prise the several impressions essential to ideas of the hard, the soft, the rough, the smooth, the hot, the cold, the moist, the dry, and so on. It is, moreover, through this sensibility that we appreciate the state of the muscles—obtain the *muscular sense*.

This fifth sense also is, presumably, awakened through the vesicular extremities—the peripheral expansion of fibrous filaments. Whether the grey substance and white fibres originating and conducting common sensation be the same as those which subserve the spinal reflex function, is a question yet undecided. This much, however, may be admitted: the communicated impression ascends along the posterior columns of the spinal cord, and attains grey vesicular centres—the ganglia of common sensation.

Physiologists are not agreed as to the identity of these structures; they must be expected, however, like the other sensory ganglia, to be somewhere at the base of the cranium; and I am myself disposed to think that the vesicular nuclei within the lateral lobes of the cerebellum constitute the encephalic centres of common sensation. Many years ago, Foville assigned this function to the aggregate cerebellum; and others, with great plausibility, have advocated the same notion. The anatomical connexion which exists between the ganglionic structures in question and the posterior columns of the spinal cord, through the corpora restiformia, favours the idea which I have advanced; and there are various physiological and pathological facts which go to corroborate it.

The experiments of Magendie and Longet show that the slightest touch of the fibres of the restiform bodies induces violent pain.* Hutin relates a case in which the sense of touch was so exalted that, upon the least contact, intolerable pain and restlessness ensued, with corresponding muscular contractions, resembling those produced by an electric discharge. The patient ultimately died in the most terrific convulsions, prostrate and exhausted. On examination after death, there was found, amongst other changes, atrophy of the cerebellum. "Its medullary centre, as compared with that of another subject, was a third less in size in either hemisphere. The white substance, which, in the normal condition, occupies the centre of the corpus rhomboidale, had ceased to exist; so that the fimbriated margins of this portion approached the centre, and only formed a small pyriform, very hard, greyish brown body."†

The view just advanced would seem to reconcile, in some degree, the doctrine of Gall with that of Flourens. The former, as all are aware, taught that the entire cerebellum forms the organ of the sexual instinct; and the latter (supported in his conclusion by most modern physiologists) conceives his experiments to have established that its office is to co-ordinate muscles acting in combination at the mandate of volition. It has also been thought to exercise some special influence in balancing the body. Now, if some portion of the cerebellum subserve ordinary feeling—common sensation, its connexion with the function imputed to it by Gall is sufficiently intelligible, without adoption of the phrenological doctrine. Numerous facts certainly appear to indicate some relation between the cerebellum and the organs of generation; but such facts receive an interpretation just as rational by reference to the tactile sensibility of these latter, as by unqualified admission of the phrenological idea. In the view regarding the muscular office of the cerebellum, the facts bearing upon it may receive an explanation by considering the probable influence of its peripheral vesicular neurine—its cortical grey matter—in determining to the muscles some reaction respondent to their feeling. The experiments of Budge and Valentin demonstrate an apparent influence of the cerebellum, when irritated in its cortical portion, upon the testes and vasa deferentia, in occasioning their retraction.‡

If, indeed, the idea be ultimately confirmed, which assigns to the structure in question the co-ordination of muscles in voluntary movement, it perfectly comports with my own hypothesis concerning the ganglia of common sensation; for, as Dr. Carpenter remarks, "all voluntary movements require the *guidance of sensations;* and most of these are of the tactile kind."*

Let the whole case, however, be as it may, common sensation must have its proper ganglia somewhere; and it cannot be doubted that these, through the spinal cord, are in some sort of connexion with every sentient structure.

I would beg my hearers to understand that, with respec to any hypothesis advanced in these lectures, the individu facts cited in its support are not offered as *proof*, but simpl as exemplifying the *kind of evidence* which, by accumul tion, might adequately substantiate the same.

