of fever—1, by its sudden invasion; 2, by the short duration of the primary fever, and its termination by an evident crisis; 3, by the almost uniform occurrence of a relapse—occasionally a second or third; 4, by the unusual number of cases with more or less jaundice or yellow color of the skin, accompanied often with gastro-enteritic and gastro-splenic symptom; and 5, by the absence of characteristic rash.

The small mortality, or death-rate, of relapsing fever shows its comparative mildness, being about one in twenty-five, or under 3.9 per cent.

Anatomical characters.—This singular form of fever, if uncomplicated, seldom proves fatal. In examination of the fatal cases, no special lesion, so invariably present as to in-
Recurrent Fever.

dicate the anatomical character of the disease, has been discovered.

The blood has in some cases been found throughout the body in a fluid state indicating a decrease in the normal amount of fibrin. I am not aware that it has been subjected to further chemical analysis.

The brain, with the exception of a moderate amount of sub-arachnoid serosity, and perhaps an increased quantity in the ventricles, shows no remarkable deviation from a normal state.

The heart and lungs exhibit no evidence of disease.

The liver has been found enlarged from congestion, and the gall-bladder more than usually distended with bile; and what may be considered worthy of being noted, no obstruction to the free escape of the bile through the ducts, even in cases in which the jaundice had been well marked, can be detected.

No disease in any portion of the alimentary canal is discoverable.

The spleen exhibits the most marked and constant lesion, more especially as to the size or volume. It was noticed in a considerable number of cases in the Edinburgh epidemic, in 1843-4. Dr. Wardell saw several in which this organ was three or four times larger than natural; in one, it weighed twenty ounces. This splenic enlargement was observed by other physicians during the same epidemic; thus, in a fatal case examined at the London Fever Hospital, the spleen weighed thirty-eight ounces. It thus appears that this organ is occasionally larger in relapsing than in either typhus or enteric fever.

Urea has been found in the blood. In a fatal case recorded by Dr. Wardell, in which the patient fell into a state of supur twenty-four hours before death, crystals of nitrate of urea were discovered in considerable abundance in the blood taken by cupping, ordered for the relief of the cerebral symptoms.

It thus appears that, with the exception of splenic enlargement—a lesion common to the other forms of fever, continued and periodic—there is no special lesions found after death in relapsing fever. If structural changes is discovered, they are to be regarded as accidental, and due to some secondary or intercurrent affections.—Lancet.
In a former number of the London Medical Review we adverted to the increasing spread of one of the most hideous and loathsome diseases which afflict mankind, viz: leprosy. It is now our object to draw attention to another equally distressing malady, which owing to its nature and close affinity to scrofula, affords many points of interest for consideration, although, fortunately we may claim an almost total exemption from it in this country.

The most common continental seats of the affection are the southern provinces of France, and certain districts in Switzerland, and in the north of Italy. The inhabitants of the two great chains of mountains, the Pyrenees and the Alps, where it has existed from a remote period, suffer most severely. In addition to these European localities, China, Syria, Northern India, the bleak shores of the Polar Seas, and some parts of the continent of America, furnish frequent instances of cretinism, and the kindred disorder, goitre.

The causes and treatment of cretinism are so amply discussed in most systematic treatises on medicine, although the etiology of the affection has not yet been clearly solved, that we shall not dwell upon this portion of the subject further than in making the consolatory remark that it is, to a large extent, amenable to judicious treatment and removal from the affected districts, a fact which is sufficiently evidenced by the circumstance referred to by Dr. Watson, in his lectures, that, out of the total number of patients admitted into Dr. Guggenbuhl's special hospital for cretin children, during twelve years, one-third became perfectly restored to health and reason, while the rest were improved in mind and in body.

The statements of most recent French and Italian writers upon cretinism tend to show that it is upon the increase, and we, therefore, in accordance with the sound principles enunciated in the aphorism, Venienti succurrere morbo, and in the hope of obtaining information upon the point from medical gentlemen residing in those districts of this country in which goitre may be said to be endemic, publish, at full length, the careful classification of cretinism, given in a recent memoir by M. Morel, who has paid considerable attention to the subject. We need scarcely premise that numerous modifying agencies dependent upon the climate, mode of living and customs of the locality, must determine, more or less, marked differences in the character of the disease.

First Division.—Goitrous individuals with symptoms of
cachexia and of mental dulness. All the countries which contain cretins, possess goitrous individuals, and no example can be given in opposition to this fact. Nevertheless, goitrous persons do not necessarily become cretins, and goitre does not form an indispensable accompaniment of cretinism. When I have visited districts where goitre is endemic, such as certain localities in Meurthe and Moselle, people have not failed to tell me that I should find no cretins there, but an attentive observation of facts has proved to me that goitre is the starting point of cretinism. In countries where goitre is endemic, we may already distinguish the first lineaments of cretinism in the appearance of individuals; the lips are thicker, the nose is rounded and slightly flattened, and the zygomatic arches are more prominent. In other cases the respiration is sibilant, difficult and sometimes stertorous; the cretinous cachexia begins to show itself. In these same countries when there is a complication with malarious elements, the degeneration is displayed in an aspect which approaches still more closely to cretinism: we observe the lymphatic temperament, hernia, tumid abdomen, mental dulness, &c.

