Vascular bronchocele and exophthalmos / [J. Warburton Begbie].

XVI.

VASCULAR BRONCHOCELE

AND

EXOPHTHALMOS.

(*Read to the Medico-Chirurgical Society of Edinburgh, 1st July, 1863, and reprinted from the 'Edinburgh Medical Journal,' September, 1863.*)

That an affection characterised by so remarkable a tetrad of symptoms as palpitation of the heart (often violent in degree), notably increased pulsation of arteries, prominence of the eyes with peculiar startled expression, and enlargement of the thyroid gland, should, when once accurately observed and definitely described, have attracted a large share of professional attention, is by no means surprising. This odd form of disease,[1] as a recent distinguished writer has called it, is certainly not new—it has only remained for a lengthened period unobserved or unappreciated; its history in this respect not differing from that of several other ailments which recent research has alone brought to light; as, for example, Bright's disease of the kidneys, leukæmia, and the rheumatic inflammation of the cardiac structures. That the association of two, and even of all the symptoms referred to, had, moreover, been occasionally noticed,

[1] "Cette maladie si *bizarre*, pardonnez-moi cette expression," &c. Trousseau, in the report to the French Academy.—'Bulletin de l'Académie Impériale de Médecine,' tome xxvii, p. 996.

long before any proper conception of their importance had been formed, is abundantly clear from the cases recorded by Flajani,[1] by Dr. Caleb Parry,[2] and certain anonymous writers, particularly in the Medico-Chirurgical Journal and Review.[3] By Dr. Graves, the cardiac affection and enlargement of the thyroid gland were accurately noted and described in 1835; and, subsequently, Dr. Stokes particularly alluded to the enlargement of the eyes in relation to the other features. In 1839 the disease was carefully observed by Dr. Begbie; and, in the course of the succeeding ten years, again and again recognised—till, in the form of a memoir, his observations, comprehending a theory as to its origin, the proof of its amenability to treatment, and important suggestions as to the means to be employed were brought before this Society in 1849.[4] Meantime, both in this country and on the Continent, the disease had attracted the attention of physicians—earliest in Germany, that of Basedow, who, under the apellation of "cachexia exophthalmica," described it.[5] It is for Basedow that Hirsch and others have claimed a priority of observation, and, conformably to a practice which finds favour with many, have sought to identify his name with the disease; Basedow's disease (Maladie de Basedow) is the title under which these writers have presented their observations and recorded instances of the malady in question. Trousseau, on the other hand, whose high admiration for the character and writings of the distinguished and lamented physician of Dublin, Dr. Graves, is well known, and can only be most agreeable to us, has determined that the disease shall be recognised as Graves's disease (Maladie de Graves); and thus he has styled it in the recently published volume of the 'Clinique Médicale de l'Hôtel Dieu de Paris.' It is, however, only fair to Dr. Stokes to observe again, that the first distinct reference by the Dublin physicians to the enlarge- of the eyeballs, in connection with palpitation of the heart and enlargement of the thyroid gland, was made by him when communicating the particulars of a case to Dr. Graves.

[1] 'Collezione d'Osservazioni e Riflessioni di Chirurgia,' tome iii.
[2] 'Unpublished Writings of the late Dr. Caleb H. Parry,' vol. ii.
[3] For February, 1816.
[4] 'Monthly Journal of Medical Science,' 1849.
[5] 'Casper's Wochenschrift,' 1840.

Of the actual existence of such a disease as that described by Graves, Stokes, Basedow, Begbie, Trousseau, there can be no question; whoever has had the opportunity of seeing and carefully studying a single well-marked instance of the phenomena referred to, must admit the entity of the disorder whose characteristic features they are. The case brought before the Imperial Academy of Medicine at Paris in April 1860, by M. Hiffelsheim, and that produced by the late M. Aran, when engaging the attention of the Academy with the same subject in the December following, are admirable illustrations of the disease, and wholly satisfactory as proofs of its separate and distinct nature. In the very important discussion in the Imperial Academy which succeeded the reading of these cases by MM. Hiffelsheim and Aran, only one speaker attempted to throw discredit on the observations—to challenge the correctness of the view which assigned to the assemblage of symptoms under discussion the dignity of a specific morbid state or disease. "There does not exist," concluded M. Piorry, on 22nd July, 1862, "a morbid unity called diathesis, cachexia, or neurosis, constituted by a triad, or a tetrad, or a pentad, or a polyad of symptoms, and which merits the name of exophthalmic goitre." I am not aware of any other expressed opinion in accordance with that of M. Piorry, while a subsequent speaker in the same discussion, M. Bouillaud—not less than M. Piorry himself—has thrown some fresh light on the real occasion of the extraordinary statement just quoted. M. Bouillaud's parole, on the 5th of August, commences as follows:—"Gentlemen, before proceeding to the subject of discussion, I desire to pay a just tribute of praise to the two eminent colleagues (MM. Trousseau and Piorry) who, during the two former sittings of the Academy, have occupied the tribune. Happy the Academy, if, renouncing certain notorious antecedents, these two orators had in some sort extended the fraternal hand, and had afforded us the edifying and agreeable spectacle of a reconciliation which science would not have failed to applaud. The hour for the consummation of so desirable an event is not yet arrived." But, not only is there a disease mainly characterised by the features adverted to, the malady in question is very far from being uncommon in its occurrence. From the period when Dr. Graves wrote, there is scarcely a country in Europe in which the disease has

not been met with and described; while, in our country, in France, Germany, and other parts of the Continent, it has formed the subject of many interesting, and some extended, observations. In America, likewise, it has not been overlooked. I am satisfied that in this city the disease is of frequent occurrence, and, in hospital practice, have often encountered it. No session has passed since my appointment as physician to the infirmary during which the opportunity has not been afforded me of directing the attention of a clinical class to the remarkable phenomena the disease presents; while, as a general rule, my experience has been that of the last session, several cases having come under our notice. Up to the time when Dr. Begbie wrote, the instances of this disorder which had been recorded were merely isolated examples—or were, at all events, related as illustrations of what was properly regarded as a remarkable combination of symptoms, without any attempt being made to explain their occurrence or production. Thus, Parry, to whom undoubtedly credit belongs for having early and independently noticed the association of two of the symptoms, observes:—"There is one malady which I have, in five cases, seen coincident with what appeared to be enlargement of the heart, and which, so far as I know, has not been noticed in that connection by medical writers. The malady to which I allude is enlargement of the thyroid gland." It is perhaps scarcely correct to affirm that Dr. Parry attempted no explanation of the coincidence he had been shrewd enough to observe; but, as regards the causation of the enlarged thyroid, all he remarked was as follows:—"One can scarcely avoid suspecting that the thyroid gland, of which no use whatever has hitherto been hinted at by physiologists, is intended, in part, to serve as a diverticulum in order to avert from the brain a part of the blood, which, urged with too great force by various causes, might disorder or destroy the functions of that important organ." And so also, in a way equally accidental, Dr. Graves wrote—"I have lately seen three cases of violent and long-continued palpitation in females, in each of which the same peculiarity presented itself—namely, enlargement of the thyroid gland; the size of the gland, at all times considerably greater than natural, was subject to remarkable variations in every one of these patients."[1] Equally

[1] 'Clinical Lectures on the Practice of Medicine,' vol. i, p. 193.

true is it that no explanation of the phenomena was, in the first instance, offered by Pauli or Basedow in Germany, or by Dr. Macdonell or Sir Henry Marsh in Ireland, by whom, meantime, interesting cases had been observed, and, in considerable detail, recorded.