All the sensory ganglia, it may here be noticed, besides their instrumentality in inducing the simpler modes of consciousness, produce reactions very often in the muscular system, when, through afferent nerves, they are stimulated from without; and that, too, in frequent independence of thought or volition. It would seem that impressions received in some particular ganglionic structure may be diffused through a whole chain of connected ganglia, and so bring about respondent movements of very varied character. These Dr. Carpenter designates *consensual*, not in the meaning of consentaneousness, but as occurring *with*, in dependence upon, *sense*. A young infant, long before distinct thought can have been awakened, exhibits restlessness from contiguity to its mother's bosom, provoked, it is probable, by the odour of the mammary fluid. An odious taste simply may determine the involuntary act of vomiting; a loud and unexpected sound will occasion slight but very general contraction of the muscles, as in startling; the eye, when dazzled, is rapidly withdrawn from the light; and a sudden dash of cold water provokes deep inspiration and audible sobbing. These muscular actions are *reflex*, as to their modes of occurrence; but they differ from the reflex actions purely spinal in being essentially attended with consciousness; and they differ from ordinary movements in the circumstance that neither volition, nor ideas, nor mental emotion, properly speaking, are concerned in their production.

There are other sensibilities which are external in their related objects, but which do not form the medium of information concerning the world without, and so, on this account, do not come within any of the foregoing categories. These comprise the physical appetites of *hunger* and *thirst*. Nothing is made out with respect to the ganglionic centres of these affections. Probably they somewhere exist among the tracts of grey matter at the base of the encephalon, there being much vesicular neurine there, the function of which is quite uncertain. But, upon this subject, conjecture on the basis of analogy alone exists at present.

* Romberg. Op. citat. † Op. citat. ‡ Op. citat.

ON THE PATHOLOGY AND TREATMENT OF LARYNGO-TRACHEAL INFLAMMATION.

By ROBERT TURNER, M.D.

OBSERVATION and reflection have impressed me with the belief that a common pathogenic condition pervades all inflammatory affections of the laryngo-tracheal mucous membrane; and that to this condition their leading characteristic, stridulous respiration, as well as their tendency to a fatal termination, is chiefly due: in other words, that the essential element of this class of diseases—of *laryngitis*, acute and chronic, and of *croup*, in all its varieties—is the same. My object in the present communication is to develope these views, and to point out what I conceive to be their application to practice.

The following positions embody a statement of some points in the physiology of the larynx; which, although well ascertained facts in vital dynamics, have not, I believe, obtained a due practical recognition in pathology and therapeutics.

* British and Foreign Med. Rev., vol. xxii, p. 510.

I. *The terminal branches of the superior laryngeal or excitor nerve of the larynx being distributed principally to the mucous membrane of the glottis, a higher degree of sensibility resides here than in any other part of the respiratory tube.*

II. *This sensibility is evinced by closure of the glottis, effected by the muscles in which the motor nerves of the larynx (the recurrent laryngeal and the crico-thyroid branch of the superior laryngeal) terminate.*

III. *It is by this act alone that apnœa, or even stridulous respiration, depending on contraction, can take place,—the absence, below the glottis, of muscular fibres capable of acting in such a direction as to diminish calibre, and the unyielding cartilaginous rings in the walls of the tube rendering constriction in that situation physically impossible.**

The vigilance of the *sentinel perdu*, stationed at the approach to the respiratory organs, and the promptitude with which its warnings are responded to, are facts so familiar as to need no illustration; but such an opportunity as occurred to me in the instance related below (Case 1) of estimating the degree of force which may be exerted in this conservative act, is not, I believe, often enjoyed.