There is a close connection between the goitrous and the cretinous epidemicity, the goitrous being only the first stage of the cretinous, and it is very rare that we find actual cretins where there are not also goitrous individuals.

Second Division.—Cretins possessing the power of continuous reproduction.—The cretins in this second division are capable of continuing their species, and many of them marry. They have the ordinary appearance of the healthy individuals of their country, but begin to be distinguished from them by a more faulty conformation of the skull. They often have the head flattened at the posterior and upper parts, whilst it is considerably enlarged laterally. They present a greater development of the zygomatic arches; the nose is more flattened, the lips are thicker, and the chin is square: the distance from the root of the nose to the commissure of the lips is greater; the bones are coarse and large, and the thickened articular surface are unsymmetrical; there is generally a disproportion between the upper and lower extremities. Goitre is not always a characteristic of the individuals in this division.

These cretins never surpass a certain intellectual limit; their speech is sluggish and embarrassed.

Third Division.—The cretins in this division may be divided into two sections. The first is composed of those who can, although only with difficulty, propagate their species; the second, of those who are sterile.
First Section—Cretins limited in their fecundity.—These are remarkable on account of the smallness of their stature, which makes them appear like stunted dwarfs, and by their uncertain and wavering gait. Their hair is very dark and bristly, their skin is black and rugged, and probably contains more pigment than in the normal condition. The fundamental principles of cretinism are strongly shown in the superior and posterior flattening of the head, and in the exaggerated development of the temporal portion and of the zygomatic arches. The nose is small, rounded and crushed down at its upper part, the lips are thick and coarse, the tongue is hypertrophical, the flesh is soft and flabby, and the chest is narrowed. Menstruation is tardy and irregular, and is in proportion to the limited fecundity of these degenerate beings, who produce only an abortive offspring, or scarcely living children.

Second Section—Sterile Cretins.—The external appearance is the same as in the preceding; the stature and physical constitution are also identical. In both sections the upper eyelid is disproportionately elongated, void of contractility, and overlaps the eyeball in an ungraceful manner; the tongue is thickened, and the speech embarrassed. The difference arises in the internal characteristics. The organs of generation are either atrophied, or only sparingly developed. Many of the cretins in this class have no second dentition; their average length of life is limited, and at twenty-five or thirty years of age they present symptoms of decay. Goitre is very rare in this division.

Fourth Division.—Cretins presenting complex degenerations.—In all countries where cretins exist, we may observe individuals who appear to deviate from the ordinary type of cretinism by a grouping of frequently very variable peculiarities. Amongst them we find all the varieties of misshaped heads, from the preternaturally small head up to the hydrocephalic, and also many goitrous persons, deaf-mutes, and individuals suffering from single or double hernia, or afflicted with diseases of the hip, or congenital dislocations. The anomalies shown in the organs of generation are remarkable; in fact, in contradistinction to the sterility of some, we may perceive a development of the genital organs in others.

Fifth Division—Deformed Cretins.—These cannot walk, but drag themselves along, or remain fixed to the place where are deposited. They only present to the view a shapeless mass; their eyes are bleary and lustreless, and the saliva dribbles between their thickened lips; their skin is black and roughened, and their hair bristly; sometimes they have enor-
onal thyroids. The speech, which is rudimentary and incomplete in the third and fourth divisions, is replaced in this by inarticulate, wild cries; and the perceptive faculties are obtuse.—*London Med. Review.*

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**On the Employment of Chloride of Zinc in the Treatment of Skin Diseases.**

After having for a considerable period employed the chloride of zinc, exclusively in its property of a caustic, in cases of Lupus and some analogous cutaneous affections, Dr. Veiel, of Caustadt, has extended its use to the treatment of chronic leers of the legs, of syenosis, of chronic eczema, &c.

He uses either an alcoholic solution (composed of equal parts) or an aqueous solution, consisting of ten parts of chlorid of zinc, and ten parts of hydrochloric acid to 500 parts of water, or the solid caustic moulded by fusion into cylindrical sticks.