When Dr. Begbie, in 1849, brought his observations on enlargement of the thyroid gland and eyeballs before this Society, he regarded these appearances as the consequences of anæmia, and this substantially is the view he still entertains.[1] A similar opinion has since that time been expressed, specially respecting one of these symptoms—namely, the prominence of the eyes—by several distinguished oculists. Dr. Mackenzie of Glasgow, for example, styles this condition "anæmic exophthalmia." Mr. White Cooper and Dr. Robert Taylor have respectively described it as "protrusion of the eyes in connection with anæmia, palpitation, and goitre," and "anæmic protrusion of the eyeballs." The anæmic theory as to the origin of the malady has, therefore, found much favour with ophthalmologists; it has likewise been adopted by physicians who have had the opportunity of devoting attention to the consideration of the whole phenomena. Among such may be mentioned the late Dr. Bellingham of Dublin and Dr. Isaac E. Taylor of New York. The former able writer thus expressed himself:—"The affection may be regarded as one of the rarer results of anæmia, as first pointed out by Dr. Begbie; indeed, the subjects of it present the ordinary characters of anæmia; they are generally pale and chlorotic looking, and often labour under amenorrhœa, leucorrhœa, and menorrhagia; they suffer from indigestion, impaired appetite, disturbed sleep, short cough, coldness of the extremities, headache, ringing in the ears, and palpitation; while various nervous or hysterical symptoms, as intercostal neuralgia, or spinal irritation, are occasionally present."[2] But, while all observers of this disease have recognised its connection with anæmia, there are several—and among these some of the best of recent writers—who have hesitated to assign to a simple blood impoverishment the important rôle which, in the view of the other writers named, it is considered to play. Anæmia is confessedly present in a large proportion of cases; but inasmuch

[1] 'Contributions to Practical Medicine, p. 176.

[2] 'A Treatise on Diseases of the Heart,' p. 532.

as that condition did not precede the development of the characteristic features in some instances, while in others it only became manifest after these had been in existence for a considerable period, it cannot, they argue, be regarded as an adequate explanation of their production. Unable to recognise the existence of anæmia in connection with the palpitation, the enlargement of the thyroid gland, and remarkable appearance of the eyes, some observers, more particularly on the Continent, having noticed the association of these symptoms with a condition of the general system more or less depraved, have described the disease under the by no means definite or distinctive apellation of a caehexia. Thus, Basedow in Germany, to whom reference has already been made, uses the expression Cachexia exophthalmica (Glotzaugencachexia, literally, large staring eye, or goggle-eyed cachexia); Withusen, that of Cachexia exophthalmica; and Hervieux, with Fischer and other French writers, terms precisely similar—as, Cachexie exophthalmique, L'exophthalmos cachectique. In the former of the two valuable papers on the subject recently read by Dr. Laycock to this Society, it is implied that certain German writers have identified the so-called exophthalmic with the strumous cachexia.[1] In the descriptions of Romberg and Henoch, whose contribution bears the title, "Herzkrankheit Struma und Exophthalmos,"[2] and in the observations of Schoch, entitled, "De Exophthalmo ac Struma cum Cordis Affectione,"[3] I have, however, been unable to find any warrant for this assumption; they have merely employed the word "struma," as it is often used by German writers, in a sense synonymous with bronchocele, and having no reference to that bad habit of body which English and other writers designate as the strumous. I have said that the term cachexia is by no means a definite one; the meaning attached to it by different writers varies considerably; as we meet with it in medical literature, it is not in all circumstances possible to ascribe a uniform, exact, or clear signification to it. While, by certain physicians, the word cachexia, and, perhaps still more, cachectic, is used to denote the existence of some profound, indeterminate, and irremediable vice of the organism,

[1] 'Edinburgh Medical Journal,' February, 1863.

[2] 'Klinische Wahrnehmungen und Beobachtungen,' 1853.

[3] 'Dissertatio Inauguralis.' Berlin, 1854.

by others the term is not understood in so formidable a light. Trousseau, who has evidently the most serious view of a cachexia, sees none in the "maladie de Graves;" and, again, by Basedow and others, who have employed this word in their descriptions of the disease under consideration, it has very evidently been used as precisely synonymous with chlorosis, anæmia, or hydræmia. This is very clearly shown in the able observations of M. Beau during the discussion in the French Imperial Academy of Medicine.[1] Lieutaud, he reminds the Academy, was the first to employ the term anæmia, though long antecedent to his time the characteristic features of anæmia had been with accuracy observed—to wit, pallor, swelling, feebleness, and flaccidity, which most readily arrest attention—and to the same assemblage of symptoms the word cachexia has also been applied. M. Beau further quotes from Felix Plater a passage, in which, under the name of cachexia, precisely the symptoms of anæmia, as now generally understood, are included —to use M. Beau's own language, "the ordinary symptoms of our modern anæmia." Every feature of anæmia is indeed noticed in this description of cachexia by Plater, if we except the important auscultatory phenomena, the discovery of which was reserved for Laënnec and his successors. "Cachexia," he says, "is a disease accompanied by discoloration of the skin, in which the florid hue is lost, and, for the most part, the proper appearance of the body is changed; hence the term cachexia. In this disease the skin becomes white, or grows pale, or acquires a livid hue, or turns to a leaden aspect, while the surface of the body acquires a swollen appearance. The affection is generally accompanied by dyspnœa, which chiefly attacks the sufferers in walking, or ascending heights, with palpitations of the arteries in the neck, and of the heart, and with weakness of the limbs. While (Plater concludes) all may suffer from this disease, it is peculiarly apt to affect young women." The cachexia, then, which is thus defined, or a condition nearly identical with it, is evidently the state or appearance of body with which the more remarkable features of the disease under consideration are held by some writers to be associated. And this cachexia is surely nothing more or less than an anæmia. In such a depraved condition of body as either of these terms may be held to express

[1] 'Bulletin de l'Académie Impériale de Médecine,' tome xxvii, p. 1101.