Under the term *spasm*, the participation of the glottidean contraction in the phenomena of inflammatory affections of the laryngo-tracheal mucous membrane and submucous tissue has been recognised by many systematic writers, from the days of Cullen downwards. It will, however, be my endeavour to show that its true semeiological and pathological import, in these circumstances, has been misapprehended or underrated by all. It is unnecessary to notice every allusion that has been made by authors to the (so called) *spasmodic element* of the diseases under consideration, as the sentiments expressed by our latest and most esteemed authorities fairly represent the general state of opinion on the point. Dr. C. J. B. Williams *(Library of Medicine*, art. *Tracheitis)* refers to it as arising from the increased sensibility of the inflamed mucous membrane, from interstitial effusion in the lining of the trachea and larynx, and from the presence of false membrane within the tube. Dr. Cheyne ascribes the difficulty of breathing in laryngitis "partly to spasm caused by inflammation of the membrane" *(Cyclopœdia of Practical Medicine*, art. *Laryngitis);* Dr. West *(Lectures on the Diseases of Infancy and Childhood*, 2nd ed., pp. 249-53 *passim)*, in speaking of croup, alludes to "that spasmodic condition of the muscles of the glottis which endangers the patient's life more than the mere extent of false membrane in the air-passages", and again to "that spasm of the glottis which the inflammation occasions"; and Dr. Maunsell (Evanson and Maunsell *On the Management and Diseases of Children*, 5th ed., p. 329) observes, "Every affection of the larynx is subject to exacerbations which partake much of a spasmodic character; and a paroxysm of this nature may occur at an early period of true croup, and destroy the patient's life before there has been time for any very important results of inflammation to be produced."

Other modern authorities of equal mark ignore, or by implication deny the occurrence of this spasmodic condition in the same circumstances; Dr. Copland discussing the value of tracheotomy in croup, without adverting to the spasmodic element at all *(Dictionary of Practical Medicine*, art. *Croup);* and Dr. Watson *(Lectures on the Principles and Practice of Physic*, 3rd ed., vol. I, pp. 844-6) referring the dyspnœa in this affection to the mechanical obstruction of the air-tube by "preternatural membrane, or serous or mucous or puriform matter", in one class of cases; and, in another, "mainly to thickening of the mucous membrane".

It will, however, be generally conceded that the broad fact of the presence of what has been designated *spasm*, in inflammatory disease of the larynx and trachea, rests on as certain grounds as any other article of belief in pathology not absolutely demonstrable by the researches of the morbid anatomist. A convincing argument in support of it is thus stated by Dr. Williams *(op. citat.*, p. 56): "The share which spasm has in causing the dyspnœa (of croup) may be inferred from the fact that in no case have the air-passages been found so much blocked up by the albuminous secretion as to account for the amount of the obstruction; and in many cases the constriction has appeared greatest where little or no exudation was found after death." The same inference is plainly deducible from Dr. Cheyne's statement to the effect that, in fatal cases of croup, a space of *three-eighths of an inch* usually exists in the larynx for the transmission of air, although this result of his extensive observation has received a different explanation from Dr. Cheyne himself.

Inflammation of the mucous membrane, then, singly, or combined with any or both of its consequences, tumefaction of the tissue of the glottis from interstitial effusion, and fibrinous deposit within the tube, are the morbid conditions held to be capable of inducing contraction of the *rima glottidis*—an opinion in which all who are conversant with the clinical history and the revelations of the scalpel after death, in the diseases under consideration, will readily concur; and this doctrine, viewed in connexion with the anatomico-physiological considerations above stated, inevitably leads to the following conclusions:—

I. *In every form, case, and stage of laryngo-tracheal inflammation, when a degree of severity of which stridulous respiration is the token has been attained, there exists a structural lesion which will excite to action the constrictor muscles of the glottis.*

II. *This glottidean contraction must greatly preponderate over, if it do not entirely supplant, all other pathological conditions, in these diseases, as a direct cause of impediment to the access of air.*

For the reasons already assigned, it is evident that any influence which the muscular fibres of the trachea can exert in occasioning dyspnœa, by lessening the calibre of the tube, will be of a very subsidiary kind, when co-existing with the glottidean contraction. The opinion, therefore, of Drs. Cheyne and Williams, who attribute an equal share to "spasm" in both situations in the production of "the croupy inspiration and cough, and the hoarseness" *(Library of Medicine*, vol. iii, p. 56, and *Cyclopœdia of Practical Medicine*, vol. iii, p. 22), is manifestly untenable. On the same grounds, the estimate of the last named authority *(loc. cit.)* respecting the agency of "effusion in the lining of the trachea and larynx", and of the pseudo-membranous tubular deposit in their interior obstructing the passage of air "directly by their bulk", must also be regarded as erroneous. The anatomical characters of laryngo-tracheal inflammation, in short, are of less pathogenic importance *per se* than by reason of their indirect tendency in inducing the excito-motor act of constriction of the glottis.