In this last form, Dr. Veiel proposes, like all other surgeons, to produce an energetic caustic action. He has especially had recourse to this method of treatment in thirteen cases of lupus with most satisfactory results. His method of applying it is thus:—When the epidermis is destroyed and replaced by more or less thick crusts, these are detached by means of emollient poultices; in case the epidermis is intact, the chloride of zinc, is applied until the skin is previously denuded by the use of a blister; by means of a pointed pencil of chloride of zinc, he penetrates deeply into the hypertrophied tissues, or those which are surmounted by tubercles, in such a manner as to apply the caustic to all the affected parts, and this application is continued beyond the diseased textures to an extent of a few lines. All around the lesion the surface, which is riddled with holes, somewhat analogous to a honeycomb, exudes, immediately after this operation, a sanguineous blackish liquid, and subsequently a serosity of a lighter color, which, at the end of some hours, hardens into a smooth and firm crust. Towards the third and fourth day a seropurulent discharge raises up the edge of this crust, and exit should be afforded to it by a few punctures. About the sixth or the eighth day the crust is elevated at its edges, and can be detached by the application of poultices continued during some days. It is rarely necessary to renew the application of
the caustic more than three times, except in cases where the morbid tissue possesses unusual thickness. When the suppurating surface which succeeds upon the fall of the eschar no longer presents any granulations of a bad nature, and becomes raised to the level of the healthy parts, it is covered with poultries during some days, and then lightly touched with the alcoholic solution of chloride of zinc every three or four days. When the edges begin to contract, the aqueous solution is substituted for the alcoholic, and continued occasionally until the cure is completed. The time requisite for obtaining this result rarely exceeds three or four months.

Dr. Veiel employs the alcoholic solution of chloride of zinc with advantage in the treatment of inveterate eczema of the eyelids, of the lips, of the genital organs, and about the anus. The aqueous solution sometimes cures cases of eczema solare, or eczema impetignodes, which have resisted all the usual remedies. The alcoholic solution readily removes the indurations which occasionally remain as a sequel of psoriasis on the neck, the back and the thighs; it is only necessary, in order to apply it in these cases, to be careful in removing the scales which cover the indurated parts.

There is a form of psoriasis palmaris accompanied by warty, painful indurations, which only gives way to the solid chloride of zinc, which is employed after having perfectly removed the epidermis by means of a blister.

The aqueous solution is very useful in cases of sycosis and favus.—Zeitschrift der Gesellschaft der Ärzte zu Wien.

The Treatment of False Articulations by Periosteal Autoplasty.

The method by which M. Jourdan has given the name of Periosteal Autoplasty consists essentially in the oblique resection of the two fragments between which the false joint has been formed, after having detached the periosteum, either upon the two portions, or upon the upper fragment only; one or more clefts are then made in the periosteum, into which slips of the periosteum covering the other fragments of bone are inserted, and the lips of the clefts are brought together by sutures, or the delicately constructed forceps called serrefines. The edges of the wound in the soft parts are then incompletely brought together; and, finally, the limb is maintained in a state of perfect immobility, for as long a time as is necessary, in an appropriate apparatus.
This operation has fully realized M. Jourdan's expectations in the cases in which he has tried it, a circumstance which will be fully understood if we bear in mind the important part which is played by the periosteum in promoting the union of a bone after its fracture.

The Chief Source of the Danger Resulting from the Inhalation of Chloroform.

In a recent communication made to the Academy of Sciences at Paris, M. Jeaucourt stated that his observations and researches had convinced him that upon every occasion when the patients breathe freely during the inhalation of the chloroform, anaesthesia was produced readily and quickly, and that he was also of opinion that if nothing offers any obstacle to the regular and continued play of the respiratory current, not only does the inhalation not present any danger, but in addition, it is exempt from what have been called the physiological effects of the chloroform, or, at least, these are less marked.

But the respiration may easily become changed during the inhalation, especially at its commencement, and it is in this change that the danger resides; if any obstacle interferes with the continuity of the respiratory action, the anaesthesia ceases to be really producible, and the effort to produce it gives rise to various accidents, more or less to be feared. The interruption to free respiration may arise from different causes depending either upon the operator, as in cases where he administers the chloroform either too rapidly or in too great abundance, or upon the patient himself, where he voluntarily ceases to respire, and even resists the injunctions which are made to him upon that head; the immediate result is the modification of the quantity and quality of the air contained in the lungs; the secondary result is variable, and may occasion the production of a transient, slight sense of suffocation, or of fatal asphyxia. The explanation of the latter phenomena may be found in the double source from which they arise, viz: the sudden deprivation of respirable air, and the poisoning resulting from the gaseous mixture retained in the lungs. M. Jeaucourt considers that we may thus account for the occasional fatal effects which have attended the employment of anaesthetics, and which have been doubtfully referred to syncope; the default of inervation of the heart appearing to result from the complex character of the asphyxia itself.

An attentive examination into the causes of these accidents-
Causes and Treatment of Dysmenorrhœa and Sterility. By Beverly Cole, M. D., Professor of Obstetrics, &c., in the Medical Department of the University of the Pacific, San Francisco.

At a recent meeting of the San Francisco Medico-Chirurgical Association, I made a verbal communication upon the subject of Dysmenorrhœa, (as met with in this country) in which the causes and treatment were discussed. I took the position that the immediate causes were, in a majority of cases, of a mechanical character, and, consequently, require a treatment essentially surgical.

I now propose, briefly, 1st, To show the connection between Dysmenorrhœa and the subject of this paper, viz: Sterility; and, 2dly, The identity of the treatment indicated in the two.

