cases, excluding, of course, those secondary to valvular lesions, endoarteritis, and emphysema, the heart is only implicated to the amount of 3.3 per cent. of the cases.

The secondary forms may be very obvious or very insidious, acute or chronic; at one time more interstitial, at another more parenchymatous; often mixed with amyloid degeneration; but, as a rule, the renal mischief only plays second fiddle, and is an adjunct to other serious diseases. Still, at times and in some cases, the renal clinical symptoms, although secondary, assume a great importance, and engage more attention than the general condition out of which they arise.

Bamberger's primary form of Bright's disease comprised both glandular or parenchymatous and interstitial nephritis—807 cases in all. Of these, he observed 67 cases which were acute in their commencement and course, 357 which were entirely chronic, and 383 which lived on to renal atrophy. As regards age, he proffers a most reliable table. Excluding the scarlatinal form, which, early as well as latest authorities acknowledge, is not morbus Brightii in Bright's sense, the facts stand thus.

Decennium.	Cases.	Males.	Females.
1	1	0	1
2	50	33	17
3	121	64	53
4	149	93	56
5	156	94	62
6	152	78	74
7	115	57	58
8	55	22	33
9	8	4	4

The greatest proportion of acute to chronic cases—54 to 13—occurred between the ages of 20 to 40; between 40 and 60 years of age, the chronic cases preponderated, the ratio being 214 chronic to 143 acute; while between 50 and 70 years, the large proportion of cases were atrophic kidneys. His table of the general primary diseases, to which morbus Brightii was secondary, gives us these etiological moments in the order of their frequency and importance.

Morbus Brightii.

Primary Disease.	Acute.	Chronic.	Atrophic.	Totals.	Percentages on 2,430 cases.
Tubercle; phthisis; scrofula	47	257	77	381	15.7
Valvular heart-lesions	19	117	86	222	9.1
Gravidity and puerperal state	80	56	16	152	6.3
Disorders of urinary channels	11	72	51	134	5.5
Suppurations	42	77	10	129	5.2
Alcoholism; cirrhosis	16	68	33	117	4.8
Carcinoma	13	55	35	103	4.2
Pulmon. emphysema.	6	51	28	84	3.5
Typhus and typhoid.	42	14	2	58	2.4
Syphilis	4	29	16	49	2.
Scarlatina	18	—	—	18	0.7
Ague and malarious fevers	1	9	3	13	0.5

Various other maladies, he admits, may be provoking causes of secondary Bright's disease; cholera, pneumonia, diphtheria, variola, scorbutus, dysentery, acute atrophy of the liver. He proceeds to argue that, if so many predisposing causes invite these localised renal pathological processes, albeit we may allow three forms or varieties of degenerative change to them, there must be some noxious influence they exercise upon the kidney which we ought to be able to discover. Do these noxious influences admit of being grouped and reckoned? Yes. 1. We can take count of certain poisonous substances—viz., phosphorus, lead, alcohol, ague, infectious fevers, decomposing pus from extensive exposed suppurating surfaces—or contaminating principles of which we have learnt in the blood, which it is the object of the kidney to eliminate from the system, although, unfortunately, it may damage itself in the task. At least one-third of the predisposing diseases probably act thus. 2. We perceive the malinfluence upon the kidney exercised by disorder of the circulation through this organ; how valvular lesions of the heart, emphysema and cirrhosis of the lungs, curvatures of the spine, invite disease in this way. 3. Lastly, we have learnt from Aufrecht's experiments on animals, and many of nature's own experiments on man—as compression of the ureters by tumours; obstruction of the urinary outlets, as effected by urethral strictures; hypertrophy of the prostate gland, and various bladder-affections—that the kidneys as secreting glands suffer pathologically, and become the seat of secondary morbus Brightii, parenchymatous or interstitial nephritis, when the urinary passages are anywhere obstructed, and the urinary secretion has to be conducted under conditions of abnormal urine tension.

[To be continued.]

THE GULSTONIAN LECTURES ON ANÆMIA.

Delivered before the Royal College of Physicians.

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LECTURE III.—PART I.

