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A TRULY VIRTUOUS WILL IS ALMOST OMNIFOTENT.

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Successful Division of the Adductor Longus Femoris Muscle, for Deformity and consequent loss of motion in the Inferior Extremity. By Paul F. Eve, M. D., Professor of Surgery in the Medical College of Georgia.

In the XI. No. of vol. II. page 671 of this Journal, the editor has been pleased to make the following remarks, concerning an operation, the result of which I now design presenting the profession—"We are happy in having it in our power to remark, that a few days previous to that on which the Gazette Medicale came to hand, which contained the following case and operation of M. Lutens, a case of similar nature was presented for the inspection of the Professor of Surgery in the Medical College of Georgia, Dr. P. F. Eve, who at once decided on an operation for extirpating the diseased and disorganized muscle, and his patient is now under preparation for the operation. The muscle affected in this case is the adductor longus femoris, causing an inconvenient and distressing adduction of the left lower extremity. The particulars of this case we hope to afford our readers in a future No. of this Journal. Dr. Eve has not yet seen the March No. of the Gazette Medicale." The operation is then...
described as performed by M. Lutens, Surgeon to the hospital at Antwerp, upon a sailor, for retraction of the leg, the notice of which in the French Journal concludes, by stating that a similar operation has subsequently been executed with success by M. Duval, of Paris.

It was in the latter part of last May (1838), that the patient upon whom I have just operated, called upon me. The Editor of the Southern Medical and Surgical Journal has correctly stated, that I had not then seen a notice of the operation of M. Lutens. This case was published in one of the March Nos. of the Gazette Medicale de Paris, which did not reach here until June, a few days after it had been decided in consultation with Professors Antony and Newton, to operate on my patient. Dr. Newton, after our meeting, addressed me a note calling my attention to the No. of the French Journal just mentioned.—This was the first intimation I had of the case of M. Lutens.

The two cases, however, differ materially. In that of M. Lutens as well in the one of M. Duval, the Stromeyrean principle, (the division of a tendon to cure deformity and consequent loss of motion) was simply acted upon; while in the case in which I operated, a muscle was divided. Again, they operated to remedy a defect of the leg; I for that of the thigh. Their operation was near the femero-tibial articulation; mine near the coxo-femoral.

The history of my patient previous to his application to me, is presented in the following letter—“From infancy to fourteen years of age, I was strong, active and remarkably healthy, and of good constitution. When fourteen, or about that period of life, I practised night-hunting to a great extent, and occasionally fishing; would sometimes lay on the wet ground, or remain on the bank of muddy creeks all night. In the month of February 1829, I felt one evening, an aching in the left side of my shin-bone, and a sharp ketch on the inside of my thigh, with acute pain whenever I moved off a high step. At night the contraction in my thigh became very violent, and the pain extended from the groin to the knee. The first two or three weeks of the attack, the suffering was so excruciating that it rendered me almost senseless. At the expiration of this time, the pain gradually moderated. I lay on my back with my legs drawn half up for four months, without my position being altered; after
which I was able to be turned on my right side with a pillow between my knees. At the end of six months the pains entirely subsided, but left me drawn up as before described. I was now lifted out of bed, and gradually improving, I ventured to use crutches. The contraction was such that for a long time I could apply only one-half of my left foot to the ground—it was about eighteen months before I walked at all without a stick.

"During the first year I was up, there came a small ulcer or sore, discharging bloody matter, just below the left buttock. I attributed it to my sitting so much.

"In the commencement of the attack, Dr. Alexander Jones, then of Lexington, Geo. was my physician. I have also applied a multiplicity of remedies to my thigh, but all to no purpose. I at length resolved to let nature take her course, and for the first five years I made considerable improvement, though it was always with great inconvenience, stiffness, soreness and pain, that I took exercise. For the last three years, I have been pretty much upon a stand; if any thing, getting worse.

"It has now been more than eight years, since this disease has been seated in my left hip or thigh, and have not been able for the time mentioned, to ride a horse half a day without great soreness and contraction of the limb affected, apparently shortened at times two or three inches. I have also not been able to walk half a mile without debility, and the least exercise would produce great suffering. I walk with my foot turned in, which increases more and more as I exercise.

Signed, ALLEN A. BEALL."

Oct. 21st, 1838.

On the 30th of May last, having procured a suitable place for my patient, I made a minute examination of his case. He had a considerable limp in walking, more especially when he commenced to walk, and invariably used a stick. He is a very muscular and robust man, aged 22. His left extremity was full one inch shorter than the other, nor when placed in the horizontal position, would traction reduce it much. Both the thigh and leg, are much smaller than the right. The foot was turned inwards, and the whole limb inclined in this direction. The foot could not be carried out farther, than about twelve inches from the median line of the body. There was a small depression and a round cicatrix near to the left ischium. In the internal and
upper third of the thigh there was a hard substance, feeling like a hempen rope situated just under the skin. It was about four inches long by one and a half broad. However relaxed the thigh might be made, this diseased mass still presented the same resisting, insensible, cartilagenous hardness. It could be isolated from the surrounding tissues, all of which appeared to be normal. It was taken for a fibrous degeneration of the adductor longus femoris muscle. The shortening of the limb was attributed to the permanent disorganization of this muscle, with the inclination of the pelvis from long habit. There was no symptom of disease in the hip-joint.

Before resorting to an operation, it was deemed prudent to place Mr. Beall upon a treatment, with the view of effecting some change, or of ascertaining something of the nature of his disease. This consisted chiefly in the use of warm bathing, heated vapour, and the most stimulating liniment, which were continued for about twenty days, without producing any appreciable benefit. Mr. B. then left for his home in the interior of Georgia, to make his arrangements for the operation which had at first been proposed to him.

He again called upon me early in October, and submitted to the operation the 9th of this month. Assisted by Professors Dugas and Newton, an incision was made, commencing at the pubis and cutting upon the internal edge of the affected muscle, and extending it about five inches, in a semi-lunar direction. The surface of the adductor longus was then exposed, and cautiously divided with the knife and a pair of scissors, about three inches below its origin from the pubis. The upper portion was found to be converted into a fibrous tissue, which slightly grated under the knife, but the portion below the section contracted, so as to separate the cut edges of the muscle about an inch. Its degeneration therefore, did not extend throughout its whole length, but the muscular tissue appeared to be healthy an inch below where it was divided in its course to be inserted into the os femoris. We removed from the upper portion a small section for a pathological specimen. Two small arteries required a ligature. The wound in the skin was closed by adhesive plaster, and a compress and roller completed the dressing. The patient was put to bed, and a two pound weight attached the next morning to the left foot, and allowed to hang out of the bed-
clothes over the back of a chair, so as to make traction in a horizontal direction.

There was no material alteration in the length of the limb until the next day, when it commenced gradually elongating, so that when dressed on the fourth day after the operation, the difference between the two lower extremities did not exceed a quarter of an inch. At the end of a week, even this difference had disappeared, and Mr. Beall commenced using the limb. His friends Dr. Wm. Butts of Warrenton, and Dr. Joel Branham of Eaton- ton, visiting him during the second week of his confinement, and did not remark any difference in the length of the two extremities. On the 15th day after the operation, my patient was out in the streets walking about, with scarcely any impediment; and on the 28th of Oct. the 19th day since the division of the muscle, he returned home on the Georgia rail road.

The left inferior extremity has not only been restored to its original length, but all its motions have been so far regained that the patient, before his departure from the city, could turn the foot and carry the leg and thigh outward to nearly the same extent and with almost as much freedom, as on the sound side; he was daily improving in these respects, and is in a fair way of realizing from the operation all the benefits that had been proposed.

Supposing the disease for which the operation was performed in this case, to have been the result of acute rheumatism, may not similar cases be relieved by surgical, in addition to medicinal treatment.
ARTICLE II.

An Essay on the relation between the Respiratory and Circulating Functions. By Charles Hooker, M.D. Read at the Annual New Haven County Meeting of the Connecticut Medical Society, April 12, 1838. Republished from the Boston Medical and Surgical Journal.

The above is the title of a pamphlet of forty-seven pages, which we have had the satisfaction of receiving from the author. We had observed the same in course of publication in the weekly numbers of the Boston Journal, but notwithstanding the great interest we felt in this hitherto too much neglected subject, we lost the value of the essay by the lapse of a week between every few pages. On reading the whole pamphlet through, at once, however, we find the subject so amply treated, and rendered so practically important, that we feel unwilling to give a mere notice, or analysis of it; we therefore present it entire to our readers, believing that our pages could not be more usefully employed. We urge on them the importance of reading the whole essay at one sitting, as we are confident no one will have occasion to regret the hour thus appropriated.

The general relation between the respiratory and circulating functions has long been known. It is unquestioned that the main office of the lungs is to effect that change in the blood which constitutes the difference between venous and arterial blood; and that the sole office of the right side of the heart is to transmit the blood to the lungs for the purpose of this change. This process has been called oxygenation, decarbonization, &c. according to different theories by which it is explained; also arterialization, a term implying no theory, but simply the fact that the blood is thus prepared for circulation through the arteries; an aeration, which simply implies that this change is effected by an exposure of the blood to air in the lungs.

RELATIVE FREQUENCY OF THE RESPIRATION AND THE PULSE.

From what is known of the philosophy of the process of aeration, it is reasonably inferred that a proper balance is required between the two functions of respiration and circulation, or, in other words, between the quantity of air respired, and that of
the blood circulating through the lungs. It might further be inferred that, in a healthy condition of the organs, a definite ratio is observable between the frequency of the respiration and of the pulse. As a general rule, this ratio may be stated as one to four and a half—that is, in a healthy, well-formed adult, when the pulse is 70 in a minute, the number of respirations is about 15 or 16; while, if the pulse is naturally more or less than 70, there is a proportionate frequency of the respiration. So, in case of general febrile excitement, if the pulse is increased in frequency, a proportionate increase of the respiration is required to preserve a due balance between the two functions. In disease, however, it is very common that this balance between the functions is not preserved, and there are many variations in the ratio between the respiration and the pulse.

The object of this essay is to trace the diagnostic, pathological and therapeutic indications of these variations.

That this subject has heretofore received little attention, is evident from the fact, that the few authors who have adverted to it, are not agreed even in regard to the natural ratio between the respiration and the pulse.

This ratio is stated by Haller to be as 1 to 3 or 4; by Dr. Graves, as 1 to 4. The number of respirations in a minute, in a healthy adult, is estimated by Magendie as 15; by Dr. Dunglison, about 18; by Sir Humphry Davy, 20 or 27; while Dr. Good, Dr. C. J. B. Williams, and most other writers, give 20 as the ordinary number. Supposing the latter to be the true number, and the pulsations, as commonly estimated, to be 70 in a minute, the ratio will be 1 to 3 1-2; while, according to the estimate of Sir Humphry Davy, the ratio is about 1 to 2 1-2.

The discrepancy of statements plainly shows, that the observations of authors on this point have been very limited. The only method which will lead to correct conclusions, a method which I have frequently practised since my attention was turned to this subject, is to count the respiration of persons who are not aware of such observation; for, as the respiration is much under the control of the will, its frequency will be varied by the operation of the mind. Hence, a conclusion drawn from observing one's own respiration would be liable to error. Perhaps diversity of climate, and national peculiarities of constitution, may occasion some variation from the ratio which I have stated; but so constant has been this ratio, of 1 to 4 1-2, according to my observation, that I have regarded any considerable variation from it as a pretty sure indication of malformation or disease. In a diagnostic and pathological point of view, therefore, I regard the comparative frequency of the respiration and the pulse as highly important.

In early infancy there is less regularity in this ratio. Owing to imperfect development of the lungs, or some other cause, it is
not uncommon that an infant, with a pulse of 120 or 130, will have 40, 50, or even 60 respirations in a minute. Generally, however, the healthy ratio becomes established in the course of the first or second year. So in adults, the respiration is rendered frequent by many circumstances which can hardly be considered as disease. Obesity, by preventing a free and large expansion of the chest, gives occasion to increased frequency of the respiration. The same effect is produced by a distension of the stomach or intestines, by pregnancy in females, and by any circumstance which prevents a free descent of the diaphragm. Any circumstance, indeed, that prevents a full quantity of air from being received into the lungs with each inspiration, necessarily calls for more frequent respiration. As a general rule, if the respiration is deficient in fullness, the deficiency is compensated for by increased frequency.

**Diagnostic Indications of a Disproportionate Frequency of the Respiration and the Pulse.**

The general diagnostic indications afforded by variations of the ratio between the respiration and the pulse, may be reduced to two heads.

1st. A disproportionate *increased* frequency of the respiration indicates,

A. Disorder of the lungs or air passages.
B. Some mechanical impediment to the motions of respiration: or,
C. Imperfect function of the organic nerves of the lungs.

2nd. A disproportionate *diminished* frequency of the respiration indicates a want of energy in the nerves which control the respiratory motions.

1st. A. *Frequent Respiration from Disorder of the Lungs or Air Passages.*

It is obvious why disease of the lungs should occasion a disproportionate increased frequency of the respiration. If by engorgement, hepatization, tubercular deposition, or other disease, a portion of lung is rendered unfit for respiration, the remaining healthy portion, having the whole office of aeration to perform, must act with increased frequency in order duly to arterialize the blood. If, for instance, only one half of the lungs is fit for respiration, the frequency must be doubled. Thus, in acute diseases of the lungs, the ratio between the respiration and the pulse may be considered as some criterion of the amount of pulmonary obstruction. In cases, however, attended with either depression or exhaustion of nervous energy, as we shall hereafter notice, this criterion must be received with some allowance.
Frequent Respiration in pneumonitis. The relative frequency of the respiration in pneumonitis is one of the most constant symptoms of the disease. As in other febrile diseases, the pulse is commonly frequent, but the increased frequency of the respiration is altogether disproportionate to that of the pulse. In cases of extensive engorgement, it is not uncommon that the respiration is 45 in a minute, when the pulse does not exceed 90; the ratio becoming as 1 to 2. In extreme cases, the respiration becomes even 60 or 70; and in children I have occasionally noticed it 140 or 150. In less degrees of engorgement, the ratio is as 1 to 3, 3 1-2 or 4.

Commonly the pain in the chest, cough, and other symptoms, sufficiently indicate the general character of the disease. In some latent cases, however, these general symptoms are wanting; and there is scarcely a single symptom indicating pulmonary disease, except the comparative frequency of the respiration.

A single case may be adduced, as an example of the importance of the ratio between the respiration and the pulse, as a diagnostic indication in such cases.

In March, 1832, I was one morning called to visit a young man, who had been attacked, the night previous, with chills, succeeded by considerable heat and febrile excitement. The skin was now cool, the tongue slightly furred—no pain or soreness in any part of the system, no disturbance of the stomach or bowels, no cough or expectoration, nor was the patient sensible of any difficulty of respiration. The pulse was 78, the respiration 30. This disparity between the pulse and the respiration was the only apparent general symptom of local disease—a symptom which probably would not have been noticed, but for my constant habit of attention to this point. The patient had not been subject to habitual shortness of breathing, and strict inquiry gained no clue to the existing disease. But the abnormal ratio between the respiration and the pulse (about 1 to 2 1-2) warranted a suspicion of disease within the chest; and, on applying auscultation and percussion, it directly appeared that the lateral and posterior portions of the right lung were extensively engorged—in short, there was a latent pneumonitis, occupying a greater part of the right lung. A large blister was applied to the affected side, and calomel, elaterium, sanguinaria, and other remedies which had proved serviceable in the pneumonitis of that season, were perseveringly administered. The disease continued day after day to run a perfectly latent course; and the nurse, a judicious elderly lady conversant with disease, was very distrustful of my diagnosis, saying that she had "always seen lung fever attended with pain in the chest, cough, difficulty of breathing and expectoration." At the commencement of the 6th day of the disease, I was called to my patient in the night. The nurse met me at the door, exclaiming, "now, doctor, I be-
lieve you—the man has lung fever.” The symptoms at this
time were a severe pain in the affected side, a laborious, rattling
respiration, and a copious bloody expectoration. The disease
was now making a crisis, and the patient gradually convalesced.
Whether this favorable result would have occurred is very
doubtful, had not the treatment been directed by an early correct
diagnosis.

We often hear of similar irregular cases of disease, which are
described as “typhoid fever,” or “general debility,” which con-
tinue for 6 or 7 days, when a “pneumonia sets in” and carries
off the patient. In such cases, attention to the comparative
frequency of the respiration and the pulse would always lead to
investigation for disease of the respiratory organs.

Frequent respiration in Phthisis. In the early stage of
phthisis, this disparity between the respiration and the pulse
may be regarded as one of the most valuable signs. It is not
uncommon, in this disease, that considerable tubercular deposit-
tion in the lungs takes place, before the occurrence of cough, ex-
pectoration, and many other of the ordinary symptoms of the
disease. Frequently, indeed, there are no prominent general
symptoms, except, perhaps, a progressive debility and emacia-
tion. With these symptoms, a disproportionate increased fre-
quency of respiration affords a strong presumption of tubercular
deposition. A simple general debility increases the frequency of
respiration; but it occasions a proportionate increased fre-
quency of the pulse—the ratio of 1 to 4.1.2 is still preserved.
Whereas, if the lungs are obstructed by tubercles, the respiration
is out of proportion to the pulse.