It must be borne in mind that Dysmenorrhœa is a vague term, which obstetricians have applied to a symptom of various conditions; that, indeed, by this term, is meant painful menstruation, arising from whatever cause it may, such, for instance, as a neuralgic diathesis, congestion of the womb, inflammation of its lining membrane, membraneous exfoliations and mechanical obstructions of the cervix. Excepting the neuralgic diathesis and inflammation, the others may all be
included under the general head of Mechanical Causes, and these are, by far, the most frequent in this country. That congestion should be considered a mechanical cause, may, at first appear strange, yet, upon reflection, it will be seen that its operation or influence upon the catamenial flow, attended, as it is, with swelling of the cervix, at the expense of its canal, thus offering a barrier or obstruction, is essentially of a mechanical character.

The causes above enumerated will, at once, be recognized by the observant practitioner, as operating, in the majority of cases, in the production of Dysmenorrhcea. Now, if congestion, membraneous exfoliations, and a narrowness (congenital or acquired) of the canal of the cervix produces painful menstruation, through the mechanical obstructions which they offer to the flow, the proposition is tenable that the same obstruction will present itself to the admission of the male matterial into the cavity of the uterus, and, hence, conception under such circumstances, is a physical impossibility.

In either the one or the other of these conditions, namely, Dysmenorrhcea or Sterility consequent upon the mechanical causes, as enumerated, the indications, in treatment, must be the same. No one would hope to cure a painful menstruation arising from congestion, without directing his treatment to that cause, endeavoring to unload the turgescent vessels of the womb, and thereby relieve the patient. This condition being once removed, and the canal restored to its original capacity, in the act of coitus the sperm is permitted to enter the uterus, and “contact” takes place.

The subject of this condition may be either of the sanguine or of the nervous temperament. In the due case, the patient is plethoric and robust in appearance, but usually indolent, taking little exercise, subsisting upon a rich diet, rendered the more stimulating by the free use of the various condiments, and the drinking of wines, &c. As the result of this mode of life, the chylo-poietic viscer are kept in an over-excited state, the venaportarum and liver are over-tasked, and a general venous congestion of the whole abdominal viscer is present, including the rectum and uterus; hence, in these cases, we are also liable to encounter hemorrhoides.

The course of treatment indicated in these cases is obvious. Alteratives and purgatives are to be administered for several days preceding the expected menstrual period, with the view of exciting the secretions and unloading the vessels, and thus relieving the congested state of the womb. But, sometimes, it occurs that (this condition having continued some time)
there will be a permanent construction of the cervical canal, the same as would result from congestion or inflammation of the urethra. In these cases, as in stricture of the urethral canal, you should dilate the stricture at the same time that the treatment above named is followed, and have the patient placed upon a prescribed diet.

It is proper that inflammations, when encountered, should be treated as under other circumstances; but often, when it is chronic, and confined to the canal, the use of the bougie, in dilatation, will be sufficient to excite a healthy action in the part and cure the case, without any other specific interference.

In that form of Dysmenorrhcea, known as "Membraneous Dysmenorrhcea," we usually meet with the same general and local conditions as just described, with the exception that the patient, during the "period," passes a membrane from the interior of the uterus, some times entire, retaining the form of the cavity of that organ—at others, in shreds: in either case, she suffers intensely, which is due to the transit of the exfoliated membrane through the constricted cervical canal. The treatment indicated in this case is the same as in the simple form of Congestive Dysmenorrhcea.

Many cases of this character, in married women, have fallen under my observation; in the majority of which, the patients have consulted their physicians on account of barrenness, rather than for relief of their sufferings; and in many of them which had been considered hopeless, so far as possibility of conception taking place was concerned, the women have, after dilatation was effected, conceived and borne children at the full term of gestation.

But it is in that form of Dysmenorrhcea which authorities denominate "Mechanical Dysmenorrhcea," or rather Dysmenorrhcea arising from mechanical causes, in which the treatment by dilatation should be expected to accomplish most.

Now, the immediate causes of this form of disease are various, consisting, usually, of stricture at the external os, within the canal, or at the internal os, and to these is added tumors, occupying the canal.

In these cases, there may or may not be congestion present, the patient complaining merely of excessive pain during the whole menstrual period, with bearing down, and sickness at the stomach. She tells you that it is necessary for her to take the bed, whenever she menstruates, her sufferings are so exquisite. Upon examination with the speculum, it will be discovered, possibly, that if an external os exists, it is difficult to discern it, and that, in passing the uterine sound over the
cervix, as presented through the speculum, a mere depression or dimple marks the spot where the mouth of the womb should be. If the sound is now pressed firmly upon this point, possibly the instrument will enter the canal, or, as sometimes occurs, you will find it necessary to make a small incision before the instrument will pass.