there is noticeable—pallor of the tissues, muscular feebleness, softness or flaccidity of flesh, and not unfrequently œdema. Associated with these well-marked features there exist, usually in a distinct form, the peculiar auscultatory phenomena connected with the heart and arteries, and with the veins, chiefly those in the neck, which have been generally supposed to result from an impoverished condition of the blood, as well as palpitation of the heart and pulsation of the arteries, and many other less important, because not constant, symptoms. Dr. Laycock has objected to the value usually attached to the hæmic murmurs as evidences of anæmia; nevertheless, I am thoroughly persuaded of their importance. In instances of marked anæmia, I have never failed to detect the systolic soft blowing murmur at the base of the heart, the arterial souffle in the arteries of the neck, and the humming-top sound—bruit de diable—in the jugular veins particularly, but not unfrequently in the femoral and brachial. For their production, in anything like perfection, I believe two circumstances to be requisite; firstly, a marked excess of water over the corpuscular elements of the blood, and, secondly, a considerably exalted action of the heart. When these conditions have co-existed, I have never failed to identify the cardiac and vascular hæmic murmurs. I have found all of these, though never well marked, in cases which presented little if any of the general features of the anæmia or cachexia already adverted to; and I have failed to distinguish them in some instances of sufficiently anæmic or cachectic individuals. In the former case there has probably been that excess of water over blood-corpuscles which is, I believe, required for their production, though the external characters of anæmia were not pronounced, and the absence of the sounds in the latter case was probably due to the feeble action of the heart. In ordinary examples of splenic leukæmia, I should not expect, and have not found hæmic murmurs, for the corpuscular element of the blood in them is far from being deficient, and I cannot agree with Dr. Laycock in regarding their usual absence in such cases as militating against such valuable information their presence in other circumstances affords. In chronic Bright's disease, if hydræmia has at the same time existed, aud the heart's action been moderately strong, I have never failed to detect them. In the disease under consideration, I have always found these

murmurs. The loudest hæmic murmur at the base of the heart, as well as the most distinct venous bruit in the neck I ever heard, were in a well-marked example of associated exophthalmos and bronchocele.[1] It must here be observed that, by those physicians who have in the strongest manner upheld the blood origin of the cardiac palpitation and arterial pulsations, the enlargement of the thyroid gland, and prominence of the eyes, the coincidence of remarkable nervous symptoms with these phenomena has not been overlooked. But while evidently impressed with a sense of their importance, their nature and even their occurrence being far from uniform, they have been viewed by such either as accidental or, as at most, accessory symptoms; and, even by those who have specially noticed them, have been ascribed, like the other phenomena of the disease, to the impoverished condition of the blood. More recently, several experienced writers and observers, in explaining the causation of the various symptoms, have attributed these to an affection of the nervous system, and have regarded the anæmic or cachectic appearance presented by the sufferers as resulting from the long-continued nervous disorder. Dr. Stokes, in his work on 'Diseases of the Heart and Aorta,' has styled the disease a special form of cardiac neurosis. "There are," he says, "strong reasons for holding that the disease is originally a neurosis of the heart, and, perhaps also of the cervical vessels themselves;"[2] and Withusen, the able Danish writer already referred to, has remarked, "We must, therefore, adhere to the opinion that we have, in such cases, to deal with a nervous

[1] The microscope affords important information in anæmia. I am satisfied that there may be the pallid appearance of countenance, and the other general symptoms of this condition, in cases in which the auscultatory phenomena adverted to have little or no existence. In such cases the microscope detects no deficiency of the red corpuscles; but they have an altered appearance, are much less coloured, are serrated in their borders, and rarely form rouleaux. This condition, as well as that of a true hydræmia, may exist in the advanced stages of renal disease. I have now under my care in the Infirmary, a sufferer from chronic Bright's disease, whose look is so sufficiently cachectic or anæmic as, in connection with infra-orbital œdema, to suggest at first sight the malady under which he labours. Auscultatory phenomena exist, but in feeble measure. His blood is not watery, yet it is certainly impoverished; it is deficient in colouring matter, and the corpuscles are unlike those of health.

[2] Page 293.

affection of the heart, which may indeed give rise to organic cardiac disease, but does not necessarily do so; to attempt to demonstrate the source of the affection would, as we cannot find it in anæmia, with our present materials, be a fruitless labour, and would lead us far into the region of hypothesis.[1] It is now four years since Koeben expressed the opinion that a lesion of the sympathetic best explained the entire phenomena; and in 1860, the late M. Aran, having diligently studied the disease, and having brought the subject under the attention of the Imperial Academy of Medicine, concluded that, in all probability, the primary seat of the disease was in a lesion of the grand sympathetic. M. Trousseau, who has of late had considerable clinical experience of exophthalmic bronchocele, and whose views on the subject may be found at length in the discussion before the Imperial Academy, in which, as "rapporteur," he took a very prominent part, as well as in the second volume of the Clinique Médicale de l'Hôtel-Dieu de Paris, rejects the anæmic theory as to its causation, and regards the anæmia as secondary to the cardiac palpitation, the arterial pulsations, and the phenomena connected both with the eye and thyroid gland. "Anæmia," he says, "is an epiphenomenon; it is secondary, sometimes tardy in its development. The morbid cause acts primarily on the heart, and it is not till the lapse of a certain time, more or less considerable, that the blood is modified in the constitution of its elements. The woman in bed 34 of the ward St Bernard presents at this time the features of anæmia; these features were not, however, in existence when she came under our care, although the disease had then continued for nine months. A neurosis of the grand sympathetic had preceded the anæmia." Again, the same distinguished physician observes, "The disease is, in my opinion, a neurosis with local congestions, having its proximate cause in a modification of the vaso-motor apparatus."[2]

There may, then, be said to exist, at the present time, two theories respecting the origin of the singular and interesting ailment we are considering. The one, that it depends upon anæmia, a blood impoverishment; the other, that it results directly from a disorder of the nervous system, is a neurosis

1 "On the Cachexia Exophthalmica of Authors." Translated by Dr. W. D. Moore, 'Dublin Hospital Gazette,' July 13th, 1859.