III. *When the inflammatory action has once excited, it will, if continuing unabated, maintain the glottidean contraction throughout the attack, whilst the function of the true spinal system of nerves remains unimpaired.*

This deduction, so far as I have been able to ascertain, is opposed to all views hitherto advanced on this subject, with the single exception of those of Dr. West, which I shall afterwards have occasion to notice more particularly. The two writers last quoted are, I believe, those who have spoken most definitely on the point; both refer to the glottidean contraction in inflammation of the laryngo-tracheal mucous membrane, as a transient condition, a "temporary spasm", liable to complete remissions; and the one describes it as marking the onset *(Cyclop. of Pract. Medicine*, vol. iii, p. 22), whilst the other *(Lib. of Medicine*, vol. iii, p. 54) recognises its presence "particularly in the advanced stages" of the disease—a contrariety of opinion the adjustment of which it appears unnecessary to attempt, as the conclusion last stated negatives alike each of the conflicting assertions. It is questionable, indeed, whether the term *spasm* can with strict propriety be applied to this muscular contraction at all. "Spasm", according to Dr. Latham's definition*—an exact explanation, I believe,

* The structure of the extremities of the bronchial tubes is a question unconnected with the subject under consideration.

* Lectures on subjects connected with Clinical Medicine, vol. ii, p. 384.

of the meaning usually attached to the term—"is a mode of action in muscular structures different from or beyond the natural and accustomed mode"; but the glottidean contraction accompanying laryngo-tracheal inflammation is a normal act, although called forth by a morbid excitant. If spasm it must be called, it is at any rate a *tonic* spasm; and, although *apparent* remissions and exacerbations of dyspnœa are undoubtedly exhibited, with more or less distinctness, in all cases, at irregular intervals throughout the attack, the causation of these admits of a satisfactory explanation, in strict accordance with the views I am endeavouring to establish: for the glottidean contraction, from the moment of its first occurrence, will originate a condition directly antagonistic of itself. By impeding the access of air to the lungs, and, therefore, of a due supply of oxygen to the blood, it will give rise to a gradual poisoning of the latter by carbonic acid. The effect of this toxæmia in the nervous centres, when it has attained a certain degree of intensity, will be to impair the energy of the *vis nervosa;* relaxation of the glottidean constriction must follow, and the stridor of the respiration will abate, or altogether cease for a time. The aëration of the blood will then be in some measure renewed, and the nervous power so far restored as to permit the glottidean contraction to resume its sway, and maintain it until again overborne by the influence of the blood-poisoning which it will in turn re-induce. Unless arrested by treatment, this alternation of opposed pathological states will go on, the toxæmia gradually gaining the ascendency, until the function of the true spinal system is abolished, and a fatal result succeeds. Some diversity of opinion exists in regard to the mode in which this is brought about. According to most authorities, it occurs by *asphyxia*—a term for which Dr. Watson *(Lectures,* etc.) proposes to substitute "*apnœa*"*;* and Dr. William Budd *(Medical Times and Gazette* for June 19th, 1852) the expression, "*death by privation of oxygen*". The views I entertain of the pathology of these affections suggest the phrase "*death by toxæmic coma*", as a more accurate description of the fatal termination in the circumstances in question.

In a direct ratio with the severity of the inflammatory action, but also modified, perhaps, in some measure, by peculiarity of constitution, will be the urgency of the symptoms depending on the glottidean contraction and the toxæmia respectively. It, therefore, varies much in the different forms of laryngo-tracheal inflammation, and even in different cases of the same variety of it; but the difference, in all circumstances, is only that of degree. The frightful

"Gasp and tug for life—the nostril stretched with struggling"—

of sthenic croup, and the calm *habitual* stridor of chronic laryngitis, equally betoken the narrowed glottis. The livid countenance and dull eye of the first, and the pallid aspect and cold extremities of the last named affection,* signify alike the injurious influence of maloxygenated blood.