Idiopathic Anæmia (continued)—Chlorosis: Reasons for and against its separation as a Distinct Disease—Congenital Defects (Vascular Hypoplasia, Virchow) cannot be at the root of all Cases—Its obvious Relations to Altered Conditions of Life and Work—Relations to Menstrual Irregularities—Symptoms of those of Anæmia—The Blood in Chlorosis—Effects of Treatment—Cardio-vascular Symptoms of Anæmia: Cardiac, Arterial, and Venous Murmurs—Their Mode of Production—Anæmia as a Cause of Heart-Disease (Goodhart).

MR. PRESIDENT AND GENTLEMEN,—In my last lecture, I endeavoured to show that pernicious anæmia must be considered as the outcome of a severe anæmia, whether symptomatic or idiopathic, its progressive course and frequently fatal issue being induced by changes, of which there is yet but little information either in the normal formation of the blood or in its destruction; and I propose to-day to speak, in the first place, shortly about chlorosis, which I believe to be a form of anæmia depending on similar changes, and therefore to be considered as falling under the head of idiopathic anæmia. I know that this is contrary to prevalent teaching, and perhaps may be regarded as a retrograde step, for the tendency is undoubtedly rather to analyse diseases than to effect syntheses of conditions which have a superficial resemblance. But, where the distinctions are so finely drawn and so subtle as they are in respect to chlorosis, such analytical severance is hardly justifiable, perhaps harmful, and certainly productive of confusion. There is only one certain ground for such severance, and that is the one which follows from Virchow's discovery, in some cases of chlorosis, of what appear to be congenital defects in the circulatory mechanism, to which I shall presently refer. Setting that aside, there does not appear any marked distinction between chlorosis, in its development and progress, from other forms of anæmia of idiopathic origin, save only that, in many of the latter, the progress is uninfluenced by treatment. The point of view taken by those who argue for the separation is, that chlorosis is a distinct morbid entity, of which the anæmia is but a symptom;* that it is marked by nervous derangement, and frequently by menstrual disorder, as much as by anæmia; but the same may be said with equal warrant of the forms of anæmia to which it should be allied. The anæmia itself is but a symptom, which in its turn brings other symptoms after it; and in both chlorosis and in the idiopathic anæmia of the adult, the anæmia prevails over every other symptom.

The reasons which, so far as I can gather, are advanced in favour of regarding chlorosis as a distinct disease, are these: its almost complete limitation to the female sex; its apparent dependence in some way on the menstrual function, and the changes undergone by the organism at puberty; certain nervous conditions, and certain peculiarities in the composition of the blood, and the structure of the blood-vessels. To consider each of these in turn. It is well known that the female sex is more readily influenced by anæmiating causes than the male; the blood is less rich in hæmoglobin, and its quantity is less. Any influence liable to create a demand on the blood is more likely to lead in the female to anæmia than in the male; and not only at puberty, but during pregnancy, the puerperal period, lactation, and the menopause, anæmia may arise and become profound. There is no essential difference between the anæmia produced at any of these periods. Nor is the limitation to the female sex of a condition indistinguishable from chlorosis invariable. I have at present under my care a youth, well developed and well nourished, who is the subject of an anæmia conforming in its history and characters, and I may add in its curability, to the most typical cases of chlorosis; and, from time to time, such cases of male chlorosis are recorded. More than this, in later life, the male, like the female, appears to be liable to the development of an insidious anæmia, without wasting, which in all its leading features resembles

* Moriez: *La Chlorose*. Paris: Masson. 1880.

chlorosis. It may be initiated by the same influences, mental, physical, hygienic, and other, which initiate chlorosis; it is not so common or so frequent, because in adult life the balance between blood-formation and destruction is more evenly maintained.

The dependence of chlorosis upon the menstrual function is not so absolute as is often supposed. The importance of that function and of its regular continuance is doubtless great, and of considerable influence upon the blood; and, at puberty, there must be a considerable readjustment of the forces of the organism when the processes of ovulation and menstruation are established. There must be an increased demand on the blood then and at every recurring menstrual period; and, although we may be unable to state precisely what the influence is, we are persuaded that there is a connection between the normal evolution of the blood and of these processes. At the same time, menstrual irregularities often neither precede nor accompany the development of an *anæmia* indistinguishable on other grounds from chlorosis; whilst both *amenorrhœa* and *menorrhagia* are as frequently secondary to the *anæmic* condition as initiatory of it.