2 'Clinique Médicale de l'Hôtel-Dieu de Paris,' tome ii, p. 645.

depending on lesion of the vaso-motor apparatus. I am strongly inclined to think that the true explanation of the pathology of the disease rests somewhere between these two propositions. Neither the state of the blood nor the condition of the nervous system, as the point of departure, "the primum mobile," is to be overlooked. It may be conceded that all the symptoms which go to constitute anæmia may result from disorder of the nervous system, and by such disorder will assuredly be aggravated; still, if it can be found that the features of the former malady were in existence before there was any evidence whatever of nervous disturbance, we shall feel entitled to consider that the blood alteration was first in the order of events. That in most, if not in all, of the cases of associated exophthalmos and bronchocele this holds true, is, I think, probable. No doubt this opinion will be controverted by some physicians, whose statements are entitled to respectful consideration, but having already pointed out that the anæmia of the writers who adopt the humeral pathology of the disease is in all probability identical with the cachexia of those who have rejected it, I feel there is some ground, even in their own statements, for the opinion just expressed. When, in addition, a careful study and analysis of the numerous cases recorded by different writers is made, there are undoubtedly afforded very strong reasons in favour of anæmia operating as their cause. The following particulars under this view of the subject must not be lost sight of. *First*. That the sufferers from the disease have, in a large proportion of cases, presented adequate causes for blood impoverishment. These causes have varied in different cases—the more frequent in their occurrence have been uterine hæmorrhage, hæmorrhoidal flux, long-continued leucorrhœa, amenorrhœa, prolonged lactation, lientery, and diarrhœa. While so suffering, the occurrence of the enlargement of the thyroid gland, or the prominence of the eyes, or both, have not unfrequently been preceded by some cause acting injuriously on the nervous system, particularly such as excited the emotions or passions—grief, fear, fright. *Second*. That the sufferers have themselves, in numerous instances, presented the characteristic features of anæmia, pallor of countenance, feebleness of limbs, and flaccidity of tissues, tendency to œdema, palpitation of the heart, and the peculiar auscultatory phenomena connected

with the heart and blood-vessels, to which reference has already been made. And it is while these symptoms in succession to some adequate cause of blood impoverishment have been in existence that, either spontaneously, or apparently resulting from some injurious operation on the nervous system, the bronchocele and proptosis have appeared. *Third.* That the remedial means which have hitherto been directed to the relief of these symptoms, with most decided effect, are just those which, in the treatment of anæmia, are confessedly of the greatest service. And *Fourth.* That the structural changes to which the central organ of the circulation is subject are of the like kind with those which result from its long-continued functional derangement in connection with anæmia when assuming its more ordinary characters. There are, then, I repeat, very cogent reasons afforded by clinical observation for associating blood impoverishment with exophthalmos and vascular bronchocele, and for assuming that they stand to each other in the relation of cause and effect. A diligent study of the phenomena of the disease must, however, satisfy all, that the anæmic theory, as thus expounded, stops short of explaining all the peculiar features of such cases, even when the anæmia is best marked, and, still more, those instances in which, while a cachexia is certainly present, there is a hesitation, an accountable disinclination, or even an impossibility, in the way of pronouncing it anæmia, as that condition is ordinarily understood.

This leads me to offer some remarks on the special and peculiar conditions which are met with, the cardiac palpitation, and arterial pulsations, the bronchocele and prominence of the eyes. That these are, one and all, to be regarded as symptoms of the same disorder, does not, I think, admit of any doubt; and, further, I believe that the essence of the disease may be in existence without the association of all these symptoms. With the cardiac palpitation and arterial pulsations, and without the bronchocele or prominence of the eyes, it occurs; and while the latter symptom is absent, the enlarged thyroid may, in some instances be found. Clearly, and this view of the subject has a very important bearing on treatment, the cardiac and general vascular disturbance precede the thyroidal and ophthalmic symptoms, and, when properly recognised, by suggesting the employment of appropriate means may be said to prevent

the appearance of the latter. The palpitation of the heart is, for the most part, the symptom which chiefly attracts the attention of the patient, and leads her to seek professional advice.[1] It is generally vehement, often it is tumultuous, always it is rapid, being precisely of the same nature, though usually more violent, as the palpitation with which we are familiar in ordinary instances of anæmia and chlorosis. That the excited action of the heart is, in the early stage of the disease, altogether independent of organic change admits of no doubt.[2] Again, the accounts of post-mortem appearances, in the fatal cases, which have been investigated by Sir Henry Marsh, Basedow and Dr. Begbie, satisfactorily prove that those changes which result from long-continued functional derangement of the heart are to be met with—chiefly permanent dilatation of its chambers, with more or less of hypertrophy. The cardiac disturbance being admitted to be among the earliest of the morbid phenomena in this disease, the question presents itself—upon what does this disturbance depend? That it is essentially neurotic in its nature may be admitted; such disturbed action of the heart as we thus find is probably best explained by interference with the cardiac plexus of nerves. That important network is formed by small branches from the pneumogastric, and by branches from the three cervical ganglia of the sympathetic; from the cardiac plexus styled great, and in which at least two ganglia are to be recognised, nerves proceed in intimate

[1] As is well known, the affection under consideration occurs more frequently in women than men; still, the observations of Dr. Macdonell, Dr. Begbie, Romberg, Henoch, and others, have shown that among the latter it can assume its most typical expression.

[2] I consider it quite unnecessary to advance any proof of the correctness of this statement. By some writers the heart affection has, indeed, been described as organic, and the sufferers from exophthalmos and bronchocele have likewise been regarded as the subjects of cardiac hypertrophy. Trousseau has specially addressed himself to the refutation of this error. But both Trousseau and Beau, the latter more especially, have admitted the existence in such cases of a temporary hypertrophy, "hypertrophie passagere," or rather a general dilatation of the whole cardiac chambers, such as the researches of Larcher, Ducrest, and Blot have shown to occur during pregnancy. Muscular relaxation with flaccidity is a characteristic feature of anæmia—the involuntary muscular structure of the heart is just as likely to suffer as the voluntary muscles from the contact of impoverished blood.

relation with the coronary arteries to the organ; into its substance they are to be traced, and they are there distinguished by possessing in their course minute ganglia, or nervous centres, which have not unreasonably been supposed to regulate the rhythmical movements of the heart. I conceive that the aberration of cardiac function, which interference with these ganglia best explains, may as readily and probably, on the whole, with greater probability of truth, be accounted for by their originally impaired nutrition, through an impoverished blood, than by the direct operation on them, or on more distant nervous centres with which they are intimately connected, of an injurious cause which cannot with any accuracy be defined, —chiefly spoken of as emotional. Healthy blood is the proper stimulus of the heart as well as of the vessels. Impure blood, unoxygenated, returning to the left side of the heart paralyses the organ, and venous blood, too, stagnates in the pulmonary capillaries. This, indeed, is the primary phenomenon in asphyxia; the depressing influence exerted by such blood on the nervous centres succeeds its retardation in the lungs. A less deteriorated blood tells on the cardiac nerves, and through them the heart is excited to unrhythmical movements.