But, it may be objected, why does this glottidean contraction here stop short of effecting the complete closure of the orifice, and inducing the sudden asphyxia which is observed to ensue from it in other affections, as in *laryngismus stridulus* and the severer forms of *hooping-cough;* as well as from the contact with the rima glottidis of noxious gas, or solid or liquid particles? The explanation appears to be that, in the circumstances just enumerated, this action is excited more intensely than by inflammation of the mucous membrane, and abruptly, when the condition of the circulating fluid affords no counteracting influence to muscular contractility; whereas, in laryngo-tracheal inflammation, the contraction supervenes, *pari passu,* with an exciting cause growing in intensity as the disease proceeds, and affording time for the development of a controlling and opposing condition of the nervous centres.

* The subject of Case III remarked to me, of his own accord, that the night after he submitted to the operation of tracheotomy was the first, for some months, in which he was able to dispense with the use of artificial means of producing warmth in bed; and he has not since exhibited, or complained of, any deficiency of animal heat—evidence in support of the chemical theory of its generation which is, at least, unbiassed.

IV. *The glottidean contraction will further impede the ingress of air to the lungs by preventing expectoration.*

Much of the inflammatory products, solid and fluid, which accumulate in the trachea and bronchi in protracted cases, would doubtless be ejected, if a more patent state of the orifice existed throughout the attack. Dr. Watson *(Lectures,* etc., *loc. cit.),* in commenting on a case of croup reported by Mr. Chevalier in the sixth volume of the *Medico-Chirurgical Transactions,* and in which tracheotomy was performed with success, observes: "The effect produced by the operation was very instructive. Air was fully inspired through the opening; then a strong cough took place, by which a large quantity of viscid reddish mucus was forced out by the natural channel through the glottis. It was evident that the child could not expectorate before, simply because it could not sufficiently fill its lungs with air to drive the collected mucus out." I submit with deference, however, that, for "*simply*", in the last sentence, we ought to substitute *partly,* and add *but chiefly on account of the constriction of the glottis.* By surgical interference, no doubt, air in sufficient volume for the act of expectoration was admitted; but if the operation had not, at the same time, relieved the glottis from the contact of the current of inspired air, and thus rendered the constriction more easy to be overcome, it seems obvious that little if any of the accumulated mucus could have been got rid of in the manner described. No mention is made in this case of the more characteristic product of the disease. If it existed here, and was not expectorated in membranous shreds, it may still have been ejected in the form of pus—a fluid into which, as pointed out by Dr. Budd *(Medical Times and Gazette, loc. citat.),* it has a tendency to degenerate. "The histological and other characters of the exudation", he observes, "are very important. If you examine a portion of the false membrane under the microscope, you will see that it is essentially made up of cells or corpuscles lying in a granular blastema. These cells bear, as you will remark, a very close resemblance to the common pus-corpuscle. Pus-corpuscles are, in fact, none other than these same cells, dead. . . . This close affinity of the exudation to pus is, in croup, a character of great moment; since, in virtue of it, a product, which was at first solid and adherent, may, by a slight change of conditions, give place to a fluid secretion. In cases of recovery, some such secretion always supersedes the croupal"—where this is present—"and is, in fact, the chief instrument of that separation from the surface beneath which prepares the way for its ejection."

V. *The other obstacles to the access of air to the lungs, which arise in protracted cases, are traceable, indirectly, to the glottidean contraction. The state of toxæmia it occasions will, when this has been of some duration, produce sanguineous engorgement of the lungs, and consequent serous effusion into the air-cells and lesser bronchial tubes, and thus another mechanical cause of obstruction to the function of respiration will be established.*

Applying the test of clinical observation to these *à priori* deductions, we shall find that it yields them, in many respects, unequivocal support.