In this disease the abnormal ratio between the respiration and
the pulse is a more uncertain criterion of the amount of pulmo-
ary obstruction than in acute diseases; for the scrofulous affec-
tion which produces the tubercular deposition in the lungs, at
the same time impairs the processes of digestion and sanguifica-
tion—hence, the quantity of blood in the system is much less
than in health, the pulse is weak, and each contraction of the
heart sends a small quantity of blood to the lungs; the quantity
of blood to be aerated in the lungs is, therefore less than natural,
and a smaller quantity of air is required in respiration. In ad-
vanced stages of phthisis, there is so little blood in the system,
that a very small proportion of healthy lung is sufficient for its
arterialization, with only a moderate acceleration of the breath-
ing. I have examined subjects who had died of this disease, in
whom scarcely a tenth part of the lungs appeared to have been
fit for respiration; when, a few days before death, with a pulse
of 130 or 150, the respiration had not exceeded 35 or 40. Were
the lungs obstructed to this degree in acute diseases, with a full
quantity of blood in the system, an immeasurably increased fre-
quency of respiration would be required to sustain life. But in
the progress of a lingering case of phthisis, the quantity of blood in the system; the size of the aorta and other arteries, which are sometimes diminished in calibre nearly one half; and the feeble imperfect contractions of the heart, all become accommodated to the small remaining portion of healthy lungs.

I should here notice some incidental remarks in the clinical lectures of Dr. Graves, of the Meath Hospital, Dublin, which seem to be the result of imperfect observation. He remarks, "I have seen many cases of phthisis, in which there was accelerated breathing, with slow pulse, but these were always cases of a chronic kind. I have never observed the same phenomenon existing when the disease was acute; it is a state of things which is compatible only with chronicity of disease." In acute pulmonary disease, he says, when the respiration is considerably accelerated, there is "a corresponding increase in the frequency of the pulse." The very reverse of this is true. Certainly nothing is more common, in the early stage of acute pneumonitis, than to have the respiration 30, 40, or even 60 in a minute, when the pulse does not exceed 90. In acute oedematous inflammation of the lungs, I have often, within a few hours from the first attack, observed the respiration 70 or 80 in a minute—a mere panting—when the pulse scarcely exceeded its natural frequency. And in the early stage of phthisis, with a comparatively moderate tubercular obstruction of the lungs, I have commonly observed the disparity between the frequency of the respiration and the pulse greater than in the more advanced stages.

The observations and judgment of Dr. Graves are justly considered as high authority; but he has evidently given little attention to this subject; and he properly remarks, "I do not know any point on which accurate observations are more wanting than on the proportion between the pulse and respiration in various states of the system, and in various diseases. Facts upon this subject might be easily collected, and would probably lead to curious and instructive results.

Frequent respiration in oedema of the lungs. This disease is a very common cause of frequent respiration. Though the disease was noticed by Hippocrates, and has been more particularly described by Van Swieten, Darwin, Maclean, and others, most recent writers appear not to be aware of its common occurrence. Dr. Good barely notices it, as if doubting its occurrence. In treating of other dropsical affections within the chest, he says, "Mater is, perhaps, sometimes effused into the cellular texture of the lungs." Laennec says it is "rarely a primary and idiopathic disease. It comes on most commonly, with other dropsical affections in cachectic subjects, towards the fatal termination of long continued fevers, or organic affections, especially those of the heart."
It appears to me that the question, in regard to this affection, is to be resolved into the general one, whether any dropsy is a primary and idiopathic disease. I am certain that no part of the system is so commonly the seat of dropsy as the lungs; and, in general anasarca, it is commonly in the lungs that the disease is first manifested. Even those authors who appear to doubt the existence of such an affection as idiopathic oedema of the lungs, generally mention disordered respiration as a symptom of general anasarca.

There are many cases which appear to be intermediate between a proper inflammation and an acute dropsy of the lungs—cases which might be termed oedematous inflammation. Such cases certainly have claim to the character of a primary and idiopathic disease. Of this character was the prevailing affection of the lungs in the epidemic influenza in New Haven, in the winter of 1831-32. In many cases of that disease, extreme frequency of the respiration, as compared with the pulse, constituted almost the only symptom of thoracic affection.

In cases of chlorosis, in most of the chronic disorders of menstruation, in general debility, and in cachectic diseases generally, swelling of the ankles and other symptoms of general anasarca commonly occur. In almost all such cases I have found oedema in the lungs, before its manifestation in other parts of the system; and frequently the lungs are the only part in which it is to be observed. The affection can hardly fail to be injurious, by obstructing the lungs and interfering with a due aeration of the blood, and it is therefore very important to detect it in its early stages. Attention to the relative frequency of the respiration will afford suspicion of the disease; and a slight dullness observed on percussing the posterior portions of the chest after the patient has been lying on the back, or the same observed about the inferior lobes of the lungs after sitting or standing, with a dull respiratory sound corresponding to the dullness of percussion, will render the diagnosis almost certain. If the serum infiltrates into the air cells and the minute bronchia, as frequently occurs, especially when the affection has any thing of an inflammatory character, the stethoscope detects a sound like that produced by squeezing a wet sponge, by wringing wet clothes, or by the effervescence of fermenting liquors—a feebler and finer sound than the crepitation characteristic of proper inflammation.

Frequent respiration in various disorders of the lungs and air passages. Besides the diseases already mentioned, any affection of the lungs, which prevents a portion of them from being freely permeated with air, necessarily occasions frequent respiration. Atrophy or emphysema of the lungs, congenital imperfection of the organs, solidification or any other lesion consequent to former disease, or pulmonary apoplexy, may produce this effect. A like effect is produced by disorders of the bronchia or bronchial
membrane, as mucous or other obstructions within the bronchial
impeiding the passage of air, or any affection of the bronchial
membrane preventing a communication between the air and the
blood within the lungs.

B. Frequent Respiration from some Mechanical Impediment
to the Motions of Respiration.

Any disorder within the chest, exterior to the lungs, which
affords a mechanical impediment to the expansion of the lungs,
necessarily causes frequent respiration, as hydrothorax, pleuritic
effusion, effusion into the pericardium, enlargement of the heart,
anerism of the aorta, or any tumour within the chest. The
same effect is produced by ascites, flatulent distension of the
stomach or intestines, or fullness of the abdomen from any other
cause, operating to prevent a free descent of the diaphragm;
hence a full meal occasions some acceleration of the breathing.
Frequent respiration is caused also by any circumstance which
renders a full inspiration painful, as rheumatism, or any inflam-
mation of the intercostal or other muscles of respiration; or a
like affection of the pleura, pericardium, heart, or any of the
abdominal viscera. In peritoneal inflammation, the soreness
and tumefaction of the abdomen render the respiration extremely
short and frequent. Sometimes a debility of the respiratory
muscles occasions the motions of respiration to be feeble, short,
and frequent.

C. Frequent Respiration from Imperfect Function of the Or-
ganic Nerves of the Lungs.

In the function of respiration two important classes of nerves
are chiefly concerned.

The motions of respiration are effected by that class which
Sir Charles Bell terms the respiratory system of nerves. These
nerves arise from the lateral portions of the medulla oblongata
and upper part of the spinal cord. The functions of these nerves
and, of course, the motions of respiration, are performed without
the aid of the will; but, by means of voluntary nerves distributed
to the respiratory muscles, the will acquires some control over
these motions.

The branches distributed to the lungs from the great sympa-
thetic nerve, termed also the ganglionic, or organic system of
nerves, are more immediately concerned in effecting the aeration
of blood. A full quantity of air in the lungs is inadequate to
effect this change, without the influence of these branches of
nerves. The motions of respiration therefore, may be continu-
ed, through the influence of the former class of nerves, but if
the organic or arterializing nerves cease to perform their office,
the venous blood is returned unchanged, to the left side of the
heart, and thence transmitted to the system through the arteries.
So if the function of these nerves is imperfect, the blood is in the same degree imperfectly arterialized.

These considerations explain reasonably how imperfect function of the organic nerves of the lungs occasions a relative frequency of respiration. Like organic disorder of the lungs, and the mechanical impediments to respiration, which have been adverted to, this nervous lesion operates to diminish the arterializing efficacy of each inspiration; and, consequently, a greater number of respiration is required.

The lesion of function of the organic respiratory nerves is considered, in this place, only as one of the causes of frequent respiration: the pathological effects of this lesion, in preventing a due arterialization of the blood, will be considered under our second general head; in connection with the subject of imperfect function of the motor respiratory nerves.

**General diagnostic indication of increased frequency of respiration.**

From the preceding considerations it may be inferred, that a disproportionate increased frequency of respiration does not indicate the particular disease which impedes the respiratory function. The impediment may be some disorder of the lungs or air passages, or some mechanical impediment to the motions of respiration, or an imperfect function of the organic nerves of the lungs. The frequency of breathing only affords the general indication, that there is some impediment to the respiration, the particular cause of which is to be investigated by attention to the symptoms, and by auscultation, percussion, and other means of exploration. Attention to this general indication will, in many cases, enable the practitioner to adapt his remedies successfully to local diseases, which otherwise might altogether elude observation, and lead to serious and even fatal results.

2d. *A disproportionate diminished frequency of the respiration indicates a want of energy in the nerves which control the respiratory motions.*

A lesion of function in either of the two classes of nerves principally concerned in respiration, occasions a disparity between the respiratory and circulating functions, and causes imperfect aeration of the blood. Imperfect function of the motor respiratory nerves produces this effect, by causing a disproportion between the quantity of air respired, and that of the blood circulating through the lungs. Imperfect function of the organic or arterializing nerves produces the same general result, by impairing the influence of the respired air on the blood. In the former case the quantity, in the latter the effect, of the respired air is diminished. As the pathological effects are in general...
same, it is proper to consider in connection, A. Imperfect aeration of the blood from disordered function of the motor respiratory nerves; and, B. Imperfect aeration of the blood from disordered function of the organic respiratory nerves.

**GENERAL PATHOLOGICAL EFFECTS OF IMPERFECT AERATION OF THE BLOOD.**

The celebrated French physiologist, Bichat, was the first who drew the attention of physicians to any satisfactory knowledge of the pathological effects of imperfect arterialization of the blood. He found, by experiments, that if a current of venous blood is turned into the carotid arteries, it produces torpor of the brain. A moderate quantity of black blood thus transmitted to the brain, produces a degree of stupor and drowsiness. A large quantity produces loss of sensation and voluntary motion, and occasions coma and death. By turning, in the same manner, a current of venous blood into the main artery supplying one of the limbs, he found it to occasion a numbness and paralysis of the limb. In short, if venous blood is made to circulate through any artery of the system, it occasions a torpor of the part supplied by such artery. If the function of the lungs ceases, while the heart continues to act, the blood not arterialized circulates through the whole system, occasioning a general torpor, paralysis and death.

The effects caused by a cessation of the respiratory function, are termed *asphyxia*. The general phenomena of asphyxia produced by a sudden cessation of the respiratory function, as in hanging, drowning, &c., are well known—the heart continues to act, sending the black blood into the arteries which naturally circulate red blood; the skin and all parts of the system assume a livid color; consciousness, sensation and voluntary motion are suspended; and, with the cessation of the heart's action, death ensues. Similar phenomena occur in most diseases at the close of life; and, in the opinion of Bichat, asphyxia is by far the most common immediate cause of death. "Whatever may be the seat of the principal disease," he says, "whether it be an organic defect, or a general injury of the functions, as fever, &c. almost always, in the last moments of existence, the lungs are embarrassed; the respiration becomes painful; the air is taken in and expelled with difficulty; the coloration of the blood is hardly carried on; it passes nearly black into the arteries. The organs, already debilitated by disease, receive much more easily in that state the fatal influence of the contact of this blood, than in asphyxia where they are unaffected. The loss of sensations and of intellectual functions, and very soon that of voluntary motions, succeed the embarrassed state of the lungs. The man has no longer any connection with surrounding objects; his
whole animal life is interrupted, because the brain, which, as it is known, governs this life, penetrated with black blood, ceases its functions. By degrees the heart, and all the organs of internal life, imbibing this blood, cease their motions also. In this case it is the black blood which altogether stops the vital motions already enfeebled by the disease. It is in general very rare that debility produced by disease brings on death in an immediate manner; it paves the way to it, and renders the organs susceptible of being influenced by the smallest change in the red blood. But it is almost always this change which puts an end to life. The cause of the disease is therefore only an indirect cause of general death; it occasions that of the lungs, which latter brings on that of all the organs."—(Treatise on life and Death.)

These views of Bichat, in regard to the deadening influence of the black blood on those parts of the system which are naturally supplied with red blood, are now commonly received by pathologists. Perhaps this influence is not so generally the immediate cause of death, as this author supposed; but it is probably true, that death is most commonly produced in this way. Since the publication of Bichat, the subject of this influence has received considerable attention, particularly as an immediate precursor and cause of death; while but little attention has been given to a less degree of the same influence observable in the progress of many diseases. Throughout the progress of some diseases, particularly fevers of a typhous character, this relation between the respiration and circulation appears to have a most important influence, a correct understanding of which, it is believed, will lead to many important therapeutic indications.

A. Imperfect Aeration of the Blood from Disordered Function of the Motor Respiratory Nerves.

A lesion of function of the respiratory system of nerves impairs the motions of respiration, causing the respiration to be infrequent and small; and in consequence, less than a natural quantity of air is respired. In this condition of the respiration, if the circulation continues strong, a disparity between these two functions occurs; the air respired is insufficient duly to aerate the blood in the lungs; and consequently the blood passes into the system imperfectly arterialized.

The deleterious effects of such impaired function of the respiratory nerves may be estimated from a consideration of the well known deadening influence of the black blood in extreme cases of asphyxia. The imperfectly arterialized blood, though still retaining enough of its arterial character to sustain life, occasions a degree of torpor in the brain and all parts of the system supplied by the arteries. Sensation, consciousness, voluntary motion—all the cerebral functions—become impaired. The
capillary vessels, partially paralyzed, become distended and engorged with dark colored blood; the lips and finger nails have a livid tinge, a livid paleness pervades the whole surface, and the florid hue of health is nowhere seen. Secretion and absorption become affected; passive engorgements take place in various parts; indeed, a torpor produced by the deadening influence of the imperfectly arterialized blood pervades the whole system. The respiratory nerves, in common with other parts of the system, become affected with this torpor, which, by rendering the respiratory motions more languid, tends still further to impair the arterialization of the blood, which again reacts on the respiratory nerves. As the degree of this influence increases, the cerebral functions become more oppressed, and symptoms of approaching dissolution appear, such as subsultus tendinum, coma, colliquative discharges, and frequently tympanitic distension of the abdomen.

Typhous fever. Something of the train of symptoms above described ordinarily occurs in typhous fever, and in other diseases of a typhoid character. The lesion of nervous function in the brain, which is a prominent characteristic of typhoid diseases, almost always extends to the respiratory system of nerves, occasioning a disparity between the respiration and the circulation. While the healthy ratio between the respiration and the pulse is 1 to 4 1-2, in typhous fever it is commonly 1 to 5 or 6, and in many cases 1 to 7 or 8. The respiration, though often more frequent than in health, is not proportionate to the increased frequency of the pulse; and if the pulse is less frequent than natural, as sometimes occurs, there is more than a proportionate infrequency of the respiration. In most cases this relative infrequency of the respiration continues through the whole course of the disease, and during the last seven years I have never seen a case of simple typhus in which it was not remarkable in some stage of the fever.

It is true, that in this disease the heart partakes of the attending general debility, and in consequence, its action being feeble, less blood is thrown to the lungs by each contraction; from which it might seem that, notwithstanding the relative infrequency of respiration, the blood may be sufficiently arterialized. On the contrary, however, it may be observed, that the respiratory muscles also partake of this general debility, and in consequence the respiration is feeble and small. In general, I think the smallness of the respiration is more than proportionate to that of the pulse, so that the deficiency of arterialization is even greater than is indicated simply by the infrequency of respiration.

That the blood is imperfectly arterialized in typhus, is sufficiently evident from the symptoms of the disease. Dr. Armstrong, in giving the distinguishing signs of common continued
fever and typhus, says, "that "In the common continued fever, the patient commonly has not much inaptitude of mind, often answers questions readily, and in a pretty firm voice, without much increased agitation of the breathing; whereas in typhus the answers are mostly given with languid slowness and reluctance, and much speaking obviously disturbs the respiration. In the common continued fever the skin is generally of a brighter red than natural, especially on the cheeks; on the contrary, the skin is always more or less of a dusky color in typhus, and an admixture of it may be best observed in the flush of the face. This duskiness of the skin is one of the proper symptoms of typhus, and seems to arise from some change in the constitution of the blood, which I have almost invariably seen darker on dissection than in ordinary fevers. In the worst cases, this duskiness increases in the progress of the disease, and lessens in those that assume a mild aspect. So very characteristic is this cutaneous duskiness, that I think I could distinguish typhus by it at any time, if two patients were presented to me, the one laboring under that disease and the other under the common continued fever."—(On Fever, p. 235.)

In another part of his treatise, (p. 410), Dr. Armstrong observes, "The blood is always blacker in typhus than natural. In severe cases it is remarkably so where the excitement is fully emerged, and at last the solids are most decidedly affected, as any one may perceive who marks the dark hue of the muscles on dissection. This state of the blood in typhus, if I mistake not, is connected with that peculiar depression of strength, and with the peculiar condition of the sensorium, which attend the rise and progress of this disease. . . . . But," continues Dr. Armstrong, "the nature of this change in the blood, I do not pretend to determine, and only meant to point to it as an object worthy of far more attention than it has yet received."