If now we turn to the consideration of the remarkable condition of the vascular system, I believe we shall there find, likewise, satisfactory evidence of its hæmic as well as neurotic origin. The palpitation of the heart is certainly not more characteristic than the violent pulsations of the arteries; it is chiefly in the neck that these are visible; the carotids beat tumultuously, and yield a very loud "bruit de souffle." When the hand is applied over the neck, or still more, when both sides of the neck are held in the widely opened hand, the vibratory thrill or purring tremor from the carotids is remarkable. Of the cervical pulsations the patient complains; they are often most distressing to her, and are always greatly increased by muscular exertion. With them are associated a sense of fulness in the chest and head, throbbing in the temples, beating in the ears, vertigo, and dyspnœa. Severe dyspnœa, paroxysmal in character, I have only seen in one case, in which the bronchocele was of very large size, and must have in all probability interfered with the recurrent branch of the pneumogastric. Unquestionably all these distressing symptoms are

likewise aggravated by emotional causes. Marked as the pulsation in the vessels of the neck, superficial as well as deep, is, it is not in these arteries alone that the movement is visible; if the larger superficial vessels at a greater distance from the heart are examined in characteristic examples of the malady, it will be found that they too are similarly affected—the brachial, radial, and ulnar of the superior, and the femoral, popliteal, and tibial arteries in the lower extremities. I have, moreover, known a patient to complain more of the *beating* in the belly than of either the cardiac or cervical pulsations, and have always found the abdominal aorta affected just as the other arteries of the body; distressing pulsation in the abdominal aorta is, indeed, of common occurrence in ordinary examples of anæmia and chlorosis. M. Beau has directed attention to the circumstance that, by writers generally on this disease, the radial pulse has been described as small, and states that he is unable to adopt a similar opinion.[1] The apparent smallness of the radial pulse is, however, due to the calibre of the artery; and, agreeing as I do with M. Beau in this observation, I believe that a juster view of the arterial pulsations will be formed if the whole superficial arterial system be examined. Something, indeed, may be ascribed to the ready way in which an increased pulsation in the superficial vessels of the head and neck is recognised. Hippocrates, who was probably unacquainted with the doctrine of the pulse, nevertheless had noticed pulsation in the temporal arteries, Σφυγμός εν τοις κρόταφοις. I have further, in attending to this particular, determined that the synchronism between the heart's contraction and the distant pulses is more exact than in ordinary circumstances, and in this phenomenon, as well as in the exaggerated vascular motion, have recognised the increased energy of the heart's action excited to overcome the loss of assistance afforded by the rhythmical contraction of the arteries. In anæmia and chlorosis, increased pulsations of arteries, particularly the arteries of the neck, are not absent,

[1] Dr. Stokes has said on this point, "In most instances we observe a want of proportion between the force of the pulsations of the arteries of the neck and those in other parts of the system. The carotid and thyroid arteries may pulsate with vehemence, so as to give the idea that all the vessels of the neck are enlarged and in a state of morbid activity, yet the radial pulse be small and weak, and only rapid or irregular according to the state of the heart's action."—'Diseases of Heart and Aorta,' p. 281.

and have long attracted attention. Felix Plater, whose description of cachexia has already been quoted, after speaking of various signs, remarks, "Accidente simul pulsatione arteriarum circum jugulum;" and Rondelet observes, "Noscitur pallidus color virginum, ex arteriarum colli pulsatione, et ex cordis palpitationibus." These writers are cited by M. Beau; and both he and M. Bouillaud, in their paroles before the Imperial Academy, have expressed the common experience of physicians when they said, that every day chlorotic girls ask our advice for palpitation of the heart and pulsations in the arteries, who believe themselves to be affected with some serious disease of the heart, and have already lost hope of recovery. As we have found the cardiac derangement to depend on a hæmic as well as neurotic cause, so I believe in the same way may the pulsations of the arteries be best explained. Allusion has been made to the supply of nerves to the heart; it is by minute branches of the same system that the blood-vessels throughout their most distant ramifications are embraced. The muscular apparatus, with its contractile property, chiefly resident in the small blood-vessels governing their diameter, receives no other nervous supply than from the sympathetic. Careful experiments have demonstrated the influence of the organic nervous system upon the calibre of blood-vessels both large and small. Those of Valentin and others, by which irritation of the sympathetic and the roots of the cervical nerves produced contractions in the aorta, and the still more important experiments of Waller on the former nerve in the neck, section or ligature of which caused enlargement of the minute arteries, accompanied by elevation of temperature, while application of the galvanic stimulant for a brief period effected their contraction to the ordinary calibre. In the disease under consideration, there is first of all increased unrhythmical pulsation of blood-vessels, and ultimately permanent dilatation—the proof of the latter occurrence will be adverted to when I come to treat of the thyroidal enlargement and proptosis. That the influence of the vaso-motor nerves is perverted, and that from this cause results the irritation of blood-vessels, and ultimately the serious impairment of that structure in them by which through nervous energy the circulation is properly maintained, can scarcely be said to admit of doubt. The question is, whence arises this

morbid influence? Is it, as Dr. Laycock has ingeniously endeavoured to establish, ganglionic, affecting certain central portions of the vaso-motory apparatus. There are certainly not wanting features in this most interesting disease which appear to lend support to this view; but it appears to me as still more probable that the influence is exerted chiefly on the nerves of blood-vessels themselves, and that just as in the affection of the heart already discussed, so in the blood-vessels, it is the blood which operates injuriously on them. It is true that there are no direct experiments to establish the correctness of the view, that blood-vessels may be stimulated to contraction, and if so, the subsequent changes may be imagined—directly through the medium of their own nerves. There are great difficulties in the way of such experiments, but at least there are no experimental observations which oppose the conjecture, and there are some facts which give it probability. Dr. Carpenter sees no reason to doubt that by the sympathetic the impression of imperfectly-arterialised blood circulating through the systemic vessels may be conveyed to the spinal cord.[1]

There remain for consideration the bronchocele and the remarkable appearance of the eyes. The enlargement of the thyroid gland, which is met with in such circumstances, varies very considerably as regards size, from a mere fulness to a bronchocele of no inconsiderable dimensions. In its nature, likewise, there exists some variety dependent in great measure on the length of time during which it has existed. At first, it is very evidently the so-called vascular bronchocele—the gland is occupied to a great extent by blood, the blood-vessels are distended, and the thyroidal arteries, like the carotids and other superficial trunks, pulsate more or less vehemently; the thrill or fremitus experienced when the hand is placed over the tumour is generally considerable. To the touch the bronchocele at this stage feels uniformly soft. Beneath the skin which covers it the superficial veins are seen unduly prominent and loaded. Suddenly, as in instances detailed by Dr. Robert Taylor, the bronchocele may appear, ordinarily the swelling occurs gradually, often with considerable rapidity, always in succession to the derangement of the heart and blood-vessels already described. The bronchocele may disappear suddenly; while yet recent its

[1] 'Principles of Human Physiology, p. 273.