The auscultatory signs in every case and stage of the diseases under consideration, when stridor of the cough and respiration has been set up, will be found to point to the aperture of the respiratory tube as its principal seat. In those instances in which the embarrassment of the respiration is greatest, and which advance most rapidly to a fatal termination, it is a fact, attested, as we have seen, by various observers, that no *post mortem* appearance is found to which the severity of the symptoms or the early issue in death can be attributed. The phenomena and the result must, therefore, have mainly depended on a pathological state which existed only during life, and which, for the reasons already assigned, *could have been* no other than the glottidean contraction.

What is the condition of the patient during the so-called "remissions" of croup, for example? A soporose, or, as Dr. Williams expresses it, "a half stupid state", clearly signi-

fying cerebral oppression from malaërated blood, and gradually deepening, as the case advances, into the perfect coma, with or without convulsions, which closes the scene.

Detached portions of false membrane, sometimes of a tubular form, and of considerable size, are, it is well known, occasionally ejected during an attack of croup; but it is matter of common observation that, in general, no favourable augury is derivable from the circumstance, for that it occurs oftenest towards the close of a hopeless case. Does not this tell us of relaxation of the glottidean constriction, delayed until irretrievable injury has been done to the brain by the prolonged circulation through it of non-arterialised blood?

The presence of false membrane in the lower part of the trachea and in the bronchi, with copious mucus or mucopurulent secretion in these situations, are appearances more especially appertaining to the asthenic variety of the same disease, to cases comparatively slow in their course, and little marked by cessations and aggravations of dyspnœa; because in these the inflammation has been more moderate in degree than in the more acute form, and has excited a less energetic contraction of the glottidean muscles, allowing time for the extension of the morbid action and its results farther down the tube.

A remarkable regularity, as regards the time of invasion of the developed stage of croup, has been noted by all writers on the subject, and is indeed a well known characteristic of the disease. In one case, the premonitory catarrhal symptoms may be present for a day or two preceding; for about the same length of time, in another, slight uneasiness in the throat may be complained of, and, if this have attracted notice, inspection may reveal the diphtheritic exudation, with surrounding redness on the tonsils and uvula; in a third, the little patient may have retired to rest in apparently perfect health; but, in all, the probability is, that the first announcement of the accession of the stage in question of this malady—the first hard ringing cough—will occur early in the night, and during sleep; and the same proclivity to nocturnal invasion or aggravation of stridor, although it has excited more general attention in this the most common disease of the class, is observable, and has also been recognised, in the other forms of laryngo-tracheal inflammation.

The explanation of this peculiarity will flow from the doctrine above advanced regarding the *rationale* of stridulous cough and respiration. "Volition", says Dr. Marshall Hall *(On the Diseases and Derangements of the Nervous System*, p. 254), "has a constant influence over some of the muscular actions, of which we are almost unconscious, and which we only discover by carefully observing the effects of its subtraction. The acts of respiration, originating, as they do, in the reflex function of the spinal marrow, are nevertheless regulated and rendered equable by this silent but constant influence and agency of volition." And thus a degree of inflammatory action in the laryngeal mucous membrane which is insufficient to excite the glottidean contraction, when the muscular apparatus concerned in it is under the full control of the cerebral system, will be adequate to the production of the act in question, during sleep, when this controlling power is greatly in abeyance.*

[*To be continued.*]

Keith, July 1854.

* As might be anticipated, a similar tendency will be found to exist in other affections involving the perversion, or morbid excitation of the reflex function—examples of which must often present themselves to the medical practitioner. A familiar one may be mentioned, occurring in some cases of fracture, in which the patient no sooner drops asleep than he is aroused by painful twitchings in the muscles of the injured part, which cease when he is wide awake, only to recur when he begins to dose again—unless the excito-motor system, which, in the language of its discoverer, "never sleeps", can be coaxed into temporary quiescence by the administration of an opiate. A somewhat whimsical exemplification of this physiological law is occasionally experienced by a friend of the writer in his own person. When a corn, situated on the lateral aspect of the little toe of his right foot, has attained a certain size, he cannot go to sleep, if he recline on the right side—so as to allow the excrescence to rest upon the bed—without the certainty of being immediately after aroused by a sudden and powerful contraction (but accompanied by no feeling of pain) of the flexors of the thigh and leg of the extremity on which his tormentor is located; and he can only escape a repetition of the annoyance, when he resumes his nap, by so supporting the right foot with the other as to ward off pressure from the tender toe, or by lying on his other side—the dorsal decubitus being made *cariare* to him by the hag Ephialtes. For some time after the corn has been pared, or "picked", he may enjoy his favourite posture in bed, secure, without precaution, from the attacks of this enemy to his repose.