Dr. Southwood Smith says, "The skin is always of a darker color than in synochus; the whole surface is of a dull and dusky tinge."—(On Fever, p. 166)

The dark color of the blood in typhus is noticed by other authors, as of common occurrence. That it "is always blacker than natural," as asserted by Dr. Armstrong, is questionable. Though I have always observed, in some stages of the fever, a relative infrequency of respiration, with the dark colored blood, and other symptoms necessarily attending this imperfect respiration; yet I have noticed, in the commencement or progress of some cases, an occasional acceleration of the breathing, continuing for several hours or even days, during which the cheeks assumed a florid color, and there was every indication of perfect aeration of the blood. Sometimes there is even a morbid frequency of respiration apparently depending upon irritation of the respiratory nerves, during which the skin is uncommonly
florid, and there is morbid wakefulness and sometimes a phren- 
zied delirium. Such a state, however, is ordinarily of short 
continuance, and is succeeded by infrequent respiration, lividity 
of skin, a low delirium, subsultus tendinum, and coma—the irrit-
tative excitement being succeeded by a morbid depression of 
nervous energy.

No inconsiderable part of the symptoms occurring in typhus, 
it is believed, may be attributed to the imperfect respiration 
which we are considering. The "sensorial debility and disturb-
ance of the mental powers," which are prominent characteristics 
of typhus, may be produced by any impediment to the respira-
tion, preventing a proper aeration of the blood. But it is not to 
be supposed that this imperfect respiration is ordinarilv the first 
link in the chain of disease in typhus. It is preceded and caused, 
in most cases, by a torpor of the respiratory system of nerves, 
which appears obviously connected with a general depression of 
nervous energy throughout the system. In such cases, however, 
the imperfect respiration cannot fail to add to the general nerv-
ous torpor, through the paralyzing influence of the black blood; 
and in cases of disease commencing in the lungs, a similar torpor 
of the nervous system is a consequent result.

I have adverted particularly to typhous fever, as a disease in 
which this deficient arterialization of the blood is ordinarily 
prominent throughout its progress. In this disease there is 
hardly a point requiring more careful observation for prognostic 
and therapeutc indications. A remarkable relative infrequency 
of respiration, in the early stage of the disease, indicates an 
 alarming prognosis. If in this stage the respiration and pulse 
are as 1 to 7 or 8, it is almost certain that its course will be of a 
low typhoid character. Vertigo, tinnitus aurium, subsultus, a 
muttering delirium, and coma, are almost sure to succeed. If 
such infrequency of respiration occurs in any stage of the disease, 
it may be considered as the precursor of a similar train of symp-
toms. Those symptoms which are commonly attributed to 
"determination to the brain" or "congestion in the brain," are 
associated with, and in a great measure depending upon, this 
imperfect respiration.

Congestive typhus. In that form of disease which is treated 
of by Armstrong and others as congestive typhus, this deficiency 
of respiration appears to be a prominent cause of the peculiari-
ties characterizing this form of fever.

This variety of typhus is commonly ushered in with chills, 
vertigo, drowsiness, and extreme general prostration; the 
breathing is infrequent, irregular and sighing, or in some cases 
frequent, but short, feeble and inefficient; the skin pale and 
somewhat livid; the heat of surface unequally diffused; the 
pulse rather frequent and irregular, or in some cases very infre-
quent and oppressed; sensation and voluntary motion are sud-
denly impaired; and subsultus, muttering delirium, and coma soon supervene. In rapid cases the disease has a near resemblance to apoplexy. On dissection, the blood is found accumulated in the veins and the right side of the heart; the arteries, brain, muscles, and all parts of the system, are dark colored from the black blood contained in them; and the blood either remains liquid, or coagulates very imperfectly.

Dr. Southwood Smith, in describing this form of typhus, says, the patient "lies insensible, with a cold and dusky skin; with a swollen and livid countenance; with a heavy and oppressed respiration; with a pulse perhaps not to be felt, or, if distinguishable, either so rapid that it cannot be counted, so small that it is like a thread beneath the finger, and so weak that it is lost by the slightest pressure, or else slow, irregular, and intermittent. In this state the patient is almost as completely paralyzed as in apoplexy, and the attack is almost as rapidly fatal as apoplexy."

(Treatise on Fever, p. 175.)

The symptoms and post-obit appearances certainly are the same as those attending asphyxia produced by inhaling certain noxious gases, by mechanical obstruction of the lungs, and by a division of the respiratory nerves; and a careful consideration of the phenomena, I think, must lead to the conclusion that imperfect respiration is a most prominent feature of the disease. These circumstances surely demand a most careful attention to the disparity between the respiration and the pulse, which attends this form of disease.

Not only in typhus, but in all diseases, when the relative frequency of the respiration is less than in the proportion of 1 to 4 1-2, it is a sure indication of deficient aeration of the blood, unless, as in some rare cases, there is some disproportionate debility of the heart, occasioning frequent, feeble, and ineffectual contractions of that organ.

But there is, in many cases, deficient aeration, when the ratio between the frequency of the respiration and pulse is normal; and even when there is a comparative increased frequency of respiration. Typhous fever may be complicated with some affection of the bronchial membrane, preventing a free communication between the respired air and the blood within the lungs; or with some affection of the lungs or pleura, preventing a full expansion of the lungs; or with tympanitic distension of the abdomen (a common symptom in typhous and typhoid fevers), preventing a free descent of the diaphragm; or with other circumstances before adverted to as occasioning a mechanical impediment to the respiratory motions. Sometimes, also, in connection with the general debility attending typhoid diseases, there is a disproportionate debility of the respiratory muscles, causing the motions of respiration to be small, feeble, and inefficient. In all such cases the blood will be imperfectly aerated,
unless the relative frequency of respiration is more than natural; as the deficient fullness of respiration ought to be compensated for by increased frequency. If the cause of this impeded respiration is manifest, it will of course be considered in counting the respiration and pulse; but if the impediment is latent, the relative frequency alone might lead to an erroneous conclusion. The degree of fullness of respiration is to be considered in connection with the frequency. Commonly, however, the imperfect aeration is sufficiently evident from the livid tinge of skin, the drowsiness, listlessness, and other symptoms which it produces.

Pneumonitis. In this disease, especially when of a typhoid character, the symptoms of imperfect aeration of the blood are always evident. In almost all cases the frequency of respiration is considerably increased. In a moderately severe case, with a pulse at 90, the respiration will be as frequent as 30 in a minute—that is, in a ratio of 1 to 3; and when the lungs are extensively engorged, the ratio is often as 1 to 2. In one sense a very frequent respiration in this disease is a bad symptom, as it indicates extensive engorgement; but while the engorgement continues, this frequent respiration is favorable, and indeed absolutely necessary to sustain life. It is desirable that the increased frequency should compensate for the pulmonary obstruction; but it is rarely fully sufficient for this purpose. The "tumid, purple face or lips," constituting a part of the definition of pneumonitis in Good and other authors, indicate that, notwithstanding the increased frequency of respiration, still the blood is imperfectly arterialized. A further increased frequency is desirable, provided there is not a corresponding increase of the pulmonary obstruction; if this obstruction is diminished, a proportionate diminished frequency of respiration is not unfavorable; but if the respiration suddenly becomes less frequent, while auscultation and percussion detect no abatement of the obstruction within the lungs, the symptom is alarming. It indicates that the nerves of respiration are losing their energy, and that imperfect aeration of the blood, with its consequences, muttering delirium, coma—in short, a fatal asphyxia—will ensue. The more typhoid is the character of the pneumonia, the greater is the danger of this failure of respiration. Indeed, in all typhous and typhoid diseases, a torpor of the respiratory nerves is to be apprehended as a common source of danger.

Typhous fever, complicated with pneumonitis, is a disease in which the effects of imperfect aeration of the blood are remarkably prominent. Dr. Southwood Smith, in treating of "typhus mitior with thoracic affection," very well describes the ordinary phenomena of this disease. "Prominent thoracic affection, as we have seen," he remarks, "is not infrequent in synochus; in typhus it is more constant; and the signs which denote its existence are more obvious, but they are not precisely the same.
The pain in the chest is less severe; it is more often absent altogether; while the sense of stricture and the dyspnœa are more urgent. The cough is more constantly attended with mucous rattle; the respiration is shorter and more hurried. The skin in general is cooler, and it is always more dusky. The dark color of the skin, in severe cases becoming quite livid, is one of the most characteristic marks of intense thoracic affection. The color of the cheek is at first of a deep and vivid red; as the disease advances it becomes of a purple tinge, and at length it is quite livid. In these cases it is not uncommon for the respiration to be from forty to fifty in a minute. The pulse is invariably rapid and weak.* The cerebral affection is equally peculiar and characteristic; it never consists of intense excitement; it is never accompanied with violent delirium; it is indicated by confusion and stupor passing rapidly into coma; and it is attended with low muttering incoherence or disjointed rambling, the trains of ideas that pass through the mind being extremely faint, and linked together by no distinguishable affinity. We know that one of the most essential conditions to the due exercise of the sensorial faculties is the due supply of the brain with arterial blood; but in this state of the system arterial blood does not and cannot circulate through the brain, because it is not formed in the lungs: the patient is in a state approaching to asphyxia, and in very severe cases he remains for several days in as perfect a state of asphyxia as seems to be compatible with life. Why debility should, in these cases, be carried to the utmost possible extent; why such cases should form the most exquisite specimens of the adynamic state, need not be pointed out: the disease is concentrated in the very organ which elaborates the pabulum of life, and that stream which should convey its vivifying and animating influence to every nook and point of the system, is corrupted at its source.”—(Treatise on Fever, p. 169.)

With this clue to the prostrating influence of the black blood on the system, it is remarkable that Dr. Smith appears to have drawn no practical inference from it, even in the thoracic cases under consideration; and it is scarcely less remarkable that he should not have traced the effects of this influence in the other forms of typhus, and in other fevers. These effects of imperfect aeration of the blood are almost equally observable in the “typhus mitior with cerebral affection,” and other forms of ever described by this author, and especially in typhus gravior.

The author also omits to mention the important fact that pneumonia, when occurring with typhus, is ordinarily of a latent character. Sometimes it manifests the thoracic symptoms

*The oppressed pulse, which is common in this disease, is not “invariably rapid and weak,” but sometimes infrequent, irregular and intermitting.
which he has described; but more commonly not only the pain in the chest is "absent altogether," but no "sense of stricture" is complained of, there is no cough or expectoration, and, unless in the advanced stages, there is no "mucous rattle."

Another important omission in the detail of symptoms might seem remarkable, were it not common to most authors; in the description of one hundred and fifteen cases of fever, the number of respirations in a minute is stated in only two or three cases. That almost all authors neglect this point, while variations in the frequency of the pulse are carefully and minutely detailed, is sufficient evidence that the importance of the relative frequency of the respiration and the pulse has been most unaccountably overlooked.

Delirium tremens. In this disease, according to my observations, there is always this imperfect respiration. Ordinarily there is a remarkable relative infrequency of respiration, even when the disease is complicated with affection of the lungs. Authors generally appear not to be aware how commonly this disease is thus complicated. In May, 1832, I lost a patient with delirium tremens, who had manifested few symptoms of pulmonary affection; but after death the lungs were found very extensively engorged. The case induced me to examine particularly for latent affection of the kind in all cases of this disease. Since that time, now six years, I have attended more than 60 cases, and have been surprised to find in every case decided indications of pulmonary engorgement. In most cases there is, in the early stage, a distinct crepitation, such as ordinarily attends pneumonitis; in other cases the sound is such as indicates edematous engorgement, resembling the sound produced by squeezing a wet sponge, by wringing wet clothes, or by the effervescence of fermenting liquors. The engorgement appears to be of a passive kind, being manifested in the most depending portions of the lungs—about the posterior portions, if the patient has been lying on the back; or in the inferior lobes, if he has been long in an erect posture. I am inclined to believe that this engorgement, which prevails through the whole course of the disease, has commonly been mistaken, in post-obit examinations, for that passive accumulation in the back of the lungs which takes place in most diseases in the last moments of life, or after death. Since turning my attention to this point, my experience has co-incided with that of the late Dr. David Hosack, of New York, who stated in his lectures, that he had always found delirium tremens complicated with pulmonary disease.

As before remarked, the respiration is ordinarily infrequent. The ratio between the respiration and the pulse is sometimes 1 to 6 or 7, even when there is considerable pulmonary engorgement. This condition of the respiration accounts for the livid skin, and may be a principal cause of the cerebral perturbation and the trembling which characterize this disease.
Night-mare (Ephialtes nocturnus, Good) is unquestionably owing to imperfect respiration. This disease is described by Dr. Good, as "produced during sleep, and interrupting it with violent struggle and tremor: the pressure on the chest seeming to be that of some hideous monster or phantom." The respiration is remarkably infrequent, irregular, and interrupted; and commonly attended with a noise indicative of anxiety and distress. The mental hallucination is sometimes an apprehension of being crushed by some heavy weight, or of being violently grasped by some hideous animal, or of being smothered under a bed, or of being tightly bound or closely confined. In general, the hallucination is such as appears to have its origin in some interruption of the respiratory motions; and it is quickly dispelled by awaking, or by an external impression which excites the motions of respiration. It occurs during sleep, when respiration is deprived of the aid of the will; and is in many cases produced by a full meal taken at bed-time, which operates, in part at least, to impede the motions of the diaphragm. It most commonly occurs when a person is lying on the back, probably because in this position the weight of the lungs presses on the ganglia and trunks of the organic nerves, and the abdominal viscera crowd against the diaphragm, more than in other postures of the body.

B. Imperfect Aeration of the Blood from Disordered Function of the Organic Respiratory Nerves.

The aeration of the blood is immediately dependent upon the nerves distributed to the lungs from the sympathetic, ganglionic or organic system. The lungs may be sound and duly filled with air, but still the function of aeration is not performed without the aid of these nerves. A lesion of their function suspends the process of arterialization, notwithstanding the motions of respiration are continued, through the influence of the respiratory nerves.

Some degree of the imperfect action of these nerves is very common in typhous and typhoid fevers, and other diseases, and especially in erysipelas, scarlet fever, malignant cholera, and some forms of dyspnœa and asthma. It causes the respiration to be frequent, irregular, sighing, and anxious. The patient, while possessed of consciousness, feels the unsatisfying effect of respiration, and often says that his breathing seems to do little good. All the voluntary muscles accessory to respiration are instinctively called into occasional vigorous action; but even after several successive full inspirations, a conscious want of further respiration remains. If this kind of breathing continues, in any aggravated degree, for a considerable length of time, it ordinarily becomes complicated with a torpor of the brain and respiratory nerves, and the patient sinks into a state of asphyxia.
This appears to be the most common fatal termination of scarlet fever, erysipelas and other similar diseases.

It is a fortunate provision of nature, that there is an intimate connection between this set of nerves, and the nerves governing the action of the heart: in consequence of which there is ordinarily a relative proportion between the function of arterialization and the motions of the heart. If torpor affects the arterializing nerves of the lungs, it ordinarily affects, at the same time, the nerves of the heart. Hence, while the arterializing function is impaired, the heart sends a moderate quantity of blood to the lungs to be arterialized, the pulse becoming slow and infrequent, or frequent, small and feeble. In the course of typhus, and other fevers, the pulse sometimes becomes extremely infrequent — 50, 40, and even 30 in the minute: in some cases this state of the pulse occurs at the onset of the fever.

This infrequent pulse may attend a torpor either of the motor respiratory nerves, or of the organic nerves of the lungs. In the former case, the breathing is infrequent, slow and small; the skin livid; and there is listlessness or tendency to coma. When the arterializing nerves are in fault, the skin is livid; but the breathing is full, hurried, irregular, sighing and anxious; and there is wakefulness, extreme mental anxiety, and sometimes delirium, succeeded by coma.

Cholera. These circumstances are strikingly manifest in malignant cholera. In that disease the morbific cause seems to determine especially to the organic system of nerves. In some cases the process of arterialization seems at once almost wholly suspended—the peculiar sighing moan, and other symptoms of disordered respiration are observed, and the whole system assumes a livid hue. At the same time the pulse, at first feeble, soon ceases to beat. So far as the influence of the organic nerves extends, life is suspended; while the energy of the brain and medulla oblongata, at least in some degree, remains. Consciousness, volition and respiratory motion continue; but the arterializing function of the lungs and the motion of the heart have ceased. In this state I have seen a patient lie, perfectly pulseless, for more than eight hours, when the functions of organic life gradually revived, and the patient recovered.

Most physicians, like myself, from mistaken views of the pathology of this disease, treated their first cases by attempting to arouse the action of the heart with opium, alcohol and other stimulants. This attempt, in some cases, was too effectual. The heart being excited to action, the blood is thrown to the lungs, from which it returns not arterialized to the heart; the left ventricle now contracts, and sends the black blood, with its usual deadening influence, to the brain and whole system supplied by the arteries; insensibility and coma ensue, and the patient dies asphyxied. Life may continue some time with a
total stoppage of the circulation; but it is soon extinguished by a circulation of black blood in the arteries.