In other cases, again, there will be no unusual appearance about the external os, but, on passing the sound beyond, into the canal, it will be suddenly arrested in its progress, by a stricture, either in the canal itself, or at the internal os. When the instrument is arrested at the internal os, it may be due to a simple stricture of that part, such as described of the external os, or to a retroversion of the body and fundus of the organ. If we consider the shape of the uterus, its great liability to displacement, particularly backward, and the effect of this retroversion upon the shape and direction of the cervical canal, we can understand how this character of trouble must be productive, more or less, of stricture at the point at which the organ is doubled upon itself; and, further, that so long as it continues, so long must the patient be the subject of Dysmenorrhœa, and, if married, be disqualified for the performance of that function upon the consummation of which depends, in many instances, the happiness of both husband and wife.

To illustrate the effect of Retroversion upon the shape and direction of the cervical canal, it will be but necessary to take a roll of cylinder of paper, bend it on itself, and it will be seen that the two sides of the cylinder will approach each other, so as to narrow, very materially, the caliber of the tube. The same effect, exactly, is produced on the cylindrical canal of the cervix, in backward displacement of the womb.

I am led to the conviction, from an extended observation in this class of cases, that no one cause of Sterility is so common in women, otherwise healthy, as stricture of the cervix, and, in a large proportion, this is dependent on Retroversion. As has been stated, the treatment, in these cases, is essentially surgical in its character, and consists in dilating the stricture part, whether it be of the simple variety or due to Retroversion. In the latter case, however, this treatment is indicated only after the ordinary means for righting the uterus have failed.

I cannot appreciate the propriety of the medical adviser, when he discovers Retroversion of this organ, dooming his patient at once to despair, by concluding that it will be impossible for her to ever become a mother; or, at least, until
he has made every effort to overcome the constriction, and thereby cure the case. Yet this is the daily practice of many, and women are too frequently rendered, through these hasty opinions on the part of their physicians, the subjects of cruelty or desertion; when a well-directed course of treatment might, in a very short time, overcome her difficulties, and bring comfort and happiness both to herself and husband, when perhaps hope had seemed to have faded.

In my remarks before the Medico-Chirurgical Association, already referred to in this paper, and which will be found in the report of the transactions of that body, the particulars of treatment in these cases were given, and consists, 1st, in the introduction of a piece of compressed sponge to the point of stricture, previously guarding it with a ligature, by pulling upon which it may, at any time, be removed. This is allowed to remain intact for twenty-four or forty-eight hours, when it may be removed and replaced by a fresh piece, which may usually be carried higher than the first. When the dilatation, through this means, has been carried sufficiently far, the English elastic bougie is to be substituted. This should be introduced at least once in forty-eight hours, and at each operation one a size larger than was used previously, should be selected.

The daily or tri-weekly introduction of the bougie must be continued some weeks, (as in the treatment of an urethral stricture) or until the part ceases to contract (at least to any extent); when, not unfrequently, to the satisfaction of patient, friends and physician, the object of their solicitude is attained, and the woman finds herself, in a short period, likely to become a mother.

The foregoing has been written rather with a view of calling the attention of practitioners to the frequent causes of Sterility in this country, and the importance of surgical interference in the class of cases referred to, than to establish any claim to originality in their treatment.

In conclusion, I would remark, that in many of the cases which have fallen under my care, I have entirely failed in the attempt to use the compressed cones of sponge kept in the stores for sale, and made after the suggestion of Prof. Simpson, of Edinburgh. The difficulty has been that they were much too large, and, therefore, I prepare my own tents, as follows: Select a fine piece of cup or "surgeon's sponge," and having melted a quantity of blanched beeswax in an ordinary vessel, the sponge is to be dipped into the liquid wax, and immediately placed between two smooth surfaces (board or mar-
ble) and a weight applied sufficient to compress the sponge and free it from the surplus wax: in a few minutes it will be ready for use. By this process, a flat cake of compressed sponge is obtained, from which pieces may be cut, of such size and at such times as required. The piece to be introduced should be well oiled and carried to the point of stricture by means of a long and slender forcep.

Reports of cases, illustrative of this general plan of treatment, will be furnished for the next number of the Medical Press.

On the Union of Fractures in Mercurio-Syphilitic Patients.

By Prof. Sigmund, of Vienna.

A young man in the Hospital of Vienna, while undergoing treatment by means of mercurial inunctions, on account of syphilitic ulcers of the skin and affection of the bones, met with an injury: as the result of which, he sustained an oblique fracture of the humerus, about an inch below the tuberosities, accompanied with considerable contusion of the soft parts, and extravasation of blood. Cold applications were made use of, and the arm was put in splints, in the usual way; no unpleasant symptom occurred, and consolidation of the fractured bone was complete on the thirty-third day from the receipt of the injury. Around the united ends of the bone there was a very considerable bony swelling; in other respects, the form and direction of the limb were quite normal. On the day when the fracture was sustained, the patient had undergone the ninth of a series of fifty mercurial inunctions; this treatment was not discontinued, but was carried on uninterruptedly until the disappearance of the syphilitic symptoms.