The same might be said of those nervous symptoms which frequently predominate in chlorotics to such an extent, that some have desired to place chlorosis among the neuroses. For, whether we regard the mental and emotional characteristics, or the liability to neuralgic and other nervous disorders; whether we consider the influence of psychical perturbations in determining the development of the *anæmia*, there is no firm distinction between chlorosis, as generally understood, and ordinary *anæmia*.

There remain two very important reasons which, if established, should suffice to justify the separation. The first is one to which I have frequently referred—viz., that in chlorosis the alteration in the blood is solely a diminution in its *hæmoglobin*, and in no other constituent. If this obtained of no other *anæmia*, the distinction would be of value. But, unless we enlarge the boundary of chlorosis until its territory becomes continuous with that of idiopathic *anæmia*, this distinction will not hold. For it has not been proved, except in a few cases of pernicious *anæmia*, that the serum-albuminates are diminished in other forms of idiopathic *anæmia* besides chlorosis. There would seem to be no evidence of such diminution except when dropsical symptoms occur, and in those cases where there is general inanition. But in very many of the cases of idiopathic *anæmia* of the adult, the body is well nourished; and in this respect shows no difference from chlorosis. Lastly, there is Virchow's discovery of certain vascular anomalies in chlorosis, which of themselves, if of general occurrence, would suffice to create a distinction on the surest basis—viz., an anatomical one. I may be permitted to briefly describe these anomalies, which have also been met with by Rokitsansky and Bamberger. There is considerable narrowing of the aorta, which can hardly admit the little finger, instead of the thumb, its normal size. It is quite infantile in size. Its walls are much thinner than normal, but their elasticity is very marked, even excessive. The intima is the seat of irregular thickenings in the form of wavy or trellice-like elevations, with ridges, between [which are] depressions. The inner coat is, moreover, often the seat of diffuse fatty degeneration, limited to the superficial layers, and forming yellow patches and striæ, especially between the intercostals in the posterior wall of the aorta. Sometimes, this degenerative change extends to the muscular coat. Finally, there are anomalies in the origin of the branches of the aorta, particularly seen in the irregular disposition of the intercostals. With these vascular imperfections, there is sometimes a small imperfectly developed heart, but more often a large one, dilated and hypertrophied. The reason for this diversity is explained by Virchow, who, believing that the whole condition is one of arrested development of the vascular system (associated sometimes with stunting of the body), and, one may add, of the blood, would recognise a small heart as part of this general change; but, if the volume of the blood increase, this, together with the narrowness of the aorta, would be a sufficient cause for the enlargement. This vascular hypoplasia may or may not be associated with an ill-developed condition of the uterus and ovaries, which Rokitsansky thought the rule in chlorotics. But neither of these congenital defects—or, more correctly, defects in the evolution of the vascular or of the generative apparatus—can be considered as underlying every case of chlorosis, or, at any rate, existing as a cause of the *anæmia*. Moreover, the vessels are liable to great variations in size; the intercostal arteries are very inconstant in their mode of origin; and narrowness of the aorta has been often described in cases where there were no symptoms of chlorosis during life. It is, however, a valuable and suggestive contribution to the subject, opening up the line of thought that, in chlorosis, we have a condition dependent on imperfect evolution of the blood and vascular system. But no proof has been given that the diminution in the size of the vessels has not followed upon diminution in the total quantity of blood.