The asthma with puerile respiration described by Laennec, affords an example of this imperfect arterialization from disordered function of the organic nerves. "In cases of this kind," says Laennec, "the respiratory sound has resumed all the intensity which it possessed in early infancy; we perceive distinctly the pulmonary expansion taking place with uniformity, completeness, and puerile promptitude, in all the air cells: and yet the patient is oppressed in his breathing, or, in other words, he constantly feels the want of a still more extensive respiration than he enjoys. The lungs, dilated as they are in an extraordinary manner for an adult, nevertheless have not capacity enough to satisfy the wants of the system. This affection is sufficiently common in persons affected with chronic mucous catarrhs, attended by a copious and easy expectoration. In such cases, the dyspnœa is frequently very intense, and is sometimes so aggravated by the slightest motion, that the patient, though otherwise in pretty good health, is condemned to a life of inactivity, or even to an almost complete state of immobility. Attacks of asthma, however, properly so called, are less frequent in such subjects, than in those affected with the dry catarrh. In these latter cases, the imperfection and small extent of the respiration easily account for the oppressed breathing. But in the others, even during the severest attacks, the completeness with which the respiration is performed is quite astonishing; the sound of it is quite puerile; and, as in the case of a strong and healthy child, we are sensible of the dilatation of the pulmonary cells to their full capacity, and over the whole extent of the chest. Nevertheless, the patient is oppressed, and, as I have already stated, would require a more extensive respiration than his organization allows; in other words, the respiration is very perfect, but the wants of the system in relation to it are increased beyond the standard of health. In such cases it is not in the lungs that we must look for the cause of the disease, but in the innervation or nervous influence itself; and this will hold equally good, even if we adopt the chemical theory of respiration, and refer the dyspnœa to an extraordinary want of oxygen in the blood. If a temporary obstruction of the bronchia by a little mucus impedes the transmission of the air to even a small portion of the lungs, the patient experiences an extreme oppression."—(Forbes' Laennec, p. 512.)

SYMPATHY BETWEEN THE DIFFERENT NERVES CONCERNED IN RESPIRATION.

Such is the sympathy between the different nerves concerned in respiration, that there is rarely disordered function in one class
of nerves, without some degree of similar disorder in the other class. In the disease, which have been adverted to, as examples of the disordered function of each class of nerves, commonly all of the nerves concerned in respiration are, in some degree, similarly affected. In typhous fever, for instance, the torpor of the motor respiratory nerves is commonly the most prominent, but there is ordinarily also some degree of torpor in the organic nerves; and in many cases it is not easy to decide whether one or the other class is the more affected. If disease commences with torpor of the organic nerves, the consequent imperfect aeration of the blood ordinarily soon occasions torpor of the motor nerves, by the paralyzing influence of the black blood.

Many diseases, besides those already adverted to, are commonly attended with deficient aeration of the blood. Dr. Stevens, for many years a distinguished practitioner in the West Indies, has particularly noticed the dark color of the blood in yellow fever, and some other diseases of tropical climates. Dr. Daniell has made similar observations in the autumnal fevers of Savannah. In dyspepsia, hypochondria, and some forms of mania, it may ordinarily be observed. From obvious causes it occurs in croup, and other diseases in which there is obstruction of the air passages. All fevers of a typhoid character are commonly attended with this condition of the blood; and indeed there are few diseases in which it may not occasionally occur.

From the preceding considerations it may be observed, that imperfect aeration of the blood is occasioned by various causes. Attentive observation of the symptoms in particular cases is requisite to ascertain whether there is any mechanical impediment to the expansions of the chest, or whether the fault is in the air passages, the lungs, the motor respiratory nerves, the respiratory muscles, or the organic nerves of respiration. A correct diagnosis in regard to these circumstances is highly important in a therapeutic point of view.

THERAPEUTIC INDICATIONS.

It is doubtful whether, in any disease, an excessively aerated condition of the blood is a prominent morbid feature. I suspect that such a condition sometimes occurs, dependent upon irritative excitation of the organic nerves, in erysipelas, scarlet fever, and some other diseases; but, if so, this state ordinarily is soon followed by collapse, with imperfect arterialization. On the contrary, there are few diseases in which deficient arterialization does not sometimes occur. Bichat considered it as by far the most common immediate precursor and cause of death, and I think it has been rendered evident, in the preceding part of this essay, that such a condition of the blood has some degree of injurious influence, in various stages, and sometimes throughout the progress, of many diseases.
The general therapeutic indication, therefore, connected with the relation between the respiratory and circulating functions, is to promote the arterialization of the blood, or, in other words, to remedy deficient respiration.

Contra-indications in cases of deficient respiration.

Stimulants, which ordinarily operate to increase the action of the heart, without a corresponding increase of the respiration, should be withheld, or given with extreme caution, when the blood is imperfectly arterialized. From erroneous pathological views, much injury is done, in such cases, with this class of remedies. The deleterious effects of such medication in cholera have been already adverted to; and the same remarks are applicable to cases generally in which the respiration is in a diminished proportion to the pulse. The paralyzing influence of the imperfectly aerated blood occasions a torpor of the whole system. The heart becomes affected with this torpor, and the feeble, small, and sometimes slow, infrequent pulse, seems to indicate debility of this organ. It is, however, commonly a torpor or oppression, rather than the debility of exhaustion; the respiration is inadequate to produce that change in the blood which renders it fit fully to support the vitality of the organs to which it circulates; there is already more blood circulating through the lungs than they can arterialize. Under these circumstances, alcohol and fermented liquors, opium, quinine, serpentina, and all articles which operate to increase the action of the heart, more than that of the lungs, may have a most injurious effect. By transmitting an additional quantity of blood to the already over-burdened lungs, they cause the whole mass of blood in the system to become more deteriorated, and thus add to the torpor which occasions the apparent debility. Such effects are too frequently produced in the progress of typhous fever, typhoid pneumonia, and other diseases, especially in the last moments of life.

We will suppose a case of pneumonia, in which during the progress of the disease, one half of the lungs has been obstructed by engorgement. The pulse has been about 90, the respiration 35 or 40. The respiration has been thus frequent, because one half of the lungs has had to perform the whole office of arterialization; yet the tumid, purple lips, the general lividity of skin, and some cerebral oppression, have shown that, with this forced effort, the respiration still has been deficient. At length—commonly on the sixth day—there is an effort towards a crisis. There is as yet little if any resolution of the engorgement within the lungs; but there is increased secretion from the bronchial membrane, while the secretions of the system generally are beginning to be unlocked. The lungs, almost suffocated by the bloody mucus poured out into the bronchia, are struggling with
increased effort to perform their office. All the accessory, as well as ordinary muscles of respiration, are engaged in agonizing labor to aerate the blood. But the lividity of skin has increased, and the brain, rendered torpid by the black blood circulating in its arteries, scarcely allows the aid of the will to sustain the respiratory efforts. Under these circumstances active stimulants are administered for the purpose of supporting the sinking powers of life. The action of the heart is excited, and the blood is hurried through the lungs, at once overwhelming the exhausted respiratory powers. For a few moments the system appears to make a renewed struggle to relieve itself of the suffocating oppression; but coma comes on; the respiration, becoming feeble and shorter, soon stops; and the heart, "the ultimum moriens," after a few more feeble, irregular pulsations, yields under the deadening influence of the black blood.

Cases of the above description are not uncommon; and a less degree of the injurious effects of such stimulants, given in the progress of fevers attended with deficient respiration, it is believed, is one of the most common errors of medical practice.

Yet there are cases of deficient respiration—cases attended with absolute debility or atony—which are benefited by these remedies. Coma even sometimes is relieved by full doses of opium; and in small doses opium and other stimulants often may be serviceable in absolutely atonic cases. Their operation however, should be carefully watched; and if they increase the action of the heart, without a corresponding increase of the respiratory function, the operation will be injurious.

A nutritious diet, by invigorating the circulation, and increasing the quantity of blood; and muscular exercise, by hurrying the circulation, commonly have an injurious effect, in cases of this comparative infrequency of respiration.

The disparity between the respiration and pulse is aggravated also by remedies which operate directly to diminish the frequency of respiration. Most of the narcotics, given in full doses, so as to affect the brain, producing vertigo, drowsiness, or coma, have this effect by inducing torpor of the brain and respiratory nerves; and some of them in moderate doses have a similar operation.

Strychnine in large doses occasions the respiration to be remarkably slow, irregular and infrequent; while in moderate doses it sometimes improves the respiratory function. I am now treating a general paralysis of the portio dura with this remedy, in whom one sixth of a grain four times a day produces fornication, slight pricking pains, and frequent spasmodic twitching of the muscles. While under this operation, the ratio between the respiration and pulse is about 1 to 7 or 8; though the patient has the ordinary healthy ratio, 1 to 4 1-2, when not under the influence of medicine. In this case, however, the
strychnine does not appear to occasion a deterioration of the blood proportionate to the diminished frequency of respiration; and in less doses it is a useful remedy for deficient arterialization depending on a torpor of the organic nerves. In such cases it appears to have an exciting operation on the arterializing nerves, as might be inferred from its efficacy in some forms of asthma and dyspnoea, in which a torpor of these nerves is manifested.

By a similar operation, as before remarked, alcohol, opium, and the exciting narcotics generally, in small doses, sometimes have a favorable effect. Their general exciting operation may be determined especially to the organic nerves of the lungs, or to the brain and motor respiratory nerves, occasioning the breathing to be more full and easy, and the blood to be more perfectly aerated. In some epidemics these effects are so uniform that the physician learns to prescribe such remedies in particular cases, with almost perfect confidence. Aside from the observation of epidemic peculiarities, however, and a consideration of the attending general debility, I know not what general rules can be given to enable a practitioner to calculate on a favorable operation of such remedies, in cases of imperfect arterialization of the blood. As before observed, when used in such cases their operation should be carefully watched; and if they are found to excite the circulatory, more than the respiratory function, their operation will be injurious.

**Remedies which promote the arterialization of the blood.**

These are,

1st. Remedies which diminish the action of the heart and arteries.

2d. Remedies which excite and invigorate the motor respiratory nerves.

3d. Remedies which excite and invigorate the arterializing nerves of the lungs.

4th. Ventilation.

5th. Remedies which obviate mechanical impediment to the respiration.

6th. Remedies which excite secretions vicarious of respiration.

1st. Remedies which diminish the action of the heart and arteries.

These remedies obviate a disparity between the two functions by reducing the circulation to a proportion with the respiration. The *antiphlogistic* medicines generally belong to this class.

*Venesection* is one of the most important of this class of remedies. If the pulse is frequent, full and strong, with a comparative infrequency of the respiration; or, as occurs in pneumonitis, pleuritis, bronchitis, and some other diseases, if, with this
condition of the pulse, the respiration is frequent, but still inadequate to a due aeration of the blood, there can be no question as to the propriety of bleeding to reduce the circulation. There are other cases, equally requiring bleeding, in which the indications are less obvious. Imperfect respiration, by producing torpor of the heart and arteries, through the ordinary influence of the black blood, may render the pulse infrequent, slow and feeble. This constitutes what is called the oppressed, depressed, or obstructed pulse.

This oppressed pulse is common in the congestive variety of typhous fever, in some forms of pneumonitis, and in other diseases. When a vein is opened, the blood runs slowly, and has almost a tarry consistence and color: but as the circulation becomes relieved, and the process of aeration is better performed, the blood assumes a florid appearance, and runs freely. This change in the blood takes place more suddenly when some degree of fainting occurs during bleeding, to check or suspend the heart's action; hence when the principal object of bleeding is to restore the balance between the respiration and the pulse, and promote the aeration of the blood, it is well to encourage fainting by bleeding in an erect posture.

The oppressed pulse may occur in a highly inflammatory, or a low typhous or typhoid condition of the system. In both these conditions, bleeding tends to restore the balance between the respiration and the pulse. In the former, bleeding is required not only to reduce the pulse to a proportion with the respiration, but also to subdue inflammation—the pulse rises in fullness and strength, as the oppressing effects of the black blood are removed; and the bleeding may be continued freely. In a low typhoid case, only one of these objects is to be accomplished by bleeding, which should be stopped as soon as faintness is induced, or the blood assumes a florid, arterialized appearance; or, if possible, the disparity between the respiration and the pulse should be oviated by other means without bleeding.

Antimony has a striking effect in diminishing the action of the heart, without producing a corresponding diminution of the respiration. In cases of inflammatory excitement it is useful in reducing arterial action, but it is particularly useful when such excitement is connected with deficient respiration.

This affords one reason for its efficacy in pneumonitis, in which this remedy has been employed successfully in frequent large doses, by Rasori, Laennec, and other modern writers. In this disease, the refrigerant and alterative powers of the remedy have a favorable operation, in reducing and resolving inflammation; but I have found it especially adapted to those cases in which the symptoms of deficient arterialization are prominent—when the respiration is infrequent and small, the skin livid, and the cerebral powers oppressed. Laennec observed
patients, in this disease, to recover their consciousness under the use of this remedy; and he advises a persevering employ- ment of it when "the oppression is great, or the head affected."

Dr. Thomas Marryatt, of Bristol, England, who published a treatise on therapeutics, in 1788, gave tartar emetic successfully in fever and in pleurisy. "I have seen many instances," he ob- served, "wherein a paper has been given every three hours [gr. x. in six papers], without the least sensible operation, either by sickness, stool, sweat, or urine; and, though the patients had been unremittingly delirious for more than a week, with subsul- tus tendinum, and all the appearances of hastening death, they have perfectly recovered without any other medical aid—a clyster every other day excepted."

Laennec found tartar emetic successful in "hydrocephalus" [cerebral congestion?] supervening "in the course of continued fever," and "general debility"—also "in nervous affections connected with a congested state of the brain or spinal marrow."

Dr. Graves employs this remedy in delirium tremens, and "with very remarkable success at various periods of fever, but principally towards its termination." In the low stages of spot- ted fever, when the symptoms denoted "a combination of primary general nervous excitement with a secondary cerebral congestion," he found a combination of tartar emetic with lau- danum very successful. "This method," he observes, "has manifestly saved many, many lives, under a combination of cir- cumstances apparently hopeless."—(Graves's C.ínical Lectures.)

In the low stages of many febrile diseases, opium may be given advantageously in combination with antimony, when it could not be given alone, without danger of producing cerebral congestion. The opium allays nervous irritation, exercises its general stimulant operation, and thus sustains the powers of life; while the antimony, by preserving the balance between the respiratory and circulating functions, and thus promoting the arterialization of the blood, prevents the congesting effects of the opium.

Ipecac, like antimony, operates to diminish the force and fre- quency of the heart's action, and thus obviates a disparity be- tween the respiratory and circulating functions. It is less pow- erful than antimony; but is appropriate to some cases, in which the more debilitating effects of antimony might be injurious.

The refrigerant salts, nitrate of potassa, bitartrate of potassa, sulphate of magnesia, sulphate of soda, &c., reduce the circula- tion, and in appropriate cases thus have a favorable effect in equalizing the respiratory functions.

In the use of antiphlogistic remedies, for the purpose under consideration, the general tone of the system is to be observed; and in low atonic cases caution is required, lest their general debilitating effects shall more than counterbalance the advantage
of equalizing the respiratory and circulating functions. In low stages of typhous fever, for instance, these remedies sometimes may be required for this purpose; but as it is important, in such cases, to avoid the occasion of debility and exhaustion, it is desirable to equalize the functions by other means; and when debilitating antiphlogistics are employed, their operation should be continued no longer than necessity requires.

Digitalis is well known to possess the property of diminishing the frequency and force of the pulse in a remarkable degree. It sometimes has a similar effect on the respiration, especially in large doses, but not in proportion to its effect on the pulse. By virtue of this operation, it is often useful in typhus, pneumonitis, erysipelas, scarlet fever, and other diseases, and particularly in congestive fevers. It relieves morbid wakefulness, subsultus tendinum, muttering delirium and coma; and sleep induced by it is commonly more refreshing than when induced by opium and most other narcotics, because the respiration is less oppressed.

In a former part of this essay, the remarkable deficiency of respiration which occurs in delirium tremens has been noticed; and the success with which I have treated this disease, principally with digitalis, induces me briefly to describe my general plan of treatment. In 1820, Dr. A. L. Peirson, of Salem, Mass. (New Eng. Jour. of Med. and Surg., Vol. IX.), recommended digitalis in the treatment of this disease. After bleeding, he gave the tincture, in doses of seventy-five drops, every two hours.

Several years since, owing to epidemic constitutional changes, or some other reason, I observed that opium was less successful in this disease, than it had formerly been in my practice; and I was induced to make trial of the digitalis. I commence the treatment of a case with a full cathartic dose of calomel, which is followed with the exhibition of nitrate of silver,* in doses of gr. 1-8, every hour, or gr. 1-4 every two hours. If called in the early part of the day, I adopt no direct means for inducing sleep until night—the natural time for sleep. In the evening I direct one ounce of tincture of digitalis, of which a third part is to be given every two hours until sleep is induced. If this fails, the nitrate of silver is resumed and continued through the following day; and on the following night an ounce and a half of the digitalis is directed, one third to be given every two hours. In a great proportion of cases sleep is induced, and the disease suspended, the first night; and it is very rare that the wakefulness continues through two nights. In most cases no other remedies are used; though sometimes, in connection with them,

*For a notice of the medicinal properties of this remedy, see subsequent part of this essay.
I direct castor, artificial musk, camphor, or some bitter infusion, with a blister to the back of the neck, or a wash of tincture of camphor, and aqua ammonia to the scalp. In a few cases the digitalis has been rejected from the stomach, when I have directed smaller doses at shorter intervals. Of more than fifty cases, treated on this general plan, only four have been fatal. One had been tampered with by a quack, before I was called; the second was complicated with a severe pneumonitis affecting both lungs; the third came on in the course of a severe dysentery—sleep was induced, but the patient sank, after two weeks, with the dysenteric symptoms; the fourth was complicated with erysipelas affecting the face and head, and terminated fatally on the ninth day. In the latter three cases, death appeared to be owing less to the delirium tremens, than to the diseases with which it was complicated.