Prof. Sigmund has met with five cases where syphilitic patients have sustained fractures while undergoing mercurial treatment. The bones broken in these cases were, the right radius (twice,) the left fibula, the left clavicle, and the left humerus. Complete union of the fractured bone had occurred on the twenty-third, the twenty-sixth, the thirtieth, the twenty-second and thirty-fourth days respectively. In all these cases the results were satisfactory. In none of these cases was the mercurial treatment discontinued, nor was any change made in the diet of the patients.

It is well known that in syphilitic patients no important deviation from the normal course occurs in the healing of wounds.
of the soft parts. Prof. Sigmund has had occasion to perform numerous and various operations in syphilis, and his observations entirely confirm the general opinion.

Prof. Sigmund does not believe that the bones of syphilitic patients, whether or not they have been treated with mercury, are more readily fractured than the bones of those who have not had syphilis, and have not taken mercury.—*Boston Med. and Surg. Journal.*

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**Phagedenic Ulcers.**

Phagedenic, from the Greek word *phago, I eat,* is much more expressive, of the literal meaning of the word whence it is derived, than most other medical terms derived from the Latin or Greek.

The margins of a Phagedenic Ulcer have a strong resemblance to a worm-eaten substance, or the surface of a substance upon which a mouse has been gnawing.

What is a Phagedenic Ulcer? The Phagedena Gangrenosa, or Hospital Gangrene, so common in some of the European cities, is never known on this coast. But there is a true Phagedenic Ulcer often seen here, attacking the integument and subcutaneous cellular tissue, generally about the face, and is extremely difficult to cure. Sometimes it attacks the deeper-seated structures of the face, as well as of other parts, even the tendons themselves, resulting in a most alarming destruction of the tissues, without any assignable cause. The fingers, for instance, are sometimes attacked, and the bones laid bare by the ravages of the disease, in a few days.

The remedy we have found available, in such cases, is calomel and morphine, in the following proportions:

\[
\text{B: } \text{Morph. Sulph. } \cdot \ 3\text{d}
\]
\[
\text{Hyd. Sub. Mur. } 3\text{ii.}
\]

\[
\text{M.}
\]

*Signa.*—Apply to the ulcer every day twice. If the constitutional effects of the morphine become manifest to an undue extent, the preparation must be used very sparingly.

This is the only remedy upon which we repose confidence in the treatment of the Phagedenic Ulcer of California.—*San Francisco Medical Press.*
The Local Treatment of Diphtheria.

The Union Medicale has recently published two letters from M. Loiseau and Trousseau on the use of tannin and alum locally in the treatment of pharyngo-laryngeal diphtheria.

M. Loiseau, considering the false membranes, in all cases, to be but consequences of diphtheria, and, with the exception of croup, rather useful than injurious, provided their putrefaction be prevented, again lays stress upon the beneficial action of styptics, and especially tannin; these seem to convert the morbid secretions into an imputrescible epidermis, which affords protection to the denuded surfaces and promotes their cicatrization. M. Loiseau performs insufflation of alum five or six times a day, and of pure tannin equally often; he states that a cure may thus be effected in three or four days, on the same principle, which M. Trousseau adopted in his practice in 1828. A quotation from an article published on the subject in 1833, by M. Trousseau in the Dictionnaire Medical, has elicited from the learned Professor a reply which we reproduce, as it explains the changes his views have undergone on the efficacy of the medical treatment of diphtheria, and more especially of croup.

"It is perfectly true," says M. Trousseau, at the date of September 20th, "that in the epidemics of diphtheria, which from 1818 to 1828 prevailed in the departments of Indre-et-Loire, Loir-et-Cher, and Loiret, the disease of the fauces readily yielded to frequent insufflation of alum, and to canterization with muriatic acid or nitrate of silver. It is equally true that, when the complaint was met in its earlier stages, four or five days were sufficient to effect a cure, excepting, of course, when diphtheria had invaded the larynx.

"For ten years past, however, diphtheria has acquired in Paris and in the provinces a degree of gravity and of malignancy which it did not, by any means possess thirty years ago; and I declare that it is now a long time since I have had the good fortune to see genuine pharyngeal diphtheria yield to treatment in four or five days. Common pseudomembranous angina, or herpes of the fauces may be cured in twenty-four or forty-eight hours, but not real diphtheria such as we too frequently meet with.

"I resort to the same means as M. Loiseau and perform insufflation into the throat every two hours, and even every hour, if necessary, alternating the use of equal parts of sugar and alum or tannin. From time to time I brush rather roughly the uvula and tonsils, before restoring to insufflation, in order
that the medicinal agents may come into immediate contact with the mucous surface, and I consider myself very fortunate when, after ten days' treatment, all trace of false membranes has disappeared.

"In five adults whom, within the last few months, I attended with my friends, Drs. Bernard, Patouillet and Blondeau, the disease lasted nine days in one case, and more than a fortnight in the others, and I repeat that it would have been utterly impossible to use with more persevering energy the remedies extolled by M. Loiseau, which I consider most useful, namely: alum and tannin.