size is readily affected by treatment; it has entirely disappeared in not a few instances. Nevertheless there is a manifest tendency to the swelling continuing permanent; when so certain important changes are noticeable—it has generally somewhat diminished, has become less vascular, not so pulsatile, and of denser consistence. Hypertrophy of gland structure, perhaps cystic formation, and permanent dilatation of blood-vessels, have in these cases resulted. In endeavouring to explain the occurrence of the vascular pulsatile bronchocele under such circumstances, assistance is obtained from attending to the normal structure of the thyroid gland, and, particularly, to the size and distribution of its blood-vessels. All anatomical descriptions of this body have reference to the remarkable vascularity which distinguishes it. A ductless gland presumed to be concerned in the process of blood elaboration, it is invested by a thin layer of dense cellular tissue, by which it is connected with adjacent parts, receives support to its vessels, and is imperfectly separated into vesicles of small but varying size. As to its blood-vessels, the thyroid gland is distinguished by their number, large size, and free inosculation. "In fact," says a recent anatomical writer, "it appears to be composed of a tissue of arteries and veins."[1] It has two and sometimes three independent sources of blood-supply, and the veins are equally numerous and large, forming a plexus upon it. Having, as Dr. Begbie and other writers have already done, spoken of the bronchocele as vascular, and entertaining no doubt that the augmentation in bulk of the gland depends upon arterial and venous congestion, associated with dilatation of both sets of vessels in the more advanced stages of the malady, having witnessed sudden and very considerable increase in its size, and its visible pulsations redoubled in force, when the heart's action became excited, I explain the enlargement of the thyroid gland in such cases as are under consideration by a reference to the number and size of its blood-vessels. Dr. Laycock has, however, argued that, depending on nervous interference, the pathological condition is to be connected with a lesion of a special nervous centre. We know the sources of nervous supply to the thyroid gland: these are twofold—from the laryngeal branch of the pneumo-

[1] Holden's 'Manual of Dissection of the Human Body, p. 16.

gastric, and the cervical ganglia of the sympathetic. I do not know any circumstances in the cases of bronchocele we are considering which would certainly lead me to suppose that a particular definite portion of the nervous centres is the seat of lesion. On the other hand, recognising excited vascular action, and afterwards dilatation of arteries as well as veins, not limited to the thyroid gland, though well-marked in it, but seen more or less in the whole vascular system, I am led to believe that while the nervous system is certainly at fault, it is essentially the vaso-motor nerves in their intimate distribution to blood-vessels which are affected, that this is specially marked in the thyroid gland, because it is so extremely vascular; and again, that a hæmic origin as readily or better explains the phenomena than the direct operation on the nervous system of some obscure cause. It may be objected to this view that bronchocele is of less common occurrence in connection with anæmia than such observations seem to imply. Upon this point I would beg to remark that I have often noticed a moderate degree of vascular thyroidal fulness, in persons of both sexes, who, having lost blood, presented some appearance of anæmia. I lately saw a youth labouring under scorbutus, and who had suffered two attacks of epistaxis, one very severe; he was of anæmic aspect, had palpitations, general vascular pulsations, and a small bronchocele.

Anatomically, as regards its great vascularity and ductless nature, and physiologically, as in all probability concerned in the elaboration of blood, the spleen may be classed with the thyroid gland. An increase in size of the latter organ has been noticed in several instances of associated bronchocele and exophthalmos, and has been specially referred to by Sir Henry Marsh, Basedow, and Dr. Begbie. In one case the spleen weighed twenty ounces, in other two it was found enlarged. Heusinger has particularly directed attention to the condition of the spleen, which he found after death much increased in volume, and manifestly diseased. I have been able in two well-marked examples of the disease to satisfy myself that the size of the spleen was considerably augmented.

Passing now to the consideration of the remarkable appearance presented by the eyes—the so-called exophthalmos. It is well ascertained that in this disease there exists a degree

more or less marked of prominence of the globes; that vision is little, often not in the least degree, affected; that the feeling of fulness and tension, varying greatly as the heart's action, is comparatively calm or much excited, is not ordinarily attended by any visible redness or injection of the conjunctival or sclerotic membrane; that, except in very advanced instances of the disease, there is no interference with visual accommodation; that the eyes under gentle pressure can be caused to retreat into the orbits; and, lastly, that the pupils are, in their normal state, contracting on exposure to a bright light. Such has been the condition of the eyes and of vision in all the cases of this disease which have come under my own notice, and this description coincides with the statements of Dr. Begbie and Dr. Stokes, as well as those of Mr. Walker, Dr. Mackenzie of Glasgow, Dr. Argyll Robertson, and other oculists. I have never seen in any case the least degree of squinting, even to so slight an extent as to depend on what may be called a want of tonicity of the ocular muscles, never ptosis, never nystagmus or twinkling of eyelids or eyeballs, or increased vascularity of the conjunctiva, or any corneal affection; nothing in short to indicate the existence of a lesion of the nervous centres, cerebral or spinal; nor have any of the patients who have come under my own care suffered from orbital neuralgia of any kind or degree. I seek, then, in the condition of blood-vessels the cause of the prominence of the eyes. A distended state of the ophthalmic vessels in all probability does exist. Increased vascularity of the choroid has been found by Graefe and Withusen, the latter of whom expressly states that a high degree of congestion of the vascular membrane of the eye is often combined with prominence of the eyeballs. The veins of the choroid are placed on the external aspect of the membrane, and are arranged in drooping branches, "vasa vorticosa." The arteries are found within, and form a very minute network, the "tunica Ruyschiana;" but with the dense sclerotica covering the choroid, it is inconceivable that the distension of these vessels can give rise to any great amount of ocular prominence. Nevertheless, in their congestion, and still more in that of the ophthalmic veins which, receiving many branches in their backward course, terminate in the cavernous sinus, it is not improbable that the cause of the proptosis exists. The congestion, however, just as in the congestion of the

thyroidal vessels, is determined by a nervous lesion—not, as I have already observed, a lesion of nervous centres—but by injury done to the "vaso-motor" nerves themselves. Here, too, there appears to me no important objection to the view that the impoverished state of the blood is the original morbid cause acting on the nerves of blood-vessels; and it is remarkable with what uniformity the protrusion of the eyes has by oculists, at least, been regarded and styled anæmic. It is not fatal to this view that no congestion of the ophthalmic veins has been found invariably in such cases after death;—it has sometimes been found. Such an appearance does not continue long, the blood readily passes into other and larger trunks than the smaller veins which it had occupied before, and the adjacency of the veins to the sinus may account for its more rapid disappearance in the case of the ophthalmic veins. But the enlargement of veins has been frequently met with—the jugular veins, the thyroidal veins, the vena cava inferior, these are all mentioned in different cases as having been found greatly enlarged. The permanent dilatation is more likely to ooccur in veins than in arteries, for the former, while possessing essentially the same structure as the latter, have less of the true elastic tissue. That the dilatation of the veins in the neck, as well as in other parts of the system, may be in part due to the distending influence of an accumulation of blood in them, which in its turn results from a diminution in the influence exerted by the contraction of muscles on them is not improbable, we know that thereby the venous circulation is in considerable measure maintained, and if the blood be impoverished muscular energy will likewise suffer. This is, I think, a more probable view than that of Dr. Marshall Hall, that the protrusion of the eyes was due to pressure on the veins, exerted by the muscles of the neck. Mr. Walker has signified a modified assent to this view; but if the action of the muscles was moderate the venous circulation would be only maintained, and if violent, besides seeing the phenomenon, we should find, at least in some cases, the trachelismus of Marshall Hall produced;—this I never heard of. Dr. Laycock having adopted another theory of the cause on which the protrusion of the eyes depends, has endeavoured to strengthen his position by a reference to the important experiments of Budge and Waller, and of Claude