Ergot has even greater efficacy than digitalis in depressing the circulation. In doses not sufficient to produce any violent effects, it will reduce the healthy pulse from 70 to 50 or even 40 in a minute. But at the same time it depresses the respiration. While digitalis affects the motor nerves of the heart more than it does the respiratory nerves, ergot affects both, and in most cases the respiratory nerves chiefly. When the object is simply to diminish the action of the heart, as in active and irritating hemorrhages, I have found this remedy incomparably more valuable than any other; but on account of its depressing the respiratory motions, it is decidedly injurious in cases of deficient arterialization; and it is noticed, in this place, only to contrast its powers with those of digitalis.

Sanguinaria Canadensis in its medicinal effects is considerably allied to digitalis. It is narcotic and alterative. By its narcotic operation it diminishes the frequency and force of the heart’s action; and by virtue of this operation, when the circulation is proportionately more active than the respiration, it restores an equilibrium of action. It is particularly useful in diseases of the lungs and bronchial membrane. In pneumonitis, catarrh, croup, and other diseases of the respiratory organs, its alterative operation promotes healthy secretion, produces resolution, and thus aids the respiratory function, by improving the condition of the lungs, while its narcotic operation tends still further to equalize the respiratory and circulating functions by depressing the action of the heart. In such cases, when the skin is livid, the cerebral powers are oppressed, and other symptoms of imperfect arterialization are manifest, its favorable operation relieves the cerebral symptoms, and gives a florid hue to the skin. As an operation consequent to these effects, the oppressed pulse, which is common in such cases, often becomes more frequent, full and strong—an effect which probably has occasioned the common, but erroneous impression, that sanguinaria operates directly to stimulate the action of the heart.
In very large doses, sanguinaria, like most other narcotics, produces torpor of the brain and respiratory nerves, with infrequent, slow, and stertorous breathing, and its consequences the ordinary symptoms of asphyxia.

*Colchicum, Veratrum, Nicotiana tabacum, and Lobelia inflata,* with general narcotic and alterative powers like sanguinaria, have also a similar operation in diminishing the action of the heart.

*Polygala Senega* though destitute of narcotic powers, is similar to sanguinaria in its alterative effects, and in its operation on the heart. The latter operation, probably, is dependent on the *nauseating property* of the remedy—a property which, in several of the articles before enumerated, contributes to diminish the action of the heart.

2d. Remedies which excite and invigorate the motor respiratory nerves.

Articles generally which produce sudden cerebral excitement with mental exhilaration have this effect. *Ether, camphor, ammonia, musk, castor, assafetida, oil of amber, cajuput oil,* and the volatile terebinthinates, such as *oil of turpentine* and that of the *Abies Canadensis,* belong to this class. These remedies are commonly termed *diffusible stimulants;* but, with the exception of the volatile terebinthinates, they have little, if any, direct stimulant operation on the heart. Their main operation is on the nervous system. They produce cerebral excitement, relieving drowsiness, coma, and low delirium, and in virtue of this operation they call the *aid of the will* to assist in respiratory action; and at the same time they appear to have a direct *exciting operation on the respiratory nerves.* In the low stages of typhous and typhoid fevers, when the respiration and the cerebral functions are oppressed, they quicken the respiration, and thus tend to relieve coma, delirium subsultus tendinum, and other symptoms of nervous oppression. They are especially useful about the time of the crisis of fevers, particularly the crisis of pneumonitis and other diseases of the respiratory organs. Their operation is ordinarily transient; but the frequent use of these various articles, in succession, is highly important in sustaining the nervous energy and the respiratory action, through the critical period of such diseases. Whenever in the progress of typhous or typhoid fevers, the respiration is observed suddenly to become infrequent, these remedies should be promptly and perseveringly employed to quicken the respiration and prevent the deadening influence of the black blood through the system.

Dr. Graves highly recommends this class of remedies, in cases "when there is great prostration of the powers of life, oppression of the nervous functions, and low, muttering deliri-
and a remark of his in regard to musk, that "it exercises a stimulant effect on the nervous system, without having any tendency to produce cerebral congestion or coma," is applicable, in general, to other remedies of this class. Indeed, the practice of giving these remedies, for the relief of such symptoms, is common; but the rationale of the practice, and the leading principle, that coma and other symptoms of cerebral oppression are commonly owing to imperfect respiration, have not been generally understood.

Enemata of some of the articles above enumerated—particularly of camphor and oil of turpentine—sometimes operate very promptly to relieve oppression of the respiratory and cerebral functions.

Coffee and green tea are mild but valuable remedies of this class. I think that injury is often done to persons who habitually use these articles in health, by withholding them during sickness. In typhous fever, typhoid pneumonitis, and many other diseases, their remedial efficacy, in producing cerebral excitement, and in quickening the respiration, is important. The use of strong tea, in cases of stupor occasioned by excessive doses of opium or alcohol, is common.

External vesicatory and irritants, such as cantharides, nitrate of silver, corrosive sublimate, mustard, oil of turpentine, oil of cinnamon, and the like, are valuable adjuvants in such cases. A blister applied to the back of the neck is one of the most common remedies for coma and other symptoms of cerebral oppression; and probably irritants applied to this region, from its proximity to the origin of the respiratory nerves, are more effectual than to other parts of the system. Dr. Graves prescribes blisters with this view; and in some cases of typhus, I think I have seen good effects from continuous irritation in this region, excited by a pitch plaster, with a small quantity of pulverized nitrate of silver sprinkled on its surface.

Calling the attention of a patient to his respiration, and prompting him to take frequent full inspirations, tend to keep up the process of aeration, and to prevent the patient from sinking into a comatose condition. I am always careful, about the sixth day of pneumonitis, to watch the symptoms of an approaching crisis. If the symptoms of deficient arterialization are increasing, as always occurs when the crisis is likely to prove serious, I perseveringly employ the diffusible excitants above mentioned, apply a blister or other irritant to the back of the neck, and whenever the respiration flags, I arouse the patient to the necessity of full and frequent inspirations. I remain by the patient until a nurse or other attendant has learned this mode of management, which in some cases is required to be continued for several hours. By this management I have seen patients sustained through the critical period of this disease, who otherwise would almost certainly have sunk into a fatal asphyxia.
It is well known, that in a low typhous or typhoid state, it is necessary that a patient, who inclines to sleep, should be frequently aroused. In natural healthy sleep the respiration is ordinarily slower and less frequent than during wakefulness. The ratio between the respiration and the pulse ordinarily becomes 1 to 5 or 5-1-2. The aid of the will is withdrawn, and the breathing is performed wholly by the involuntary respiratory nerves. In low typhus fevers the disparity during sleep becomes still greater. While awake a patient feels those distressing sensations, which attend imperfect aeration of the blood, and which instinctively demand the aid of the will to assist the torpid and enfeebled respiratory nerves and muscles; but during sleep, the aid of the will being withdrawn, the breathing becomes irregular, intermittent, short and infrequent—a breathing which in this diseased condition would soon overwhelm the system with asphyxia.

But in spite of all our efforts, the respiration sometimes flags, and patients sink into a comatose sleep, from which, for a time, they cannot be fully awaked. Our efforts should be still continued; if the patient is able to swallow, the most diffusible excitants, ammonia, ether, camphor, &c., should be administered little diluted, so as to make a strong impression on the mouth and fauces; or the same substances should be applied to the nostrils, or sprinkled on the face. These means, with perhaps the aid of frictions over the chest, if they do not awake the patient, will generally arouse the system enough to occasion several successive full inspirations. I recently saw a little patient recover from a coma succeeding scarlet fever, during which, for about three days, the breathing absolutely stopped, whenever these means were discontinued even for a few minutes.

In a similar way cases of profound coma consequent to large doses of opium and other narcotics, taken by accident or with suicidal purpose, have been treated successfully by flagellation and other violent external irritation. That such means prove efficacious by exciting and sustaining the respiration, may be inferred from experiments, made by Brodie and others, of supporting life, under the influence of enormous doses of certain narcotics, by artificial respiration. These experiments prove that such narcotics occasion death by suspending the respiratory motions and inducing asphyxia, rather than by a direct operation on the brain.

This general mode of treatment has been applied to extreme cases of intoxication with remarkable efficacy.

3d. Remedies which excite and invigorate the arterializing nerves of the lungs.

Most of the remedies above enumerated, which operate to excite and invigorate the motor respiratory nerves, have in some
degree a similar operation on the organic nerves of the lungs. Such is the sympathy between these two classes of nerves, that when one of them is affected with torpor, the other is in some degree similarly affected; and the remedies which affect one class, also ordinarily affect the other. But the effects of artificial respiration in cases of coma caused by alcohol, opium, and other stupifying narcotics, show that in those cases the torpor is principally in the brain and motor respiratory nerves. On the other hand nervous asthma, malignant cholera, and some other diseases, are instances in which the torpor is chiefly in the organic nerves, while the brain and respiratory nerves are comparatively little affected.

These circumstances afford grounds for a distinction of two classes of remedies. The class above treated of operates principally on the motor respiratory nerves. The remedies next to be considered appear to operate principally on the organic nerves, though some of them have also an evident operation on the motor nerves. In general this class produces a gradual and permanent increase of nervous energy, while the former class effects a sudden and more transient excitation.

Nitrate of silver, arsenical solution, chlorine, cantharis and capsicum, are the principal remedies of this class. Tetrakinitrate of bismuth, sulphate of zinc, and bisulphate of copper, have a less degree of the same operation. Mustard and other pungent tetradymanous plants, also belong to this class.

**Nitrate of silver.** I consider this article as one of the most valuable remedies for restoring and sustaining the balance between the respiratory and circulating functions. It commonly increases the frequency of the respiration; but it appears to operate more on the organic nerves.

My common dose is gr. 1-8, in pill, repeated every hour, or once in two or three hours, according to the urgency of symptoms. Frequently I give a solution of the following form: Β. Nitrat. argent. gr. iij.; aquæ distillat. 3j.—dissolve and add syr. simp. 5 vii. M. The dose of the solution may be such as to contain from 1-8 to 1-4 of a grain. The solution is the preferable form when an effect of the remedy on the faucies is desirable, as in scarlet fever, and some other diseases; and it is ordinarily more easily administered to children than the pill.

In typhous and typhoid fevers, in which a failure of the respiration is a source of no inconsiderable part of the danger to be apprehended, I place much reliance on this remedy. In-frequent respiration, abdominal tympanites,* aphtha, subsultus tendinum, and coma—symptoms which are commonly associa-

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*For my first hint in regard to the efficacy of nitrate of silver in obviating tympanites, I am indebted to Dr. Lester Keep, of Fair Haven, in this county.*
ted in typhus—are some of the most prominent particular indications for its exhibition. Commonly, however, I commence its use as soon as any degree of deficient respiration is observed, and continue it through the whole course of the disease. When there is a great degree of deficient respiration, and the disease has decidedly the congestive form, with urgent symptoms of oppression of the respiratory and cerebral functions, bleeding, antimony, the diffusible excitants, or other remedies, which more promptly relieve such symptoms, are required; but to prevent these symptoms, to relieve them when moderate in degree, and to sustain the respiratory function when restored from a state of depression, I have found no remedy more efficacious than nitrate of silver. The intestinal hemorrhage, which often occurs in the course of typhus, I have almost invariably observed associated with tympanites; and with the subsidence of the tympanites, which this remedy is almost sure to effect, the hemorrhage has always ceased.*

In delirium tremens this remedy contributes to obviate the imperfect respiration, which has been noticed in this essay, pages 21 and 31, as a prominent symptom of the disease. It relieves also the tremor, false vision, and other symptoms of nervous disorder. These effects are sometimes so obvious to attendants, when the remedy is alternately administered and withheld, that I have been often asked whether its design was to obviate the trembling.

In the treatment of typhoid pneumonitis I consider this remedy a valuable adjuvant, and in many cases I employ it through the whole course of the disease.

In phthisis the nitrate of silver has been highly recommended; but physicians generally appear to have been disappointed in the use of it. As a curative remedy, in this disease, little can be expected from it; though it is useful in relieving occasional symptoms, as paroxysms of dyspnœa, and the drowsiness, livid skin, and other symptoms denoting imperfect arterialization of the blood, which frequently occur.

*In the use of nitrate of silver, the greatest caution is requisite in regard to chemically incompatible remedies. Most authors complain of the uncertain operation of this remedy; and I am confident that inattention to this circumstance is a common cause of the failure of its efficacy. It is ordinarily inert, if given in connection with any alkali or alkaline salt. Ammonia or prepared chalk, for instance, wholly neutralizes its power; and the alkaline salt contained in Dover’s powder frequently has this effect. A practitioner, who was formerly a student of mine, several years since complained to me that he had been often disappointed with nitrate of silver in treating typhus. On inquiry it appeared that, in connection with this remedy, he frequently prescribed a mixture containing carbonate of ammonia. Since that time he informs me that he prescribes the remedy with the greatest confidence, and that he could hardly dispense with it in the treatment of typhus.
Dyspnœa, asthma, dyspepsia, hypochondrias and cholera infantum, are diseases to which this remedy is often adapted; and in most diseases attended with general nervous torpor or irritability, or with flatulent distension of the intestinal canal, or with any of the symptoms above mentioned, as constituting particular indications for its exhibition in typhous fever, the nitrate of silver may be advantageously employed.

The following case of erythema anatomicum—a case of the writer’s personal experience—may serve to show the general indications for which I prescribe the nitrate of silver in erysipelas, scarlet fever, and other allied diseases, as well as to illustrate some other points connected with the general subject of this essay.

One afternoon in March, 1834, I examined the body of a man who died the day previous with a malignant erysipelas affecting the face, scalp and brain. I had at the time on my left thumb two slight scratches made with a common pin a few hours previous; and while examining the body I slightly scratched the same thumb with the point of a scalpel. They were slight abrasions of the cuticle, not sufficient to occasion the least oozing of blood. On the following morning these scratches were a little red and inflamed, attended with a slight itching and smarting sensation. I touched the thumb with a piece of nitrate of silver; and, without apprehension of danger, proceeded to visit my patients during the forenoon. At 11 o’clock, A. M. about twenty hours subsequent to the post-obit examination, I was seized with chills, which continued violent about an hour, when heat of skin, thirst, a quick, frequent, jerking pulse, and other symptoms of irritation and febrile excitement supervened, with nausea and vomiting. There was now no irritation about the thumb, nor any inflammation extending up the arm; and the slight injury of the thumb did not even occur to my mind as the cause of the present symptoms. An emetic of ipecac, with a small proportion of tartar emetic, produced no relief. At evening a swelling and soreness of a gland in the axilla was noticed; and in the course of the night a vivid erythematic inflammation covered the whole left side of the chest. From this time symptoms continued severe, and with little variation until the eighth day of the disease. The pulse was ordinarily from 120 to 130, quick and jerking, but weak; skin rather hot and dry; the affected side painful, and so sore that friction of the bed-clothes or any slight touch seemed intolerable. But the prominent symptom, indicated by my feelings, was a difficulty of respiration, evidently connected with affection of the organic nerves. I frequently observed to my attending physicians, that my respiration seemed to be scarcely of any service; and that the sensation was as though the breath was drawn into an inanimate bag. During occasional mental aberration I fancied that
I was using a pair of borrowed lungs. The acute pain and soreness attending the disease seemed trifling as compared with this distressing suffocating sensation. For eight days and nights I was not conscious of a moment’s sleep; and when I shut my eyes they were filled with as many imaginary objects, as ever haunt the mind of a patient with delirium tremens. The general nervous irritation, the sensation of impending suffocation, and the want of sleep, were truly agonizing. The disordered function affected the motor, as well as the organic respiratory nerves; and a constant effort of the will was required to sustain the motions of respiration. With such continued effort I ordinarily made from 25 to 35 inspirations in a minute; but still the respiration was unsatisfying. During this period the nitrate of silver, in doses of one eighth or one fourth of a grain, every two or three hours, and sometimes every hour, was almost constantly employed. It rendered the respiration easier, and mitigated the general constitutional irritation; and whenever its administration was suspended for a few hours, the distress and anxiety of breathing became extreme. No other internal remedy showed decided beneficial effects. All exciting remedies appeared to fall in with the diseased irritation and aggravate it. A few drops of laudanum, or a teaspoonful of brandy, produced a distracting nervous excitement through the whole system. Two draps of the oil of valerian seemed to pervade the system with a thrilling sensation, almost like electricity, increasing threefold the nervous irritation. After the disease had progressed several days, the local affection was treated with a wash of the nitrate of silver, 48 grain to 3 j. of water, so as to vesiccate almost the whole left side of the chest, with a most happy effect on the local and constitutional symptoms.