"Appealing to the testimony of my learned colleagues of the Hospital for Infancy, M. M. Blache, Bouvies, Roger, Sec, and of Dr. Barthez, I find their statements are perfectly similar to mine, and that they agree with me in thinking that the singularly rapid, extraordinary and numerous cures effected by M. Loiseau may perhaps be accounted for by his not having allowed himself sufficient time to establish an incontrovertible diagnosis.

"It is difficult at first, and especially in children, to distinguish genuine diphtheria from pharyngeal herpes; and although in doubt I prescribe the local application of alum and tannin, I do not flatter myself that I have effected a cure of tonsillary diphtheria when, after twenty-four hours, I cease to detect in the throat any peculiar concretions."

We are happy to be confirmed by so competent an authority, in the remarks we have offered above on the importance of diagnosis in the appreciation of the various remedies recommended for a disease the gravity of which, far from subsiding, seems rather on the increase, especially when observed in an epidemic form.

_Treatment of Eruptions Around the Anus._ By Joseph Bell, Esq., Gateshead.—Occasionally we see obstinate cutaneous ulceration surrounding the anus in children. Considerable tumefaction attends it betimes, and deep fissures are occasionally seen. This disorder is probably herpetic, and almost always can be cured with yellow wash. The proportions being from 1 to 1 to 3 grains of hydrarg, bichlorid, to 1 ounce aq. calcis. The part is to be frequently bathed with it, and should the lotion produce pain, it is to be diluted with water, and when at rest, a little lint, soaked in the lotion is to be applied and left on the part; deobstruents being at the same time administered._—**Med. Times & Gaz.**
EDITORIAL AND MISCELLANEOUS.

A COMPENDIUM OF HUMAN HISTOLOGY,
By C. Morel, Professor Agrege a la Faculte de Medicine de Strasbourg. Illustrated by Twenty-eight Plates. Translated and edited by W. H. Van Buren, M. D., Professor of General and Descriptive Anatomy in the University of New York, &c., &c. BAILLIERE AND BROTHERS. New York: 1861. pp. 207.

Dr. Van Buren and the Brothers Bailliere have certainly rendered an important service to the profession in the translation and publication of this valuable work. Our readers must know that we cannot always read thoroughly the works which it is our duty to notice as journalists. This, however, is one of which we can speak with a personal knowledge and we have found it both concise and comprehensive—very interesting and advanced to the last hour, of pathological investigation.

The author, after defining in his introduction the object and purpose of the science of Histology, presents us with what we consider a very convenient and simple division of the ultimate organic elements:

"In the present state of Science, all of the simple elements of which the body is composed may be reduced to one of the following typical forms, viz: 1st, Structureless Material; 2d, Cells; 3d, Fibres; 4th, Crystalline Substance."

In accordance with this brief and, at the same time, most philosophic classification of the elements, our author proceeds to arrange them into the several tissues which they are found to compose, and, to systematize his labor, he divides the work into ten convenient and rather brief Chapters:

Chapter I, Cells and Epithelial Membranes; Chapter II, Fibres; Connecting Tissue; Chapter III, Cartilage, Bone, Teeth; Chapter IV, Muscular Tissue; Chapter V, Elements of Nervous Tissue; Chapter VI, Vessels, Arteries, Veins, Capillaries, and Lyphatics; Chapter VII, Glands; Chapter VIII, Skin and its Appendages; Chapter IX, Intestinal Mucous Membrane; Chapter X, Organs of Sense.

In the treatment of these several departments, our author is clear, concise and happy in his illustrations. With the description of each tissue,
brief directions are given for the selection and preparation of specimens for microscopic examination which is, in itself, a most valuable feature of the work. The book is evidently prepared for the elementary student as well as for the more advanced pathologist, and, on this very account, must soon become generally popular.

Dr. Morel is very decidedly a follower of the celebrated Virchow, whose doctrine of "Cellular Pathology" seems to have taken firm hold upon his belief, and appears to enter as a necessary part into all his reasoning. "The Plasmatic Cell" takes a place in the minds of these pathologists, almost of every other element of nutrition as the very cause, origin, sole agent and perfection of all organic processes—*self-governed* and uncontrolled by any other element in the entire organism. Though to all this, we cannot, as yet, give our full assent, "still it cannot be totally denied that some processes of nutrition are completed with a certain degree of self-government in the system of organic cells;"* and both Virchow and our author may be, in the main, correct, though only *out of time*, being a little too much in advance of the general ideas now dominant in the worlds of Physiology and of Pathology.

The above work will be found in this city at the Book-store of Messrs. T. Richards & Son.

In addition to the above work we have received also from Messrs. Bailliere Brothers, the notice of work on the now all-important subject of Diphtheria. The work itself has not yet come to hand, but doubtless will and shall receive due attention in our next issue. We refer our Students at present in the city to Messrs. Richards & Son, where the work may probably be purchased. Price, $1 50.