Bernard, on the sympathetic in the neck.[1] Interesting and important as these are, however, I do not see that they nor the more recent experiments of the last-named physiologists have any immediate bearing on the eye affection which is found in connection with bronchocele. It is, in the first place, true that the former occurs, though that is very rare without the latter, and therefore the pressure of an enlarged thyroid on the cervical sympathetic could not explain the relationship when it did occur. This, however, while at one time the view entertained by Dr. Laycock, has long been abandoned, and, founding on the experiments of the accomplished physiologists referred to, he has embraced the opinion, and ably supported it, that there is a definite tract of the cord intimately connected with the ganglionic nervous system, which is the seat of lesion, —a tract which maintains through the sympathetic and cerebro-spinal ocular nerves a most important relation. This tract, too, is no doubt in connection with the heart and blood-vessels in the neck, and hence may be assumed to arise their disturbance. I have already attempted to show that this explanation of the cardiac and vascular excitement—and the latter includes the bronchocele—is unnecessary, and that the operation of an impoverished blood on the vaso-motor nerves of the sympathetic, at least as satisfactorily accounts for their implication; and I think, further, that there are grave objections to the view that a lesion of the cerebro-spinal system, acting through the cervical sympathetic, determines the proptosis which we meet with in such cases as those now under consideration. In the cavernous sinus the sympathetic is connected by branches with the third, fourth, fifth, and sixth nerves, besides this, has, with two of these, the third and fifth, other important connections, and

[1] The late M. Aran, in endeavouring to explain the etiology of the exophthalmos associated with bronchocele, and cardiac, as well as vascular disturbance, had made full use of the important experiments of M. Claude Bernard, very specially attaching importance to the influence exerted by the sympathetic on the orbital muscle of H. Muller, the action of which is to carry eyeball forwards. Dr. Laycock, availing himself of still more recent experiments by the same physiologists ("Recherches experimentales sur les Nerfs vasculaires et calorifiques du grand sympathique," 'Comptes Rendus,' 18th Août, 1862), has ingeniously argued that heat is the proximate cause of the nervous and anæmic palpitations, pulsations, and thrills.—'Edinburgh Medical Journal,' July, 1863.

itself governs the radiating fibres of the iris. Now, were the cilio-spinal region of the cord, "regio cilio-spinalis," as Budge and Waller have styled it, or the sympathetic trunk in the neck, or any of its ganglia, the special seat of irritation, it may be inferred that some abnormal condition of the muscles, governed by the third, fourth, fifth, and sixth nerves, or an abnormal state of the pupil, which is under the control of circular fibres, receiving supply from the third pair and the fifth, and radiating fibres which filaments from the sympathetic govern, would have been found and described. Such, as already stated, has not been the case. Neither convergent or divergent squint, nor contraction, nor dilatation of the pupil, nor ptosis have been noticed. That such conditions have been observed in some instances of proptosis is certain, but not in instances of the disease with which we are occupied. Petit's shrewd discovery more than a century ago, that section of the united pneumo-gastric and sympathetic in the neck affected the pupil; the queer gropings of Testa, forty years ago, half in the dark;[1] the philosophical conclusions drawn by the late Dr. John Reid, respecting the influence of the sympathetic on the pupil; the brilliant experiments of Valentin, Budge, and Waller, and Claude Bernard, not less than the patient clinical observations of Dr. W. T. Gairdner, Dr. Walshe, Dr. Ogle, and many others, have shown that there exists no more certain result of irritation of the cervical sympathetic, and very probably of the spinal centre with which it is connected, than a modification of the pupil.[2] One other nervous phenomenon I have noticed in cases of associated exophthalmos and bronchocele, namely, an exalted temperature, of which the patient herself often complains, not of face, or neck, or chest alone, but of general internal heat, sometimes experienced greatly in the feet; the dilatation of minute blood-vessels most satisfactorily explains this condition.

[1] 'Delle Malattie del Cuore.' See chapter ix of second volume, entitled "Della cecità, che talvolta sopravviene ad alcuni Cardiaci.

[2] It must be held in remembrance, as mentioned by Dr. Argyll Robertson, that Dr. Praël, of Brunswick, has found in three out of nine cases that the protrusion of the eye was unilateral, the right being the one affected—a circumstance which, while not directly lending support to the anæmic theory, does not, I admit, oppose the view of the proptosis depending on a lesion of nervous centres.

Before adverting to treatment, and mentioning certain general conclusions to which the foregoing observations seem to tend, I desire to communicate very briefly the history of two cases of vascular bronchocele with exophthalmos, which have recently come under my notice in the Royal Infirmary.

Case 1.—P. B., æt. 34, admitted into Ward 15, Royal Infirmary, 6th November 1862. Married nine years, and has had one child. Has for a long period suffered from scanty menstruation, with occasional intervals of total absence of the discharge. One of these intervals extended over a period of eleven months. Has enjoyed, on the whole, better health since her marriage than before it. For some months previous to February, 1862, suffered from profuse leucorrhœa, and, after recovering from this, continued in a very weak state. In June had several profuse bleedings from the nostrils, and these attacks, though lessened in severity, have continued to occur till the present time. While so suffering, about June she began to have palpitation of the heart, from the first accompanied by buzzing noises in the head, and severe headache. About a month after the palpitation had commenced she observed a fulness about her neck, and, after the lapse of another month, her friends had remarked an altered expression and prominent appearance of the eyes. Throughout the summer has had frequent looseness of the bowels, and has noticed that the stools often contained portions of undigested food. Has latterly become very nervous and depressed in spirits.

On admission, the patient has a decidedly anæmic appearance; the eyes have a prominent aspect, and peculiar wild expression ("expression sauvage" of French writers); the eyes feel hot and tense to the patient, but her sight is unaffected; there is no peculiarity about the pupils, or the muscular apparatus of the eyeballs or eyelids, no orbital œdema. There is a bronchocele of considerable size, more prominent to the right than left side of neck, and much pulsation in the thyroidal and carotid arteries; the jugular and thyroidal veins appear distended. With the stethoscope a loud blowing sound closely synchronous with the systolic action of heart is audible, and when the hand is applied over the tumour a distinct thrill is distinguished. The heart's action is much excited—the beats 120 per minute—the rhythm altered considerably and variously. Region of precordial dulness not extended; soft blowing murmur, with first sound at base; loud bruit de souffle in the arteries of neck, arms, and lower limbs; very loud in abdominal aorta, the pulsation of which is readily seen, and proves distressing to the patient. She is easily agitated, and now somewhat desponding.