I expected this state of irritation to be followed by a general nervous torpor, and apprehended danger from failure of the respiration. I directed the attention of the nurse to this subject; and told her what symptoms would require notice, and what remedies would be needed, should my consciousness and respiration begin to fail. On the eighth day the nurse observed me suddenly fallen into a state of drowsiness, with shortness and extreme infrequency of respiration. On being aroused I found a torpor pervading the system; the whole lower extremities were entirely devoid of feeling; and though the sun was shining bright against my windows, a sense of darkness rendered surrounding objects scarcely visible. My attentive and judicious nurse prompted me to vigorous respiratory efforts; but such was the mental and physical torpor that respiration could hardly be continued. The skin at this time, as I was subsequently informed, assumed a deep livid hue; and, notwithstanding the assiduous exertions of attendants, my respiration occasionally sunk to ten and even eight in a minute, while the pulse...
was beating irregularly about 130. Ether, ammonia and camphor were freely administered and applied to the nostrils; and frictions with volatile liniment and oil of cinnamone were perseveringly employed. I soon revived in some degree; but for several hours the sense of darkness induced me to suppose it real night; and respiration was sustained only by constant and laborious efforts. The involuntary respiratory nerves seemed almost powerless; and for more than twenty-four hours I could not be suffered to sleep longer than two or three minutes, without a nearly total cessation of breathing. The sensations at this time were very different from those of the preceding days, when the difficulty of respiration seemed chiefly depending on the organic nerves. Then the breathing was anxious—the conscious feeling of imperfect respiration, with the exercise of reason, called for vigorous and hurried respiratory action. Now, consciousness, sensation, reason and muscular energy were at the lowest ebb; the little life which remained was a burden; and the exertions of friends to arouse me seemed an annoyance. A person who has never experienced the feelings attending such a state can have no adequate idea of them. As consciousness and reason revived, I felt like one who is laboring to escape from drowning; who has been swimming for the shore, until his strength is almost exhausted; occasionally his head is suffered to sink in despair, and again the agonizing sense of suffocation calls for another desperate struggle; while every wave threatens to overwhelm the last effort of exhausted nature.

After this critical period, wine, brandy, quinine, and a moderate use of opium, operated favorably. Two abscesses formed on the posterior part of the side, each of which discharged five or six ounces of healthy pus.* I was confined to the room in all five weeks. Much of the time there was considerable tendency to tympanitic distension of the abdomen, which was promptly relieved by more full and frequent doses of the nitrate of silver. The disordered function of the nerves concerned in respiration, which was so remarkable through the whole disease, continued in some degree even after I was able to resume the active duties of my profession. Frequently I was aroused from sleep by a sudden deep spasmodic sighing inspiration, which sometimes also affected me when awake.†

*Dr. Higginbottom speaks highly of the external use of nitrate of silver in promoting healthy suppuration. I have observed many proofs of the correctness of his views; and I am fully satisfied that the internal use of the remedy has a no less salutary effect in promoting this object.
†A remarkable symptom, attending the early stage of my disease, was a morbid excitation of the faculty of memory. Articles that I had read cursory, years before, were fresh in memory, so that I could recollect not only general ideas, but almost the precise language, pages, &c. points on which my memory ordinarily is very deficient. After the critical stage of collapse,
Arsenical solution. It has been a matter of dispute whether this article is a stimulant to the circulating system. I am undecided whether it is directly so, or only secondarily through the influence of the arterializing function. The latter operation is certainly the most prominent; and it is therefore a valuable remedy in the congestive form of typhous and typhoid fevers. Drs. Miner and Tully recommend this article as a valuable remedy in the low stages of typhous and other fevers, when the general debility is attended either with irritability or torpor.—(Essays on Fevers.)

Cantharis, as an internal remedy, is of much value in the low torpid stages of typhous and typhoid fevers, particularly those of a congestive form, in which the respiratory function is deficient. It operates upon the nervous system generally, relieving subsultus tendinum, coma, and other symptoms of nervous exhaustion; and its effect on the nerves concerned in respiration, I think, constitutes no inconsiderable part of its favorable operation.

Capsicum is particularly adapted to scarlet fever and erysipelasotous diseases generally; but is useful in the low stages of most diseases attended with nervous torpor.

Chlorine. The change which this remedy effects in the blood has been noticed by several writers, and different views have been entertained in regard to its modus operandi. It is useful in typhus; but more especially, I think, in scarlet fever and erysipelasotous diseases. The chlorides of soda and lime are convenient forms for its administration.

Creosote appears to have an operation on the respiratory function, similar to that of chlorine; but, from limited experience with this remedy, I cannot speak confidently of its powers.

4th. Ventilation.
Free ventilation is very important in cases of difficult or imperfect respiration. Its advantages are very obvious in dyspnæa and asthma, and in many cases of phthisis, pneumonitis, and other diseases.

A most injurious custom prevails in many places—that of crowding the room of the dangerously sick and dying with friends and acquaintances of the patient. I would not, for slight reasons, object to a custom which to many minds appears sanctified by common association with the solemnities of death; but a custom so injurious—so murderous—as this, ought not to be tolerated. To persons in health the impure air of a crowded

there was a proportionate failure of this faculty, the effects of which remained some time after my general health was restored. The first time I rode out, it was with difficulty and uncertainty that I could remember streets and houses with which I had been most familiar; and on several occasions I even found myself laboring to call to recollection my own name.
room is often unpleasant; and in the diseases just mentioned it commonly occasions distressing sensations to patients. But its most injurious effects are to patients who from unconsciousness or extreme exhaustion cannot express the injury thus occasioned them—the dying, and those in imminent danger of death. Many, very many lives, I have no doubt, are sacrificed to this pernicious custom; and, in a great proportion of cases, it renders the last moments of life more distressing, and hastens death. When the system is struggling in agony to sustain the respiration, and nature is almost exhausted, the deteriorated air occasioned by surrounding, anxious, sympathizing friends, may turn the scales in which life and death are so equally balanced.

In severe paroxysms of dyspnoea and asthma, patients commonly feel the necessity of free ventilation; and in phthisis I have had many patients insist on having the windows and doors of their rooms kept open, even in the coldest weather of winter. Such cases show the importance of attending to this subject, in the low critical stages of other diseases; and as a general rule, in such cases, I would advise that a room should be freely opened, while, if the weather is cold, the body is protected with warm but light clothing; and no person should be in the room, excepting such as are required to attend the patient.

5th. Remedies which obviate mechanical impediments to the respiration.

This indication is sometimes very important in the treatment of diseases attended with deficient respiration. The various mechanical impediments to the respiratory motions, adverted to in a former part of this essay (page 10), should receive careful attention and be obviated if practicable. If, for instance, the respiratory motions are obstructed by water collected within the pleura or peritoneum, calomel, elaterium, digitalis, and other remedies of this class will be appropriate.

One of the most common mechanical impediments to the respiration, in the low stages of typhous and typhoid diseases, is tympanitic distension of the intestinal canal. For this affection various remedies are used, as ether, camphor, capsicum, the pungent aromatics, and the introduction of a flexible tube per anum; but there is no remedy which I have found so commonly efficacious as the nitrate of silver, exhibited in doses of gr. 1-8 or gr. 1-4, every hour or every two hours.

In dyspepsia, hypochondrias, phthisis, delerium tremens, and other diseases attended with deficient respiration, injury is often occasioned by tight dress, which confines the motions of the chest.

In dyspnœa, asthma, phthisis, and other diseases, patients frequently complain of inconvenience from the weight of bedclothes. In the low stages of pneumonitis, typhus, and in gen-
eral when there is extreme exhaustion, with laborious imperfect respiration—as in the dying—the bed clothing should be of the lightest fabric; and in many cases it is desirable that the clothing should be supported by the hand of an attendant, so as to prevent its pressure on the body of the patient. Under such circumstances, a slight impediment, which in health would occasion no inconvenience, may prove a fatally oppressive load to the system exhausted by disease.

6th. Remedies which excite secretions vicarious of respiration. The bronchial membrane, the liver, skin, kidneys, salivary glands, and the uterus and mammary glands in females—all the secreterent organs—are to some extent vicarious in their functions.

The menstrual secretion has an important relation to the respiratory function. In cases of oppressed and deficient respiration it is not uncommon that this secretion occasions immediate and decided relief.

In some cases of general exhaustion, as in advanced stages of phthisis, it is generally considered as desirable that this secretion should be suspended. The utility of this suspension appears, however, to depend upon other circumstances than simple exhaustion. If with much exhaustion there is a frequent, quick and irritative pulse, a florid skin, natural wakefulness, and other indications of perfect arterialization of the blood, a continuance of the menstrual secretion is injurious. On the contrary, if the pulse, whether frequent or infrequent, is oppressed; if the lips, the finger nails, and the surface generally, have a livid tinge; if there is a disposition to drowsiness with occasional vertigo and tinnitus aurium; if the exhaustion is complicated with torpor—a torpor occasioned by imperfect respiration—if such are the permanent prevailing symptoms, the menstrual secretion commonly has a favorable effect, and rarely fails to afford at least temporary relief.

I apprehend that the injurious effects of morbidly excessive menstruation have rendered many practitioners over-cautious in regard to the debility which this natural drain of the system is supposed to occasion.

A similar remark appears applicable in reference to the function of lactation. Excessive lactation is exhausting; and should be cautiously avoided in the low stages of fever, in phthisis, and other diseases attended with much debility. Yet a sudden suppression of the milk is almost sure to occasion unpleasant nervous symptoms, with oppressed respiration; and in typhous and typhoid fevers, and in some cases of phthisis—notwithstanding a considerable degree of exhaustion—if there are prominent symptoms of oppression of the respiratory and cerebral functions, the secretion should commonly be encouraged.
The skin is well known to perform an office in some degree vicarious of respiration. If the cutaneous secretion is checked, the respiration becomes hurried and laborious; and in cases of oppressed respiration a free perspiration often produces decided relief. These circumstances clearly indicate the importance of attending to the skin, in disorders of the respiratory function. Caution is required, however, in case of disparity between the respiratory and circulating functions, that the remedies exhibited to act on the skin, do not excite arterial action, and thus increase this disparity. Through neglect of this caution, much injury is done by the hot drinks, the external heat, and the general stimulating regimen, commonly employed in domestic and empirical practice, to “sweat” or “steam” a patient, in the commencement of any febrile disease.

The liver also performs a similar important vicarious office. The green discharges, produced by increased action of the liver, which attend a favorable crisis in cholera, are an example of the agency of this organ in depurating the blood. So in congestive fevers free bilious evacuations are almost invariably accompanied with a relief of the subsultus, stupor, coma, livid skin, and other symptoms of imperfect respiration.

Of the remedies which act upon this organ, and thus obviate the effects of imperfect arterialization of the blood, calomel is the most important. This remedy, a notice of which has been deferred for this place, on account of this peculiar operation, is one of the most important of the class of remedies, before adverted to, which operate to excite and invigorate the arterializing nerves. It appears, indeed, to have an exciting operation on all the organs supplied by the great sympathetic nerve; and hence it produces a general effect on the secretions of the system. Its operations on the liver, the mucous membranes, the skin and the salivary glands, are well known; and most practitioners must have noticed the relief afforded by calomel in cases of cerebral and general nervous oppression—subsultus, stupor, coma, muttering delirium, &c.—symptoms which, as I have endeavored to show, are commonly connected with imperfect respiration.

Concluding Summary.

The preceding essay, it is believed, establishes several important pathological principles, affording valuable diagnostic and therapeutic indications, which hitherto have been but slightly noticed, or wholly unknown. The indications of the pulse have received much attention; but the variations of the respiration have been little attended to, and the relations between the respiratory and circulating functions have been almost wholly neglected.
The comparative frequency of the respiration and the pulse in health, which from constant observation during a period of several years, I have ascertained to be 1 to 4 1-2 (p. 3), has not been commonly observed; and most of the indications afforded by variations of this ratio (p. 5) have been altogether overlooked.

A disproportionate increased frequency of the respiration has been shown to afford the general indication (p. 11) that there is some impediment to the respiration; which may be owing to, A. Disorder of the lungs or air passages (p. 5), as pneumonitis, phthisis (p. 7), edema, of the lungs (p. 8), or (p. 9) any affection of the lungs which prevents a portion of them from being freely permeated with air, or any disorder of the bronchia or bronchial membrane which impedes the communication between the air and the blood within the lungs: or, B. Some mechanical impediment to the motions of respiration (p. 10): or, C. Imperfect function of the organic nerves of the lungs (p. 10).

A disproportionate diminished frequency of the respiration, which indicates a want of energy in the nerves which control the respiratory motions (p. 11), has been shown to be common in typhous fever, and in many other diseases.

The pathological effects of imperfect aeration of the blood, which had been treated of by Bichat and some subsequent writers (p. 12), but which they scarcely noticed except as immediate precursors and causes of death, I have observed to be manifest through the progress of typhous fever (p. 14), and many other diseases. What is commonly termed congestion in the brain, I have endeavored to show (p. 17), is simply a deterioration of the blood caused by this imperfect aeration, a prominent example of which occurs in the disease termed congestive typhus (p. 17). The effects of this imperfect aeration, depending upon disordered function of the different nerves concerned in respiration, have been traced in various diseases (p. 14 to p. 25).

The common occurrence, and the injurious effects, of this imperfect aeration of the blood suggest the important general therapeutic indication (p. 26) to remedy deficient respiration. The medicinal agents are detailed (p. 26 to p. 28) which aggravate deficient respiration, by increasing the circulation, or by diminishing the respiratory function.

The use of remedies, with a view to promote the arterialization of the blood (p. 28), it is believed, has never been distinctly treated of by any author, as a prominent object of medication. Though my 1st class of these remedies—those which diminish the action of the heart and arteries (p. 29)—have been commonly known to possess this power over the circulation, still they have not been commonly employed with the view—a view which I consider as highly important in many cases—to obviate a disparity between the respiratory and circulating functions. The 2d and 3d classes of remedies (p. 64 and p. 36)—those which excite
and invigorate the motor respiratory nerves, and the arterializing nerves of the lungs—have rarely, if ever, been recommended for those particular purposes; though I think it will be obvious to my readers, that many of the known valuable effects of these remedies are owing to such operations. The other three classes—4th. Ventilation (p. 42); 5th. Remedies which obviate mechanical impediments to the respiration (p. 43); and, 6th. Remedies which excite secretions vicarious of respiration (p. 44)—though their general effects on the respiratory function have been known, have not been commonly employed for the distinct purpose of obviating deficient aeration of the blood.

In short, the general subject of the pathological relations between the respiratory and circulating functions has received little, very little attention. The writer hopes that he has at least shown the subject to be deserving of investigation.

Part II.—REVIEWS AND EXTRACTS.

The American Phrenological Journal and Miscellany. Philadelphia: Published (for the proprietors) by A. Waldie, No. 46 Carpenter-street.

We have just received the first (or October) No. of this new work, with a prospectus of the same, which we take pleasure in giving a place under our head of Medical Intelligence. Although we still occupy the same ground formerly avowed relative to the science of phrenology—that is to say, we consider its claims as a practical science, at least in the present state of its advancement, unworthy of the confidence of the community; and its claims to truth, as a science, incompatible with the facts of anatomy; still we are pleased with the avowed objects of the work before us, and shall be pleased to see truth on this subject, as well as on others, placed beyond the reach of controversy. We have no prejudice against phrenology, or its enlightened and prudent advocates, or partiality for its opposers, which we wish to sustain. If, therefore, there be truth in its compatibility with anatomical facts, in its harmony with "the truths of revelation," &c. we shall be pleased to see these facts demonstrated. We would not be considered in thus requiring its consistency with revelation, as wishing to proscribe truth merely because it did not comport with revelation; but that, as Spurzheim says of
religion, we hold that Revelation "is central truth"—fundamental truth—truth with which truth alone, and with which all truth will harmonize. It is so much the very criterion of truth, that all claims to this which do not harmonise with it, may be considered either false, or not well understood: and so insidious is error, and often so plausible too, from the omission of some of the premises which lay the foundation of the reasoning process by which conclusions are arrived at, that we feel it the duty of every friend of truth, whether religious or philosophical, to challenge error at the threshold, yes, even at the very outposts, and refuse its entrance, without the true sign and password, which prove on good and sufficient trial a fraternal harmony with the great fundamental truths which constitute what are called the revelation of God to men.

The avowed object of this new periodical, as will be seen in the prospectus, is "to preserve from oblivion the most interesting of the very numerous facts confirmatory and illustrative of the truth of phrenology; to show the true bearing of this science on Education, (physical, intellectual and moral;) on the Medical treatment of the insane; on Jurisprudence; on Theology, and on Mental and Moral Philosophy." (Page 2, Prospectus.) Again: "One prominent object in giving it (the Journal) existence is, to wrest Phrenology out of the hands of those, who, in ignorance of its true nature and tendencies, suppose that they find in it an instrument by which to subvert the truths of revealed religion, and lessen the bonds of human accountability, and moral obligation."

The religious character of the work is declared to "be decidedly evangelical;" and respectful enquiries and honest objections on the subject of its religious bearings are solicited; as well as "the communication of facts which are supposed to militate against phrenology, which last, when well authenticated, and all the facts furnished, will be published in the Journal.

This cause may, for ought that we know, be a good one—it may be the cause of truth; but if so of itself, it has been made to appear false, and the instrument of imposition by the itinerant hordes who have been peddling it around the country. We are therefore pleased with the purpose of wresting it from the hands of ignorant imposters, and sitting it on the fair basis of its own merits.

The first article in the number before us, occupying nearly twelve pages, is an introductory statement of its object and design; these are freely, boldly and handsomely set forth. The course marked out is a good one; and in addition to what we have said from the prospectus, promises "to show its bearings on human welfare, corporeal and mental, for time and for eternity." "This large field, therefore," says the editor, "is open before us; and we enter on the cultivation of it, with the assur-
ance that it will not be fully traversed and rendered fruitful till long after we shall cease to be numbered among its labourers."

We regret that our space will not allow us to draw more largely on this ably written introductory statement. According to its views and the purposes it holds forth, the subject which it advocates should be fairly investigated; and we really trust that, as the pages of the only American phrenological journal are fairly open to all respectful objections and enquiries, and to the publication of facts which militate against the truth of the science of phrenology, its pages may become the means of removing all the obscuring rubbish and revealing the truths of nature in this department of science, whether they be for or against phrenology.

