THE CROONIAN LECTURES

ON

FUNCTIONAL DERANGEMENTS OF THE LIVER.

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LECTURE II.

III. *Abnormal Disintegration.* 1. *Lithæmia*; 2. *Gout*; 3. *Urinary Calculi*; 4. *Biliary Calculi*; 5. *Degenerations of the Kidneys*; 6. *Structural Diseases of the Liver*; 7. *Degenerations of Tissue throughout Body*; 8. *Local Inflammations*; 9. "Constitutional Diseases."—IV. *Derangements of Organs of Digestion.* 1. *Tongue*; 2. *Appetite*; 3. *Taste*; 4. *Flatulence*; 5. *Constipation and Diarrhæa*; 6. *Vitiated Stools*; 7. *Intestinal Hæmorrhage*; 8. *Hæmorrhoids*; 9. *Hepatic Pain*; 10. *Jaundice, its Pathology*.—V. *Derangements of the Nervous System.* 1. *Aching Pains in Limbs*; 2. *Pain in Shoulder*; 3. *Neuralgia*; 4. *Cramps*; 5. *Headache—Migrain*; 6. *Vertigo*; 7. *Convulsions*; 8. *Noises in Ears*; 9. *Sleeplessness*; 10. *Depression of Spirits*; 11. *Irritability*; 12. *The Typhoid State*.

MR. PRESIDENT, FELLOWS OF THE COLLEGE, AND GENTLEMEN,—In my last lecture I endeavoured to show that the secretion of bile was, perhaps, the least important of the functions of the liver; but that, in the first place, this organ contributed greatly to the processes of sanguification and of nutrition of the tissues; and, secondly, that it was probably the chief seat of the disintegration of albuminous matter; while even the secretion of bile, although in part excrementitious, was mainly destined to assist the assimilation of the food. If these views were correct, I pointed out that the existing classification of the functional derangements of the liver, founded on the quantity or the quality of the bile in the stools, had become obsolete; and I proposed to substitute another, founded on the more important functions of the liver, and on the derangements which the liver excites in other organs of the body. I then described some of the derangements of nutrition and elimination traceable to the liver; and I now proceed to consider the more important disorders coming under the head of Abnormal Elimination.

III.—*Abnormal Disintegration.*

Modern investigations, pathological as well as physiological, go far to prove that one of the chief functional derangements of the liver, if it be not the foremost of all, is an imperfect disintegration of albuminous matter, or its non-conversion into a soluble product (urea), which can be readily excreted by the kidneys. A strong corroboration of the correctness of this view is furnished by the disease known as acute atrophy of the liver, to which I have already had occasion to refer. In this disease there is a rapid destruction of the secreting tissue of the liver, and the result is a disappearance of urea from the urine, and the substitution for it of leucin ($C^6H^{13}NO^3$) and tyrosin ($C^9H^{11}NO^3$), products of the disintegration of albumen more complex and less oxidised than lithic acid ($C^5H^4N^4O^3$) and urea (CH^4N^2O), and which are also found in abundance in the wasted tissue of the liver. The substitution of leucin and tyrosin for a portion of the urea of the urine takes place in other diseases of the liver, in which the destruction of the hepatic tissue is less rapid and less extensive than in acute atrophy, as, for example, in certain cases of cirrhosis and of obstruction of the common bile-duct. I have known it also to occur in certain febrile diseases, such as typhus and enteric fever, in which the hepatic tissue appears, in consequence of the increased work thrown upon it, to undergo partial disintegration.* But these important changes in the urine, so far as we know, only occur in cases where there is structural change of the liver. The urine is liable to other changes indicating imperfect disintegration or oxidation of albuminous matter, which are much more common, and which are also the result of functional derangement of the liver, but which are not necessarily associated with structural disease of that organ. The most common of these changes in the urine are deposits on cooling of lithic acid, lithates, and pigmentary matters; but there are probably others,

less frequent and as yet but little studied, such as the presence of xanthin, cystin, kreatinin, etc. I need not remind an audience such as that which I have the honour to address, that deposits in the urine of lithic acid or lithates are not due to any morbid condition of the kidneys. What I wish to insist upon is, that the frequent occurrence of these deposits in the urine ought always to be regarded as a sign of functional derangement of the liver, arising from causes, sometimes temporary, at other times more or less permanent. Excluding those cases in which deposits of lithic acid or lithates are thrown down in the urine not until twelve or twenty hours after its emission, as the result of spontaneous changes, to which Scherer has given the name of acid urinary fermentation,* and those which are due to a marked deficiency of urinary water, deposits of lithic acid, lithates, and abnormal pigments, which appear in the urine as soon as it cools, are chiefly met with under the following conditions.