**AN ELEMENTARY TREATISE ON HUMAN ANATOMY.**

As an elementary Treatise on Human Anatomy, Dr. Leidy's work is certainly a success. So long accustomed as we have been to the household words of anatomical nomenclature, we are scarcely able to do justice to any attempt on the part of an author to simplify these terms, altering

*Letter from Mr. Doubovitsky, of St. Petersburg. This letter we may publish in a future number of this journal.*
what, by dint of long use, has become, to us at least, familiar as the alphabet. This impression, however, must not receive too much importance in the minds of teachers in recommending a work for beginners, they must remember, if possible, as Dr. Leidy seems to have done, the great mountain in the way, which the nomenclature of anatomy presented, and, knowing that simple terms are easier of acquisition than more complicated ones, we should give full credit to the task accomplished by our author.

The work is filled with clear and beautiful illustrations, the text open and large, with each principal word or subject struck in large block type to fix the attention of the student—and the cream-colored paper on which the print is executed is, by no means, an inconsiderable point of value.

The authors descriptions are clear and concise, evidently from one, as he is known to be, thoroughly familiar by daily and constant handling with every portion of his subject.

Camphor as an Antidote to Strychnine Poisoning.—In the Pacific Medical and Surgical Journal, for June, Dr. M. T. Dodge reports a case of poisoning with strychnine, entirely relieved by the administration of camphor. According to the report, five grains of strychnine had been taken three hours previously. Ten grains of camphor were given in emulsion, and repeated every half hour or hour for seven hours, when the spasms entirely ceased, and the patient rapidly recovered. It would certainly be a fortunate discovery should camphor be found to be a reliable antidote of strychnine. The case reported lacks at least two essential points to make it available as proof upon this point. It is thought by many that much of the strychnine in use is nearly inert and if taken as claimed, there is no proof that the article was genuine. More than this, there is no proof, but the patient's statement, that the five grains of strychnine had been taken at all. There is certainly one suspicious fact in the case, that must in some measure detract from our confidence in the antidotal power of camphor. Three hours had elapsed from the taking of the poison before remedial aid was had, and yet the patient was sitting up, and presented no very alarming symptoms. Prof. Wood says that, in cases of poisoning from strychnine, the alarming symptoms usually follow the administration in from ten minutes to half an hour. One of two things is evident: the five grains were not all taken or the poison was not of standard strength; either would effect the result so far as relates to the antidotal powers of camphor.

Remedy for Burns from Phosphorus.—The skin should be wetted with a solution of chloride of lime or of soda, or if these are not at hand it should be dipped into a vessel with lead water.
**Glycerine in Skin Diseases.**—This substance has been justly recommended in various affections of the skin, and especially in those attended with desquamation. In that troublesome affection *pityriasis capitis*, in which the hairs become dry and fall off, during the abundant epidemic exfoliation, undiluted glycerine may be applied with excellent and durable effect. In *pityriasis rubra* and *pityriasis simplex*, a mixture, composed of equal parts of oil of almonds and glycerine, and one-half of oxide of zinc, has proved very useful.—*Dublin Hospital Gazette*, May 15, 1860, p. 158.

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**On the Therapeutic Methods of Preventing Pitting of the Face in Confluent Small-Pox**—By Dr. Stokes, Dublin.—During the last five years Dr. Stokes has employed gutta percha and collodion in a considerable number of cases of confluent small-pox, for the purpose of preventing pitting of the face. In most of the cases the crust came off in large flakes or patches, composed of the dried exudations and the covering material, leaving the skin uninjured. This kind of treatment was most successful in cases of a typhoid character, but appeared to be not so well adapted to those presenting a more asthenic type. Dr. Stokes considers that the application of poultices over the face is the surest method of preventing disfigurement in small-pox. Their use should be commenced at the earliest period, and continued to an advanced stage of the disease. In most cases they may be applied over the nose, so as to cover the nostrils. This plan should fulfil three important indications of treatment—namely, to exclude air, to moderate the local irritation, and to keep the parts in a permanently moist state, so as to prevent the drying and hardening of the scabs. The best poultice is formed of linseed meal, which should be spread on a soft material; such as French wadding, and covered with gutta percha paper or oiled silk. The conclusions to which Dr. Stokes arrives are the following. 1. That the chances of marking are much greater in the asthenic or inflammatory than in the asthenic or typhoid confluent small-pox. 2. That considering the change in the character of disease observed during late years, we may explain the greater frequency of marking in former times. 3. That, in the typhoid forms of the disease the treatment of the surface by an artificial covering, such as gutta percha or glycerine, will often prove satisfactory. 4. That in the more active or non-typhoid forms the use of constant poulticing, and of every other method which will lessen local inflammation, seems to be the best mode of preventing disfigurement of the face.—*British and Foreign Medico-Chirurgical Review*.

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**Atropine.**—**Strength of Solution Used.**—When it is wished to dilate the pupil for ophthalmoscopic investigation, the strength of the solution used should not be more than one-half a grain of the sulphate to an ounce of water. This will suffice for the purpose, and the unpleasant effects of a stronger solution will be avoided.