In this patient's case I had the first opportunity of combining the general regimenal treatment and the use of iron, as recommended by Dr. Begbie, with the employment of belladonna.

After the application of a large plaster of belladonna, for a few days, a very marked diminution in the size of the bronchocele, and a sensible amelioration in the condition of the eyes, had resulted.

While the application of the plaster was continued, I prescribed atropia internally, in doses of one sixtieth of a grain, morning and evening, only interrupting its administration when a complete dilatation of both pupils had resulted, and the patient was unable to read.

Greatly improved in health, this woman left the hospital a little after Christmas. I have seen her twice since that time. On the last occasion, only a few days ago, when availing herself of an excursion by train from the part of the country where she resides, she came to town. I found the eyes normal; the bronchocele still existing, but not as a vascular bronchocele; a small firm tumour alone remained, while cardiac palpitation and vascular pulsations have vanished. Her appearance is no longer anæmic, and, twice since she left the hospital, menstruation has taken place.

This is in every respect a favorable case. Treatment was employed at an early period, and speedily produced a beneficial effect. In cases distinguished by the continuance of the characteristic symptoms for a much longer time, so successful a result is scarcely to be anticipated. That a relapse may possibly occur is not to be questioned; but familiar as I am with one of the earliest cases recorded by Dr. Begbie, in which a perfect cure has resulted, and now at the end of fifteen years continues, I am disposed to think that such an occurrence is unlikely.

Case 2.—Mrs.—, æt. 37, mother of seven children, with her strength greatly reduced from nursing an infant of thirteen months, and repeatedly a sufferer from menorrhagia. Anæmic in appearance; has a considerable bronchocele, and in a marked degree the peculiar prominence and expression of the eyes. These symptoms have developed themselves within the last two months. Is not nervous. The beating of heart and arteries, and the auscultatory phenomena connected with these, are precisely as in the former case. This woman states positively that she never sustained any sudden shock, or mental distress of any kind.

After a few weeks' treatment the patient has greatly improved under the use of iron, with belladonna prescribed in the same manner as in the case already detailed.

The plan of treatment pursued in these cases and in others

which have come under my care has had reference, firstly, to calming the excited action of the heart and blood-vessels; and, secondly, to improving the evidently deteriorated condition of the blood. I believe that in order to remedy the disorder both of these indications must be met, the one without the other will fail. Belladonna is a powerful excitant of blood-vessels, acting on the unstriped muscular fibres in them. The experiments of Brown-Séquard upon animals have sufficiently established this point. Again, as a remedy, belladonna is known and prized from its possession of this very property. Acting in all probability on the blood-vessels of the iris, it causes dilatation of the pupil; on the blood-vessels of the mamma it arrests the secretion of milk; on the muscular coat of the intestine action of the bowels. Administered in the form of its extract, in doses of one sixth or one fourth of a grain, or as atropia, in doses of one sixtieth, or applied as a plaster over the enlarged thyroid gland, I have found this remedy to produce speedily a remarkable effect on the eye, in causing its retirement and in removing the peculiar staring expression; on the thyroid gland in leading to the rapid, or at all events speedy diminution in its bulk; on the heart and blood-vessels in modifying and controlling their excited action. I cannot doubt that in producing these effects its special action is exerted on the dilated vessels, stimulating them to rhythmical contractions, and thus overcoming congestions. It is from its action in this way that the late Professor Schroeder van der Kolk found belladonna so useful a remedy in epilepsy,[1] and that Brown-Séquard has satisfactorily tested its claims to employment in cases of paraplegia dependent on congestion of the cord or chronic inflammation.[2] But while belladonna, and specially atropia, produce these effects, and thus greatly modify the distressing symptoms in such cases, unaided neither will accomplish a cure. Iron, as the "summum remedium" in blood impoverishment, must be administered, and that steadily for a time. Thus combined, I think, in comparatively recent cases, the most desirable results will

[1] 'On the Spinal Cord and Medulla Oblongata, and on the Proximate Cause and Rational Treatment of Epilepsy.' New Sydenham Society's edition, p. 275.

[2] 'Lectures on the Diagnosis and Treatment of the Principal Forms of Paralysis of the Lower Extremities,' 1861.

speedily be obtained. Dr. Begbie had found iron in combination with henbane, a plant belonging to the Atropaciæ, and exerting some properties similar to belladonna, most serviceable; and before I was led to employ the latter, I always used the tincture of hyoscyamus with the tincture of the muriate of iron. Trousseau has employed digitalis, and speaks with confidence of the remedial virtues of cold compresses when applied over the thyroid gland. The operation of the latter is evidently directly on the vaso-motor nerves, and leads to a sympathetic contraction of blood-vessels in other parts. Iodine is not only useless as a remedy in this form of bronchocele, but, as M. Beau and others have shown, positively injurious. None of those means which are ordinarily employed with benefit in the treatment of blood impoverishment, associated with more or less of nervousness or hysteria, should be neglected,—advantage is certainly to be derived from change of air and scene; but, on the other hand, the disease is emphatically one requiring for its relief the continued use of such remedies as have been referred to. It has been noticed by some writers that when a woman affected with this peculiar disease becomes pregnant, a manifest improvement in her condition occurs—a circumstance only to be explained by the change which takes place in the condition of the blood while pregnancy exists, and pointing, therefore, to the hæmic origin of this complex malady.

I am, therefore, disposed to conclude,—that the true pathology of the bronchocele and exophthalmos, found in connection with cardiac palpitation and vascular pulsations and dilatations, lies both in the blood and in the nervous system, but that the "primum mobile" is the former;—that an altered state of the blood—for a time stopping short of what is generally known as anæmia,—but in many cases amounting to well-marked anæmia, acts directly on the nerves of blood-vessels, and on the nerves of the heart—"Sanguis moderator nervorum;"—that, as a consequence, their rhythmical movements are seriously affected, and dilatation of the heart's chambers, and of blood-vessels, arteries, but chiefly veins, results;—that for a lengthened period the bronchocele is truly a vascular enlargement and dilatation; but that, in course of time, hypertrophy and degeneration of gland-structure result;—that the exophthalmos, which is not a necessary consequence any more than the bron-

chocele of the disordered state of blood, and neurosis of blood-vessels, depends upon congestion and vascular dilatation of the ophthalmic vessels, with effusion of serum into the post-ocular cellular tissue;—and, lastly, that a plan of treatment directed to the improvement of the condition of the blood, and, at the same time, to the state of the nervous system,—is successful in effecting a cure, provided those organic changes in the heart, to which reference has been made, have not already been induced.