1. In febrile diseases, in which we know that the liver becomes enlarged and congested, and its gland-cells loaded with minute granules, and in which there always is an increased disintegration of albuminous matter. Every one, for example, is familiar with the copious deposits of lithates which are so common during an attack of ordinary febrile catarrh.

2. In many structural diseases of the liver, and particularly in those which are characterised by an increased amount of blood in the organ, such as inflammation, cirrhosis, cancer, and simple hyperæmia, whether mechanical or active.

3. In functional derangement of the liver, either temporary or persistent.

To this third cause of an excess of lithic acid in the urine, I wish now to restrict my remarks. What I desire to maintain is, that lithuria, like glycosuria, is very often due to a functional disease of the liver, although even glycosuria is still ranged in some text-books with albuminuria and diseases of the kidneys. In other words, abnormal disintegration of albuminous matter in the liver may lead to a morbid condition of the blood and of the entire system, which often manifests itself in lithuria. This morbid state of the blood I propose to designate lithæmia.†

1. *Lithæmia*.—When oxidation is imperfectly performed in the liver, there is a production of insoluble lithic acid and lithates, instead of urea, which is the soluble product resulting from the last stage of oxidation of nitrogenous matter. Persons who habitually enjoy the best of health are liable to deposits of lithates in the urine after a surfeit of food, or even after partaking moderately of one of the fashionable dinners of the age. Under these circumstances, an excess of work is thrown upon the liver and the other glandular organs, and one result is that a quantity of albumen, instead of being converted into urea, is discharged by the kidneys in the less oxidised form of lithic acid or its salts. But what in most persons is an occasional result of an extraordinary cause, is in some almost a daily occurrence, either from the diet being always excessive in amount or unduly stimulating, or from some innate defect of power, often hereditary, in the liver, in virtue of which its healthy functions are liable to be deranged by the most ordinary articles of diet. Most persons appear to have more liver, just as they have more lung, than is absolutely necessary for the due performance of its functions. But in others, not unfrequently the offspring of gouty parents, the organ, in its natural condition, seems only just capable of performing its healthy functions under the most favourable circumstances, and functional derangement is at once induced by articles of diet which most persons digest with facility. This functional derangement may manifest itself by various symptoms of "indigestion", by disturbances of circulation and of other physiological systems, but especially by deposits of lithic acid, lithates, and pigments in the urine. These deposits, it is true, are often absent, and yet the urine may contain a great excess of lithic acid. Indeed, as Dr. Bence Jones‡ has shown, clear urine sometimes contains more lithic acid than that which thickens on cooling. But the frequent deposit of lithates shows that oxidation is less perfect than it ought to be. Very often, however, these urinary deposits exist for years without the patient experiencing any general or local discomfort. But sooner or later, often about middle life, lithic acid and lithates are formed in such excess that they cannot be eliminated by the ordinary channels, and they accumulate and create disturbance in different parts of the organism, and then the urinary deposits begin to attract more attention than they had previously done, from their being accompanied by symptoms of indigestion, or from the evidence of some serious local mischief, the onset

* *Ann. d. Chemie und Pharm.*, Bd. 42, s. 171.

† It has been pointed out to me that Dr. Austin Flint has proposed the term "uricæmia" to designate the excess of uric acid in gout and in cases of lead poisoning. (*Principles and Practice of Medicine*, 3rd edition; Philadelphia, 1863, p. 86). The term which I have employed appears to me to be preferable.

‡ *Philosophical Transactions*, 1849, part ii, p. 249.