The history of chlorosis presents, in the majority of cases, a distinct etiological factor or factors, which cannot be ignored. Those who are most frequently its subjects are young women who have exchanged the light and air of the country for arduous domestic work in a town house, withdrawn from sunlight, undergoing considerable physical exertion in climbing stairs, or engaged in sedentary occupations in crowded and ill-ventilated rooms, or in many other ways subjected to conditions which we know to be prejudicial to healthy nutrition; whilst, at the same time, by reason of their age and sex, they are more susceptible of such influences. There are changes then at work, both around and within the organism, all tending to the same end. It would be absurd to eliminate from the category of chlorosis all the cases in which there are these etiological factors, because in other cases the disease develops without them; for it is impossible to say to what extent they act in inducing the *anæmia*. And the symptoms of chlorosis are those of *anæmia*. The increasing pallor, breathlessness on exertion, palpitation, headache, vertigo, and general nervous irritability, the fatigue induced by slight effort, the physical and mental inertia, the cardiac and vascular signs, the marked thirst, frequent derangements of digestion, and the character of the urine. These and other symptoms can be directly attributed to the *anæmic* state. Nor is the course of chlorosis quite *apyrexial* in all cases. It is often so, but it is not very unusual to find a temperature of about 99°, with slight exacerbations to 100° or 101°, a mimic reproduction of the irregular "*anæmic fever*" that appears in pernicious *anæmia*. Finally: What are the characters of the blood in chlorosis as regards *hæmoglobin* and corpuscles? This has been thoroughly inquired into of late years; and, in my first lecture, I referred to some of the facts concerning this matter.

I may briefly recapitulate and extend these points. There is invariably a reduction in the total quantity of *hæmoglobin*, a reduction reaching, according to the early researches of Duncan, about one-third of the normal. According to Quinquaud, the *hæmoglobin* is diminished about one-half in moderate chlorosis, varying between 70 and 30 grammes, instead of 125 grammes (which is the normal quantity), per 1,000 grammes of blood, and the capacity for oxygen is very greatly reduced. The same observer declares further that the chief saline constituents of the corpuscles—the potash salts and chlorides—are appreciably diminished, but that there is no change in the amount of the stromal globulin. In a series of observations by Hayem, where the number of corpuscles was estimated in relation to their richness in *hæmoglobin*, this latter was found to be on an average about 50 per cent. of the normal, and in a few cases, in which I have made similar calculations, this diminution has been almost as marked. But there is not, as a rule, a corresponding diminution in the number of corpuscles. The mean of eighteen numerations by Hayem gives 3,520,000 corpuscles per cubic millimetre of blood, or 70.4 per cent. of the normal; and of seven cases, I find a mean of about 3,000,000, or 60 per cent., there being, however, remarkable variations in the total number of corpuscles in different cases. For example, in one well-marked case, where the percentage of *hæmoglobin* was only 45, the number of corpuscles was 4,058,000; whilst in another the number of corpuscles was only 2,090,000, with 32 per cent. of *hæmoglobin*. Such examples as these—and they might be multiplied—prove what I have before pointed out, that the number of corpuscles is only one factor in the degree of an *anæmia*, their value as to *hæmoglobin* being the more important factor. Especial attention has been paid in chlorosis, as in pernicious *anæmia*, to alterations in the form and size of the corpuscles. Malassez declares that the corpuscles are, as a rule, larger than those in health in the ratio of 1.09:1, and others have found a certain number of truly giant corpuscles, with a diameter of 12 μ instead of 7.7 μ (Hayem). More striking, however, is a departure from the normal in the contrary direction, such, according to Hayem, occurring in undue proportion. He lays much stress upon the abundance of those small elements or "*hæmatoblasts*", which, it will be remembered, he considers as the early form of the adult corpuscle, and believes their accumulation to point to the incomplete development or evolution of the blood. The same observer has also noticed great variations in the form of the corpuscles, which bring to mind the variations described in pernicious *anæmia* by Quincke. I cannot say that I have been enabled to confirm this; certainly the corpuscles seem to be very variously sized, and to be more plastic and softer than in normal blood, forming rouleaux which are far more irregular, where the corpuscles, too, seem to be flattened out and otherwise slightly altered in form; but the extreme variations in size and in form, except after exposure (when they more rapidly become crenated than do healthy corpuscles), I have not seen.

The effects of treatment, especially of ferruginous medication, are so remarkable in those cases of idiopathic *anæmia* which are styled chlorosis, as to be in sharp contrast with the other forms occurring in the adult. In a very short time, under such medication, the blood re-

gains nearly its normal standard. Sometimes this improvement is permanent, but often the anæmia returns at some later date, under the influence of some exciting cause. There is an anæmic tendency in such individuals which might be explained on the anatomical defects described by Virchow (in which case the disease would be practically incurable), but which seems more probably dependent on a defective evolution of the blood-forming organs.