The next article is a notice of Dr. Sewall's "examination of Phrenology" and Dr. Caldwell's Phrenology vindicated, and anti-phrenology unmasked." Looking to this work for every thing ingenuous, we regret to observe, as we think we do, a decided favoritism for the vindicator of phrenology, and a spirit of direct proscription of its examiner. For whilst the production of the former is spoken of but in measured terms, relative to—we had almost said its severity, when we should have said, its fullsome abuse, at once disgraceful and calculated to contaminate whatever portion of truth it may have been intended as the vindication of;* Dr. Sewall is hurled into ridicule, and into the contempt of "fourthrate phrenologists," &c. without fully and fairly meeting and disproving the facts from which the examiner deduces his conclusions. He (Dr. S.) is criminated of plagiarism, disingenuousness, intellectual obtuseness, &c. without shewing him to be a plagiarist, only by the dictum contained in the violent ebullitions of the vindicator, and in the face of a personal character for ingenuousness, long observation, intellectual acumen, and piety, at least fair, amongst those of fair claims.

For the sake of truth, we hope sincerely that the editor will not suffer its beauty and richness to be obscured by untempered zeal; for this is only necessary, to help a bad cause by leading the attention off from the contemplation of the error; and when brought into operation in favor of a cause, stands as prima facia evidence of its want of truth. Truth has an intrinsic worth and power too great for it not to prevail, and against which, though beaten on and overwhelmed by successive tides of error, will withstand every assault; and which, though consumed like a phoenix, will like this prototype, rise renewed from the ruins of the conflagration and ultimately maintain its glorious majesty.

*We have only seen those points of Dr. Caldwell's vindication which have been given by reviewers; but in these, we have seen enough to know that Dr. C. has greatly compromised his merited literary character by the unhallowed mixture of the gall of disgraceful passion.
If then, phrenology be indeed founded on the rock of truth, it needs no unhallowed aid of this kind for its support. It does not need that its competitors be dragged down from their first elevation; but will rise to more glory by its greater exaltation above them.

The number of the Phrenological Journal now under notice contains, in addition to those we have noticed, an article entitled, "A Phrenological Analysis of Conversion"; another, entitled, "Pathological fact, confirmatory of Phrenology"; an article on "Phrenology in Germany," and one on George Combe, Esq. We regret that we cannot give time to the investigation of their merits.

PART III.—MONTHLY PERISCOPE.

New Infirmary. Dr. Chase has organized and will open, with this month, an infirmary for the relief of poor persons laboring under hernia or rupture, at No. 98 Locust street, above ninth, Philadelphia. Dr. C, has, as is well known, had his attention drawn peculiarly to the department of surgery here alluded to, and has made many improvements in various apparatus for the treatment of hernia. This institution is a novel one in this country, in all its plan and purpose, except that of treating hernia for the cure, instead of selling the apparatus. The plan of treating for the cure, was adopted by Stagner and his agents, who itinerated for this purpose, and not professedly for the sale of trusses. We hope and expect better success from Dr. C.'s operations than was found in the wake of Stagner, within the sphere of our acquaintance.

Two very important purposes lie in the course of this enterprise:—1st. It is purely a charitable institution, designed and calculated to effect an extensive charity to a class of sufferers hitherto illy provided for by various imperfect retentive means, or none at all; whilst they are, more than other people, under the necessity of bodily ability for active and laborious life. The public may not be aware of the large proportion of individuals in this country who suffer more or less privation from some form of hernia, and those diseases which are sometimes mistaken for hernia. Various estimates have been made of the proportion of cases of hernia, in different countries. Its frequency in England
has been estimated as great as one in seven; and in the United States, the proportion has been estimated as great as one in five; which we think probably about correct, relative to the male population, amongst whom hernia is more common than amongs females. Dr. C. thinks it, however, perfectly safe to estimate the proportion at one in ten of the human family in the United States. This may be a very fair estimate for the city of Philadelphia, but the general proportion is increased when extended to those engaged in country occupations, and especially in new countries, where the hard-laboring class is greater and the labor more calculated to produce this disease in those who otherwise would pass their whole life free from the affliction.—

The more relaxing climates of the south are also calculated to influence in some degree the proportionate frequency of hernia. But at Dr. C's estimate of one in ten, the population of Philadelphia, which is about two hundred and twenty thousand persons, will afford no less than twenty-two thousand patients of this description. Of these, by far the greater proportion are amongst the poor, to whom this charity, most creditable to the heart of its author, is addressed. If Dr. Chase's apparatus are such as to exercise curative powers, and that they are, has been settled by a body as competent as any other, so far as time and opportunity have allowed, the good to be afforded by the faithful administration of this charity by Dr. Chase, as surgeon, cannot fail to afford him abundantly, the delightful complacency arising from helping those who cannot help themselves; to make the poor bless him as he passes, and cause his memory to be em- balmed in the rich tears of gratitude.

2d. But other valuable purposes cannot fail to be effected by the operation of this institution. The collocation together at one establishment, of the great number of cases of these diseases, and their treatment under close observation, and with regular records of all facts, which we doubt not, is no small consideration in the establishing this institution, will soon afford the most am- ple tests of the extent of the value of the improvements to be put into use in the institution—be it great or small; and at the same time, by the opportunity offered pupils and practitioners, for gratuitous instruction, will disseminate a far greater famili- arity with, and more accurate knowledge of those afflictions than has hitherto been enjoyed by the medical community. Dr. C. has our hearty wishes for the greatest possible success in all the benefits designed by this institution, both to himself and to the public.

This institution will be under the government of a board of superintendence, consisting of seven gentlemen, having not less than one-third, nor more than one half, at any time, medical men.
Dr. Chase is surgeon, and Dr. R. Coates' services are enlisted as consulting surgeon and ex-officio member of the board. The rules, regulations, and general laws, are all such as they should be, and are not to be altered or amended, nor new ones enacted, without the consent of the committee of superintendence. The first general law is as follows: "No officer of the institution shall ever be permitted to receive any pecuniary emolument for instruments or surgical advice given in the infirmary, nor shall any be required of the graduates or students who may attend the practice thereof."

Caesarean Section. The propriety of an early resort to this operation in cases where it is necessary, has been very properly insisted upon; but the circumstances which render it necessary, are not always readily determined. M. Castel stated, at a recent meeting of the Academy of Medicine, (Feb. 17th, 1838,) that some years since, a woman was in labour at the hospice de perfectionnement, the professors were all assembled, and the caesarean section resolved on. The crowd of students was so great that some delay took place whilst arrangements were making for their accommodation, and during this time the woman's delivery took place naturally.

M. Gimelle also stated that he saw, at the hospice of M. Dubois, a small woman who had five times submitted to the caesarean section, and who was delivered naturally the sixth time.—Gaz. Méd. de Paris, March 3, 1838.

The occurrences above related, afford a very salutary lesson to the obstetrician, and at the same time evince great weakness, or what is worse, carelessness, in high places. In the first instance, the consultation of the hospice de perfectionnement had settled the matter, that the child could not be born per via naturales, but it was thus born, too soon to allow the time necessary for accommodating the company and proceeding to the operation. In the second instance, a small woman was delivered in the natural way, at the hospice of Dubois, who had, at the five last preceding accouchements been compelled to suffer the caesarian section. We feel disposed to venture the belief that M. Dubois was not the operator in the five previous cases, or any of them; we have too much confidence in his good judgment and discrimination.

Under the best circumstances, this operation requires the greatest care to prevent its being one of the most formidable in all surgery. Much of the success of those who have a great fondness for the knife, depends on their early accession to the operation, and on the other hand much of the ill success of surgery arises from too much procrastination, either from the subordination of the patient or want of timely decision on the part of the surgeon. With the former cause of delay, the surgeon has little to do; his course is plain when his patient rebels against his prescription. But no one point in the practice of surgery is of more importance to humanity and to the science,
than that rare, but valuable attribute, called decision. We do not mean by decision, that flippant quickness of pronunciation by which words are made to announce that an operation must be performed. This may be imprudent or criminal precipitancy, the effects of which are doubtless seen in many communities, where the loss of limbs abounds on every hand. This speaks badly for the surgery of such place; for the beauty and the perfection of surgery lies in its ability to cure, to save, or to renew deficiencies instead of mutilating. That is commendable decision—the only kind with which the surgeon or physician should feel self-complacency, or which should be tolerated by a community, which is promptly deduced from the whole bearings of the case duly ascertained and properly estimated; and every decision short of this manner of coming to it, is but a guess. The nobleness—the greatness of surgery is not in the mere manipulations or the dexterity and accuracy with which the knife, the saw and the tenaculem are used. It is true that good surgery cannot be practised without good and accurate manipulation; but the main, radical value of the science lies in the judgment exercised in its administration.

We have often thought that there was in many instances better practice found in exercise by many thinking men in our own country, and in private practice, than was found amongst those in high places. We have often observed announcements of wonderful improvements in general practice, and in surgery and obstetrics abroad, which were old things and long proved by our judicious practitioners; and we have often seen successes boasted of abroad, of which many of our private practitioners would feel perfectly ashamed. But we confess ourselves utterly astonished at the facts of the two cases at the head of this article; and we trust that there are no such blunders any where in American surgery.

Case of Caesarean Section, performed with success for the fourth time, on the same individual. Although we believe this to be the same case reported some time ago, by M. E. Charlton, President of the Medical Society of Edinburg, and noticed on page 178, vol II. of this Journal, (q. v.) we give it here as reported by Dr. Michaelis. and taken by the Eclectic Journal from Paffe's Mittheilungen, on account of some additional facts of interest which the present version contains.

Case of Caesarean Section, performed with success for the fourth time on the same individual. By Dr. Michaelis, of Kiel. An account of the three preceding operations, and of the case generally, is given in our second volume, p. 270. The first operation was performed in June, 1826, the woman being then in her twenty-ninth year; the second in January, 1830; the third in March, 1832. This woman became once more pregnant, and, the operation being equally necessary as before, it was performed by Dr. Michaelis, on the 27th June, 1836, after the patient had been in labour three days. The
new incision intersected the second and third cicatrices, and the uterus has become so completely adherent to the abdominal parietes that the peritoneal cavity was not laid open. On the third day after the operation, the patient was threatened with alarming symptoms of peritonitis, accompanied by tympanitis, which speedily yielded to the internal exhibition of ice and a few doses of calomel. The external wound could not heal, on account of the gaping of the uterine opening, which kept apart the adherent margins of the divided skin, and thus converted the wound of both integument and uterus into a single symmetrical aperture. On the 1st of August, (the period at which the last report is dated,) the uterine aperture was rather more than half an inch in extent; and this diminution appeared to be solely dependent on the gradual contraction of the uterus, inasmuch as the healing process itself was not then contemplated. Nevertheless, the patient left her bed daily, and her general health was good. She herself suckled her child, which was thriving well.

[An interesting point connected with this case is the occurrence of peritonitis after the fourth operation, in which instance alone, it will be remarked, the serous sac was not opened, and was therefore unexposed to the influence of external agents, as the atmospheric air, &c.

A medical friend suggests the expediency, in cases of hopeless deformity of the pelvis, that the ilopalian tubes should be divided during the Caesarean operation; in the event of a successful result to the operation, this proceeding would, of course, do away with all risk of a second.]

Pfaff's Mittheilungen.

Opium in large doses to prevent inflammation. M. Malgaigne has communicated to the Academy of Medicine his first results from a new method of preventing traumatic inflammation. After wounds from accident or in operations, the principal enemy to be feared is inflammation. This traumatic inflammation, according to Mr. M., consists of but two elements, the nervous element or the pain, and the inflammatory engorgement. It occurred to Mr. M., that by paralyzing the former the latter might be prevented. With this view he has given the gummy extract of opium in the dose of from six to ten grains a day, continuing as long as inflammation is to be feared. The results so far have exceeded his hopes; he has prevented in the four cases in which he has administered the remedy, fever, local inflammation, and even pain.—Bull. Général de Thérapeutique, 15 Nov. 1837.

We are pleased with observation in medicine, and with experiments tending to improvement in practice—every thing which tends to increase the certainty, the facility, expeditious, ease and economy of ameliorating or removing the ills to which humanity is subject: but we are often led to regret the unguarded direction which the minds of some men take for effecting these good purposes. It should be the first purpose of the practitioner, to guard against doing harm. When this precept is neglected, it is true that we may still profit by their experience, but in order to it, we will often have to take the back track, and profit by the effects of their errors, which we find in the trail they have marked out. Here we may find what to avoid, and here receive stronger lessons than we had before received. But it is most stupid, to design those changes in practice which, instead of actual improvements, are, when effected, retrogressions. We had occasion to remark somewhat
in this manner on a former occasion, when noticing the use of opium in large doses, for the cure of rheumatism. We have similar objections to the experiments of M. Malgaigne in the present instance—the injuries done by the remedy adopted. Six to ten grains of the gummy extract of opium a day, is rather worse, in our estimation, than a quart of good West India, or Cognac, for it has other injurious effects besides high stimulating powers. But in addition to this, we may well object to the very purpose of this prescription; at least in its general application. It is the prevention of traumatic inflammation; whether from accidental wounds or operations. It is true that in some wounds, and some operations, the height and extent to which inflammation may tend is to be looked to with much anxiety; but it is equally true that the present highly improved antiphlogistic plans of treatment are found competent to every end which may be hoped in the case, as possible under the circumstances. Look at the success attending lithotomy and the caesarian operation at the present day. Who now dreads fatal inflammation from the former, with the opportunity of preparation, and with proper enforcement of regimen afterwards. And are we not now constantly informed of the successful termination of the causes of delivery by the caesarian section, without preparation, even to the fourth and the fifth time, in the same individual? These are surely amongst our most formidable operations for the dangers of inflammation.

But we would ask, who will say he can cure a wound, whether accidental or designed, without inflammation? To whom is this natural agency of the system not the handmaid on which he most relies? and who has not in practice the chief purpose of contenting himself with merely favouring, by a removal of those circumstances which are calculated to prevent its natural salutary tendencies of the increased action nature institutes? We apprehend that no surgeon is to be found on this side of the Atlantic who does not operate on, and adjust parts, &c. with the view of simply enabling the natural efforts of the system or of the part, to effect the cure.

We think the Royal Academy, all medical societies and journals, should watch well these kinds of improvement in medicine; and if experimentors fail to see more than one thing at one view, academies, societies, &c. should not fail to do so.

**Carbonic Acid Gas in Dysmenorrhœa.** The following articles, the first from the Medico-Chirurgical Review and the Bull. Gén. de Thérapeutique, and the second from the American Journal of Pharmacy and the American Medical Library and Intelligencer, we think proper to present together, to our readers. Nothing can be more desirable than useful information on the
subject of dysmenorrhœa, not only on account of the immediate distress attending the periodical returns of this disease, but the difficulty which the profession has ever found in its permanent cure, and the extreme importance of that cure to the life of those who are chronically afflicted with it. We hope to be informed of the successes of the remedy related to, amongst American practitioners. We have much blame to attach to most of American practitioners in relation to their management of those complaints of females which are peculiarly disagreeable, distressing and dangerous. We know not why it is that this blame is so much merited—whether from wilful neglect of attention to those distresses, or from the great sin of torpid ignorance from obtuseness of intellect, or a wilful neglect of the study of them. Nor are we less at a loss to determine which of these sources merits the greatest reprobation. Certain it is that the profession is far behind its progress in other particulars, in the understanding and the treatment of most of the uterine affections to which females are subject. It is passing strange that afflictions so severe and dangerous at least, as are all those which interfere in the least with the natural functions of the uterus, should be passed lightly from the care of the profession; and especially when visited alone on the finest sensibilities and deepest interests of humanity.

**Dysmenorrhœa relieved by Carbonic Acid Gas.** Every physician is aware that some females suffer most severe pains in the uterine region, for one or more days before each appearance, and not unfrequently also during the continuance of the catamenial flow. Young girls residing in large towns are perhaps more subject to this distress than any other females;—their systems being often unusually irritable, and this excess of irritability being very generally associated with constitutional weakness. It is a common remark that such girls menstruate earlier in life than such as are robust, and those who reside in the country. Under these circumstances, marriage will often aggravate the dysmenorrhœa;—the generative organs being apt to be so highly excited by coition, that the accustomed monthly discharge, intended, no doubt by Nature as a means of local relief, is either stopped altogether, or is only very sparing and uncertain. The treatment of such cases is often extremely difficult. The employment of the ordinary emmenagogues is very generally pernicious, and even the application of leeches to the feet, or to the vulva, will sometimes only aggravate the sufferings. Professor Mojon, of Geneva, assures us that he has used injections of carbonic acid gas per vaginam, with the most soothing effects. Like Rasori and Borda, he considers this gas as a powerfully depressing or contra-stimulant agent; and it was by reasoning from its known effects, as such, that he was led to try its effects as a local application to the womb in painful dysmenorrhœa. The gas is easily obtained by pouring diluted sulphuric acid on some pieces of charcoal into a flask, (which ought to be provided with a double orifice) like an inhaling apparatus; a curved flexible tube is fitted on to one of these, and when the gas is freely disengaged, the extremity of the tube is to be introduced into the vagina, and the fumigation is to be continued for five or six minutes. This remedy may be used two or three times in the course of the day.

M. Mojon assures us that he has employed this mode of treatment in a great number of cases, and very generally with decided advantage. Not
only was the pain almost always relieved for the time, but also the menstrual flow, in future, became more regular in its return, and more copious in its quantity.—Am. Jour. Med. Chirurg. Rev. from Bull. Gen de Therapeutique.