That some diseases have a disposition to arise, by preference, at night, is an old observation. "Nonnullos adoritur," says Heberden, "post primum somni tempus; quod in morbis ex distensione frequens est." Probably these *morbi ex distensione* are of the class to which the foregoing remarks have reference—affections in examining whose prominent characteristic, I have employed a light which has illumined many of the dark places of pathology—that supplied us by the labours of the illustrious Marshall Hall.

PHYSIOLOGICAL AND PRACTICAL STUDIES.

By BENJAMIN W. RICHARDSON, M.D.

No. II.

ON THE EFFECTS OF THE HORIZONTAL POSITION OF THE BODY IN SYNCOPE; WITH OBSERVATIONS ON THE RELATIONSHIP THAT EXISTS BETWEEN THE BRAIN AND HEART.

[*Read in abstract before the Physiological Section of the Medical Society of London, on April 10th*, 1854.]

PART I.

THE simple fact, that the horizontal position of the body affords oftentimes marked and immediate relief to those serious symptoms which follow upon a sudden failure in the action of the central organ of the circulation, is so often observed and so generally known, that it ranks in popularity with the well understood medical truths, salts purge and opium stupifies. But I do not know that any very signal and distinct attempt has ever been made by the physiological inquirer to explain the principles on which this excellent and simple remedial measure produces its good effects.

One view, however, on this subject has fixed itself in the professional mind, and this view, though it has an indirect source and is used more for explaining and strengthening other theories than as illustrating specially the mode in which the recumbent position becomes useful in syncope, requires to be carefully and thoroughly refuted before an explanation of the simple fact can be entered on at all.

The view to which I refer, is that which presumes that, during failure of the circulation, the nervous system, sharing seriously in the depression, fails to supply the heart with nervous power; that, by laying the head low, in such cases, the blood is allowed to flow more freely to the brain and medulla; and that these centres, regaining energy by this process, react on the heart and supply it with renewed vigour.

The theory here supplied has been spoken of by many authors. Thus, Dr. Alison of Edinburgh, in his excellent work, *Outlines of Pathology and Practice*, p. 536, says, "When, therefore, we see a fit of syncope or a tendency to it, brought on either by loss of blood, or by purging, or by sweating, or by alteration of the distribution of the blood, as by drawing off the fluid in ascites, we may reasonably infer that the immediate cause of the complete failure of the heart's action is not the mere diminution of the stimulus acting on the heart, but a change in the condition in the nervous system."

"This secondary action or reaction on the heart," he continues, "of diminished pressure on the brain (originally consequent in some cases on deficient action of the heart itself) is very important to be kept in mind in all speculations as to syncope; and explains the well-known effect of the horizontal posture, not only on the nervous symptoms in syncope, but on the affection of the heart itself. This," he remarks, "is one of the considerations formerly cited to prove, that, in the living body, the actions of the heart are subject to an *influence and control*, from certain changes which take place in the nervous system; and which seem to extend over the whole of that system, and to act at a peculiar advantage on the heart, as an organ connected through the ganglionic nerves, with all parts of the cerebro-spinal axis."

In the article on Syncope in the *Cyclopædia of Practical Medicine*, Dr. Ash says that "the recumbent position is generally found to promote recovery, apparently by facilitating the restoration of the cerebral circulation."

Sir George Lefevre, in his work bearing the remarkable title of *An Apology for the Nerves*, makes also the following