I have ventured to point out these matters because of the difficulty, which I feel sure is a real one, of deciding in any given case whether it is a chlorosis or not. It is not a mere question of nomenclature; if that were all it would matter no whit by what name we signified these conditions; but it is the difficulty which has arisen in consequence of the word "chlorosis" being held to convey more than the word anæmia, and being also arbitrarily considered inapplicable to idiopathic anæmia arising in later life. It may be most desirable, as Immermann (in his article on chlorosis in Ziemssen's *Cyclopædia*) rejoices to think it is the case, that in chlorosis we have a distinct malady rescued from being merged in the "great ocean of anæmia"; but, unless its distinctive features can be more sharply defined than they are at present, the difficulty of separating it from other forms of idiopathic anæmia will constantly be felt.

I desire now to speak shortly of two of the more constant and striking effects produced by the anæmic condition—the signs furnished by the heart and blood-vessels, and the influence it has in determining fatty degeneration. Upon the former of these points, which has been the object of much controversy and speculation, I hardly feel qualified to speak with authority, not having studied the matter so deeply as many. It seems to me, however, that, as regards the production of so-called hæmic murmurs, we have to consider, not only the factor of the blood-impovertyment, and especially its diminution in quantity, but also the factor of the conditions of the walls of the heart and blood-vessels induced by that impoverished blood. Indeed, the idea that the murmurs are solely due to the first of these factors has, I believe, been almost abandoned; it did not afford an adequate explanation, and seemed to be contrary to physical laws. As regards the purely cardiac murmur, there are at least two conceivable explanations for it in which the condition of the muscular walls (dependent on the anæmia) is primarily concerned. One of these is that the heart is dilated, and the murmurs are produced by its cavities being incompletely filled, and the other that there is actual regurgitation through the tricuspid and mitral orifices owing to the imperfect action of the enfeebled papillary muscles deranging the mechanism of the valves. Besides the cardiac bruits, there are murmurs produced over the pulmonary artery and aorta. All of these murmurs are systolic in time, and vary much in intensity and situation; the most constant seat being at the base of the heart, the next at or within the left apex. Dr. Pearson Irvine, whose loss we have had so previously to deplore, studied this subject for a long time, and embodied his conclusions in a paper read before the Royal Medical and Chirurgical Society in 1877. He started from the ground that dilatation, especially of the left ventricle, is the chief cardiac change in chlorosis—an opinion promulgated by Stark,—and endeavoured to explain the murmurs, not obviously vascular, on the fact of this dilatation. One may admit the fact that in many chlorotics there are signs of this dilatation. The matter, however, is very difficult of clinical proof, but it is supported by the *post mortem* evidence of hypertrophy by Virchow and Lewinski—a hypertrophy which is as conceivably produced secondarily to a dilatation, as to a narrowed aorta. The known relation between anæmia and fatty degeneration of the heart supplies us with ground for believing that in slighter cases the heart muscle is enfeebled; and probably also its innervation is affected by the impoverished blood. Dr. Irvine distinguished four cardiac murmurs in chlorosis, having their points of maximum intensity over the left auricle and its appendix, at the left apex, over the fourth left costal cartilage, limited there or transmitted downwards to the right or left, and lastly, in the fifth left space, below it or over the sternum adjacent to it. He was inclined to attribute the production of these murmurs to the dilatation of one or both ventricles, and did not favour the view that any of them were due to regurgitation. The regurgitant hypothesis, which explains the auricular murmur as well as those met with about the region of the apex, is supported on the left side by the almost constant accentuation of the second pulmonary sound, and on the right side by the occurrence of jugular pulsation. The mechanism of this regurgitation may be either a slight inadequacy in the contraction of the papillary muscles, or it may be dependent on dilatation. Although the basic systolic murmur may be in many instances due to this regurgitant eddy into the auricular appendix, there can be no question that bruits are heard strictly over the aortic and pulmonary areas. Of the mode of the production of the former (which are not common) no adequate explanation has been given; but of the latter, the true pulmonary bruit, we have Quincke's view that, in the cases

where it is marked, the lung is retracted and the pulmonary artery slightly compressed at every systole; and we know how pressure by the stethoscope will increase the intensity of these bruits.