Observations on the Employment of Carbonic Acid Gas as a Therapeutic Agent, by Wm. R. Fisher, M. D., Professor of Chemistry and Pharmacy in the University of Maryland. In the twenty-third number of the first vol. of the "American Medical Intelligencer," (pp. 415 to 417,) occurs an abstract from the memoir of Dr. Furnari, relative to the employment of carbonic acid gas in medicine. In this abstract the use of fumigations of this gas to various diseased tissues is spoken of, and the intravaginal employment of it in amenorrhoea and other uterine diseases warmly recommended. It is not my purpose to comment either upon the pathological considerations which have induced this practice, or to offer any views as to its efficacy; but an apprehension lest some injury may result from the application of the gas to tissues of such delicacy and sensibility, unless the administration be attended with proper precautions, induces me to ask the attention of the profession of this country to the following considerations. The danger, which I apprehend, may arise from the following paragraph:—"These fumigations are prepared, in cases of uterine pains, by receiving into the vagina the free extremity of a gum elastic canula, surmounted with a nipple-like end, through which is passed carbonic acid gas, which is disengaged from carbonate of lime by means of dilute sulphuric or hydrochloric acid." . . . . . . . "Nothing is more simple, less expensive, and more easy to practice than this operation."

It is true enough that there is no simpler operation in chemistry than the disengagement of carbonic acid gas, and the subsequent distribution of it in any direction by means of an elastic tube; but did the author bear in mind that nascent gases, especially those resulting from the action of an acid, always carry over with them large quantities of the acid in the form of vapor, intimately associated with every bubble that rises! Is there not room for apprehension, that the gas fresh from the materials, to the reaction of which its escape is due, will carry over a sufficient quantity of the mineral acid to act, if not as an escharotic, at least as a powerful rubefacient or stimulant to the delicate tissues for whose advantage it is directed to be employed?

So great have been my apprehensions upon this subject that I have felt it my duty to caution the profession against this effect immediately upon the perusal of the paragraph quoted; and I am induced at the same time to suggest a means by which the efficacy may be tested, without exposing the patient to the risk of injury from the direct action of the strong mineral acids.

It is essential that the gas employed for this purpose should be perfectly free from the sulphuric or hydrochloric acids, by means of which it is liberated from its solid compound; and this degree of purity can only be accomplished by washing the gas in water. The employment of an apparatus for this purpose may be somewhat inconvenient in the country; but it would be far better to abstain from the use of the gas altogether than to incur the risk of irritation, or even inflammation, which might ensue from its employment in an unwashed state. I shall endeavor to arrange some simple apparatus for this purpose, in which, if I should be successful, I will forward you a drawing and description of it. At present, the only means which suggests itself, is to employ for the purpose Woulfe's bottles, connected with each other by a bent tube. In the one, the carbonate of lime is to be placed; in the other, water enough to cover the end of the bent tube which connects the bottles. The elastic tube should then be connected with the open mouth of the second bottle, in which the water is contained; and the whole apparatus being prepared, the dilute acid may be poured into the first bottle containing the car-
bonate of lime; the mouth of the bottle being immediately closed. Efferves-
cence will immediately take place, and the gas proceeding through the bent
tube will be compelled to pass through the water in the second bottle, be
drived of all contamination, and forced out of the elastic tube by the pres-
sure from behind, arising from the constantly accumulating pressure in the
bottle wherein it is discengaged.

The chief difficulty attending the use of this would be obtaining the
Woulfe's bottles; in all other respects no improvement or simplification
would be required. The patient could readily perform all the manipulations
herself, after having been once instructed in the proper proportions of the
materials to be employed.

A word or two as regards the acid to be used. Hydrochloric acid is de-
cidedly preferable to sulphuric acid, on account of its yielding a soluble salt
with lime, which may be removed from the generator with far greater ease
than the heavy, adhesive, insoluble sulphate; and on this account it should
always be employed. The quantity of carbonic acid yielded by limestone or
chalk, if of tolerable purity, is always the same, whatever be the acid em-
ployed; and I annex the quantity by weight which is required to produce a
gallon of carbonic acid gas at the average temperature of 60° F.; should
the temperature range above 60° F., the volume of gas will be somewhat
increased. The paper from which I quote the above paragraphs, gives no
idea of the quantity of gas required; but it is decidedly an advantage to
the correct observer to be acquainted with the exact amount employed, as
he may thereby be enabled not only to form a much more correct estimate
of its influence, but to increase or diminish the quantity in definite propor-
tions as the indication may require.

In large cities, where carbonated waters are manufactured on a large
scale, the most easy plan of all to obtain the use of this new therapeutic
agent, and in a perfectly pure condition, is to affix the elastic tube to a bottle
of soda water, as it is called, and having introduced the canula into the va-
gina, to compel the gas to pass over by immersing the bottle in a basin of
boiling water, by which means a quantity of gas would be obtained equal to
about five times the volume of the soda water employed.

The exact quantity of pure carbonate of lime required to furnish a gallon
of carbonic acid, is 242.80 grains, near enough to half an ounce to allow that
weight to be substituted for it. To decompose this quantity, a fluid ounce
of common muriatic acid will be sufficient. By adopting these proportions
the gas may be administered in definite doses, as it were, and its effects be
much more satisfactorily observed and determined.—Am. Jour. Pharm. Am.

Radical cure of Varicose Veins and of Herniae by Acupuncture. We have before noticed with great pleasure the suc-
cessful application of acupuncture and the small ligature to the
cure of varices, hydrocele of the tunica vaginalis, neck, &c.
We have now the pleasure of calling the attention of the pro-
fession to the successful application of a similar practice, again
to varicose veins, and to the herniary sac.

The common operation for herniae with the knife is itself so
formidable that it has not been prudent to adopt it merely with
curate views; but it has, as a matter of prudence, been held
in successful use in cases rendered irreducible by strangulation,
incarceration, &c. Whilst, therefore, it has been a valuable
acquisition to surgery, it has not been available for the treat-
ment of ordinary cases—the great frequency of which we have had occasion to notice in another place. We congratulate the profession, therefore, on the demonstration of success offered by M. Bonnet, of a simple and safe plan, of operation, which none may dread or find difficulty in adopting. It seems to be calculated to afford, with little pain and danger, in a short time, and with a good share of certainty, all the success, and upon the same principle too, which has been desired by the truss-makers who have so generally failed to effect their desired end—a radical cure. We commend the practice of the surgeon of the Hotel-Dieu at Lyons to the favorable notice of American surgeons.

M. Bonnet, chief surgeon of the Hotel-Dieu at Lyons, informs us that he has treated eleven cases of varicose veins by introducing pins through their cavities, and allowing them to remain there for some time. Nine of these cases were cured. He has applied the same treatment to hernial sacs; and the following is a short account of his method, and of the success which he has obtained from it. He passes three or four pins through the hernial covering close to the inguinal ring, and in order that they may exert a certain degree of compression, as well as of irritation, on the sac, he twists upwards their points and heads, so as to give them a circular direction.

Caution is necessary not to injure the spermatic cord. The inflammation and pain commenced usually on the third or fourth day after the operation, and the pins were removed a few days afterwards. M. Bonnet has treated four cases of inguinal hernia by acupuncture. In two of these, the hernia were small, and three weeks sufficed for the cure. The third was more troublesome. It occurred in an old man 67 years of age; and in him the hernia descended to the bottom of the scrotum, and was with difficulty kept up by a truss. Six needles were used. After a months treatment, this patient could walk about, without any tendency of the viscera to descend. In the fourth case, the hernia was of thirty years standing; no truss could keep it up; the inguinal aperture was large enough to admit "l'introduction de cinq doigts reunis," and the tumour descended a considerable way down the thigh. Five weeks were necessary for the cure. We are assured that all these patients could cough and walk about freely without any escape of the bowels, and that the inguinal ring was so plugged up, that it could no longer be distinctly recognized.—Ecl. Jour. Bulletin de Therapeutique, from Med. Chir. Rev.

Kreosote in Gonorrhœa and Gleet. Dr. Dick of Glasgow, has employed Kreosote in the chronic stages of gonorrhœa and in gleet; and thinks its beneficial effects are more obvious than those of copaiba. He administers it in doses of 2 drops a day, with loaf sugar, beaten into syrup, with water. [Am. Jour. from Ed. Med. and Surg.

This is an important fact to the practitioner, and we hope it will be soon confirmed by the observation of other practitioners; for however loathsome to the feelings of the practitioner, the treatment of this class of diseases may be, still it has to be done; and in order to this, he now has to pay enormously for copaiba, the use of which the kreosote is designed to supplant.
Very large Calculus passed by a young Woman without operation. A woman, 18 years of age, who had for seven years suffered from great pain in the pudendum, &c. whilst sitting upon a pot-de-chambre, endeavoring, by very forcible efforts, to discharge her urine, and which exertion she continued for ten minutes, passed into the vessel a calculus of an oval form, 2 5-8 inches long, 1 3-8 inches broad, and weighing 651 grains.—Am. Jour. Guy's Hospital Reports, April, 1839.

Injection of nitrate of silver in the treatment of chronic vesical Catarrh.—There is recorded in the Bulletin Gen. de Therapeut. (Jan., 1838,) by M. Alquié, a case of chronic cystitis, which resisted, for three years, various means, and which was cured in a few days by an injection of a solution of nitrate of silver, in the proportion of one grain to four ounces of distilled water. The urine was first evacuated by a silver sound, and the solution then injected into the bladder through this instrument, and allowed to remain for five minutes. The sound was then withdrawn and the injection was evacuated by the patient without any pain. This operation was repeated for four days in succession, after which period the patient was completely relieved.

The remedy is worthy of further trial.—Am. Jour.

Useful application to Bed-Sores. A correspondent of the Bulletin Général de Therapeutique recalls to the attention of medical men a very excellent, and easily prepared, local application for those troublesome and distressing sores which are so apt to occur in bed-ridden patients.

It is unnecessary to allude to the frequency of this annoyance in certain cases of protracted disease, more especially of obstinate fevers, of phthisis, &c., and to the extreme difficulty of counteracting them. The late M. Autenreith, of Vienna, was much in the habit of using the thick sedimentary deposit obtained by adding the liquor plumbi, drop by drop, to a strong decoction of oak bark, (in short, a tannate of lead,) as a topical remedy to bed-sores, with great success. The super-natant liquor being decanted off, the sediment is easily procured; it is then to be spread on linen, as we do with an ointment. The application to the abraded surface should be repeated every night and morning.

Dr. Tutt, a countryman of M. Autenreith, has, of late years, used this remedy with very satisfactory effects. In some cases, where it did not seem to agree, he mixed a certain portion of the tannate previously dried, with simple ointment, (two drachms to one ounce,) and he found that the sores often healed readily under the use of this cerate.

We can bear our testimony in favour of the good effects of this application to bed-sores. In our own practice we have prepared it by mixing together the liquor plumbi and the common tincture of kino.—Lond. Med. Chirurg. Rev., July, 1839.
MEDICAL INTELLIGENCE.

MEDICAL PRIZE.

The Medical Society of Augusta, Ga. offer a Prize of Fifty Dollars, or its equivalent, to be designated by the successful competitor, for the best approved, original Essay,

On the use and abuse of Calomel, as a therapeutic agent.

The following are the arrangements adopted by the society:

1. The Essay shall not exceed 40 octavo pages.
2. Essays, intended for the competition, are to be directed, free of expense, "To the Secretary of the Medical Society of Augusta, Ga."
3. Each essay must be endorsed with a motto, which must be also on an accompanying sealed letter, containing the name and address of the writer.
4. Should none of the Essays be judged worthy of the prize proposed, they will remain in the hands of the Secretary, subject to the order of their authors, for three months, the names remaining under seal; after which, if not otherwise directed, will be considered the property of the Society.

The Medical journals of the United States, and also the Literary periodicals, are respectfully requested to give notice of the same by publishing the above. — [Extract from the Minutes.]

Prospectus of the American Phrenological Journal and Miscellany. It is a remarkable fact, that while the converts to the belief that Phrenology is true, have, within a few years, most astonishingly multiplied, there does not exist on the American continent a single periodical whose object is to advocate its truths, repel the attacks made upon it, or answer the enquiries which even candid persons are disposed to make concerning it. And this is the more surprising since the materials already existing and daily augmenting, with which to enrich such a publication, are almost inexhaustible.
The science of medicine has its appropriate media through which to present to the profession and to students all the new facts which occur, and all the new theories which are advocated in the various institutions of medical science throughout the world; and it is proper that it should be so. The same is true of the other leading professions of law, and of divinity. But, notwithstanding the important bearings which phrenologists know their science to have on medicine, and divinity, and law, there is no publication through which, as the appropriate channel, those bearings may be pointed out. It is true that some newspapers, and also one or two works of a less ephemeral character, do occasionally admit articles in favor of phrenology: but these do not meet the present necessity. A periodical which is avowedly phrenological—one, whose pages shall constitute a permanent depository of facts, and which shall be open for the expression of opinions and the record of principles connected with those facts, is now needed: and a strong feeling of this necessity, together with a belief that such a work is extensively demanded, and will meet with encouragement and support, has induced the publisher to present the prospectus of "The American Phrenological Journal and Miscellany."

The object of this work will be to preserve from oblivion the most interesting of the very numerous facts, confirmatory and illustrative of the truth of phrenology;—to show the true bearings of this science on Education, (physical, intellectual and moral;) on the Medical Treatment of the Insane; on Jurisprudence; an Theology, and on Mental and Moral Philosophy. On all these subjects there is encouragement to hope for contributions from several able pens: while the resources of the editor himself will not, it is hoped, be found inconsiderable.

The religious character of the work will be decidedly evangelical: for one prominent object in giving it existence is, to wrest Phrenology out of the hands of those, who, in ignorance of its true nature and tendencies, suppose that they find in it an instrument by which to subvert the truths of revealed religion, and loosen the bonds of human accountability, and moral obligation. A frequent subject of discussion in our pages will therefore be, The Harmony between the truths of Revelation and those of Phrenology. And on the subject of the religious bearings of our science we respectfully solicit the enquiries and objections, not of cavillers, but of the truly candid, and the conscientiously fearful. Such correspondents we shall always welcome to our pages, and they will always be treated with kindness; as, also, will honest and respectful objectors to Phrenology. But the captious and cavillers will ensure to themselves our silent contempt; and the ignorant pretender, who seeks to overthrow a science which he will not be at the pains to investigate, may expect a merited rebuke.

As our object is the establishment of Truth, we solicit the communication of facts which are supposed to militate against Phrenology; and we pledge ourselves to publish them, in all cases in which we have satisfactory vouchers for their genuineness; and in which all the facts in the several cases are furnished to us. But as we must form our own judgment of the cerebral development in all cases on which we express our opinions, it is obvious that we cannot receive, in these instances, the opinions of non-phrenological or anti-phrenological writers, as to the degree in which the several organs are developed:—we must, in every such case, see the head or skull, or a cast of it, properly certified to be true to nature.

Original Essays on Phrenological subjects will form part of the Journal; as also, Reviews of Phrenological and Anti-Phrenological Works: nor shall we fail to present to our readers such matters of interest and importance as may be found in foreign Phrenological works of standard excellence, and which are not generally accessible to the American public. Our facts we pledge ourselves shall be bona fide such; and, as often as practicable, we
shall accompany our descriptions with illustrative cuts; indeed, we intend and expect that scarcely a number will be issued without two or more such cuts.

To encourage Phrenologists of talent (and especially professional men who are Phrenologists,) to enrich the work with their contributions, we offer for accepted matter, as liberal a compensation per printed page, as is usually afforded by the very first periodicals in our country: but the editor does not promise to endorse all which his correspondents may communicate; nor all which he may admit into the work. To error, if serious, and especially if it affect the interests of morality and religion, he claims the right of correction, in the form of reply, or of the suppression of objectionable matter:—and communications for which compensation is expected, must be so prepared as to be fit for the public eye.

In conclusion, we may be allowed to say, that the pecuniary value of each number will depend much on the extent to which the work is patronised. It is not with the desire or expectation of gain that it is offered to the community, but from moral considerations: from a desire to know and to promote a truth. Hence should a large subscription list be obtained, a considerable proportion of the profits will be devoted to the enlargement and improvement of the work, without an increase of expense to the subscribers. More frequent illustrations and embellishments will, in that case, be inserted, and the attractions of the work be thus multiplied.

Terms.—1. The American Phrenological Journal and Miscellany will be issued monthly, commencing on the 2d of October next.

2. Each number will contain at least 32 octavo pages, making a volume of not less than 354 pages; corresponding in point of mechanical execution with the best periodicals of the day.

3. The work will be furnished to subscribers at $2 per annum for a single copy; $5 (current in Philadelphia or New York) for three copies, or $10 (current as above) for seven copies sent to one address. To Clergymen and Theological Students, single copies will be furnished at $1.50 per annum; and to companies of eight or more of such, it will be reduced to $1.25 per copy, if sent to one address, and the subscription forwarded to the publisher free of expense.

N. B.—As funds are already deposited for sustaining the work one year, subscribers will incur no risk of loss by paying in advance; and for the same reason, subscriptions will be invariably required in advance.

Money sent by mail, if enclosed in the presence of the postmaster, will be at the risk of the publisher; but postage must, in every case be paid.

To editors who will give this Prospectus one or two insertions, and forward a paper containing it to the publisher, the work will be sent for one year.

Subscriptions, and letters of business, may be addressed to the publisher, Adam Waldie, 46 Carpenter-street, Philadelphia, and communications for the work to the Editor of the Am. Phren. Jour., care of A. Waldie.

To Postmasters throughout the country, will please to act as agents for this Journal.