The murmur heard in the carotids and other arteries is only an exaggerated degree of what can be heard in health, and is probably due to the impaired tones of the vessel allowing it to be more readily influenced by slight pressure.

The hum in the jugular vein—to which more significance has been attached than it merits, as shown by Dr. Herbert Davies—is produced by pressure, and increased in intensity whenever the flow of blood is accelerated. This is illustrated in the influence of posture—its increase in the standing position, in the rise and fall of the otherwise continuous blowing sound with the respiratory movement, the increased respiration into the chest with every deep inspiration being accompanied by increase in the intensity of the murmur, which can be entirely arrested by forced expiration. It is noticed also that the auricular and ventricular diastole influence slightly the intensity of this bruit, so that in it we have a measure of the variations in celerity of the venous blood-flow.

I ought not to leave this part of the subject without alluding to the hypothesis advanced by Dr. Goodhart (*Lancet*, 1880, vol. i, p. 479), that anæmia may be at the foundation of some of these valvular diseases, especially of the mitral valve, the etiology of which is still obscure. He thinks the evidence conclusive that in anæmia there is ventricular dilatation, just as there is *post mortem* evidence of muscular degeneration, and suggests that the continuance of regurgitation may submit the valves to so constant and irregular a strain as to lead to alterations in their intimate structure, thickenings and puckering, productive of permanent regurgitation, and possibly some stenosis.

DEFECTIVE NERVE-POWER AS A PRIMARY CAUSE OF DISEASE, WITH ITS SPECIAL RELATION TO DIPSOMANIA.*

By STEPHEN S. ALFORD, F.R.C.S.

MUCH of my time of late has been devoted to efforts for promoting the recovery of dipsomaniacs. Those lapsing into dipsomania are generally of a highly nervous, sensitive, lively temperament. This condition often has its commencement in mistaken efforts to sustain exhausted nerve-power, arising from continued overstrain and irregular work at high pressure; or from hereditary inability to endure the ordinary stress and troubles of life; or from a system exhausted by indulgences and late and irregular hours; or even by indolence and ennui; each and all being modified by circumstances of society, and by atmospheric and climatic conditions. In studying these cases, and their etiology, my attention has been directed to the harmful effect produced by the above causes acting on defective nerve-power.

As an old practitioner, I do not pretend to enter into the new physiological or pathological researches as to molecular disarrangements, but trust the few practical observations I can make may lead to a discussion on this subject. Surely, the effect of low nerve-power is not sufficiently recognised as a primary cause of disease. If the nervous system, including the cerebral, spinal, and sympathetic centres, with the sensorial and motor nerves distributed over the body, form its working, regulating, and protecting power, it is evident that their defect or disarrangement must more or less interfere with the functions depending upon them. We know for instance that, even when the nerve-power is only temporarily defective, the controlling influence of the vaso-motor nerves may so fail, that the smaller blood-vessels lose their elasticity, and, becoming distended with blood, produce the appearance seen in blushing. We further see this in the face of the drunkard as the effect of repeated stimulation; the vessels, from being frequently dilated, become at length permanently enlarged. Does not deficient nerve-power, as exhibited in the form of insufficient control over the vaso-motor nerves, cause the first dilatation of the smaller blood-vessels, which, by being intensified or frequently repeated, may pass into inflammation? Or further, by producing a modified increased flow of the vivifying stream, may not this defective nerve-power so interfere with the nutritive processes as to cause perverted deposits and dangerous structural changes, as exemplified in tubercle, cancer, and other destructive formations which occur in an asthenic condition of the system? Thus, what is ordinarily a healthy reparative process, becomes in our system, by defective controlling nerve-action, a destructive power which may end in death. The effect of defective or irregular nerve-power is also evi-

* Read before the North London District of the Metropolitan Counties Branch of the British Medical Association.