* See Murchison *On the Continued Fevers of Great Britain*, 2nd edition, 1873, pp. 157, 210, 255, 533, 629.

of which had been insidious. These symptoms are all the more likely to occur if the patient be what is commonly known as "a generous liver", if he take little exercise in the open air, or if he have much mental work. Of the symptoms referred to, the most common are the following:—

- a. A feeling of weight and fulness at the epigastrium and in the region of the liver.
- b. Flatulent distension of the stomach and bowels.
- c. Heart-burn and acid eructations.
- d. A feeling of oppression and often of weariness and aching pains in the limbs, or of insurmountable sleepiness after meals.
- e. A furred tongue, which is often large and indented at the edges, and a clammy, bitter, or metallic taste in the mouth, especially in the morning.
- f. Appetite often good; at other times anorexia and nausea.
- g. An excessive secretion of viscid mucus in the fauces and at the back of the nose.
- h. Constipation, the motions being scybalous, sometimes too dark, at others too light, or even clay-coloured. Occasionally, attacks of diarrhoea alternating with constipation, especially if the patient be intemperate in the use of alcohol.
- i. In some patients, attacks of palpitation of the heart, or irregularity, or intermission of the pulse.
- k. In many patients, occasional attacks of frontal headache.
- l. In many patients, restlessness at night and bad dreams.
- m. In some patients, attacks of vertigo or dimness of sight, often induced by particular articles of diet.

All of these symptoms are liable to occasional aggravations from errors in diet. Gradually the patient is taught by experience to become more careful as to what he eats or drinks. One thing after another he is compelled to give up. First, he renounces malt liquors; then he discovers that Port wine, Madeira, Champagne, and Burgundy disagree, and he betakes himself for a time to "dry sherry"; but at length this does not suit, and after an interval, during which a trial is made of claret or hock, the patient, probably under medical advice, finds temporary relief from the substitution for wines of brandy or whisky largely diluted with water. At last, unless he be misled by the fashionable, but to my mind erroneous, doctrine of the present day, that alcohol in one form or another is necessary for digestion or to enable a man to get through his mental or bodily work, he finds that he enjoys best health when he abstains altogether from wine and spirits and drinks plain water. The patient goes through a like experience with regard to solid food; one dish after another, very often what he likes best, has to be given up, until at length, if he be well advised and have the sense to follow the advice, he restricts himself to the plainest food in moderate quantity. As a rule, those articles of diet are most apt to disagree which contain much saccharine or oleaginous matter, and not, as might perhaps have been expected, nitrogenous food if plainly cooked. In most of these cases, the digestion appears to be strongest in the morning, and the patient suffers from late dinners or suppers.

The picture which I have thus imperfectly drawn represents a morbid condition extremely common in this country, which is associated with a constant tendency to the deposit of lithic acid or lithates in the urine, and which, for the reasons already given, I believe to originate in functional derangement of the liver.

2. *Gout*. But, secondly, you cannot fail to recognise that this picture represents a train of symptoms very common in gouty people, and to which the terms "gouty dyspepsia", "latent gout", "suppressed", "anomalous", or "irregular gout" have been applied; although what I desire to maintain is, that they are also very common in persons who neither inherit articular gout, nor ever have it themselves. Gout itself, however, is merely one of the results of lithæmia. Thanks to the researches of our colleague Dr. Garrod, we now know that gouty inflammation of a joint is due to various exciting causes, which it is needless here to enumerate, determining a local deposit of lithate of soda, which has previously existed in abnormal quantity in the blood, as well as in the fluid that exudes from it into all the textures of the body. The accumulation of this substance in the blood will, no doubt, be favoured by non-elimination consequent upon disease of the kidneys; but in most cases of gout the kidneys are in the first instance healthy, and the presence in the blood or tissues of lithic acid or its salts is the result of imperfect digestion, or more strictly of functional derangement of the liver. Articular gout is, so to speak, a local accident, which may occur at any time in persons, in whom the normal process by which albuminous matter becomes disintegrated in the liver into urea is persistently deranged. In other words, gout, like diabetes, is the result of a functional derangement of the liver; and just as we found that in many persons in whom there is no evidence of articular gout an innate defective power of the liver, in virtue of which its functions are deranged with unusual facility, is often transmitted by parents to their offspring, so gout, which

is one of the consequences of that condition, comes to be an hereditary disease. I hold, therefore, that what is called a "gouty diathesis" always indicates, and is the result of, hepatic derangement, and that many symptoms commonly referred to gout would be more correctly ascribed to disorder of the liver.

3. *Urinary Calculi* are another consequence of lithæmia, and therefore of functional derangement of the liver. Of the concretions which form in the urinary passages, the great majority consist, in the first instance, at all events, of lithic acid or its salts. According to Dr. William Roberts, lithic acid constitutes five-sixths of all renal concretions, and of vesical calculi which have only recently descended from the kidney.* The circumstances favourable to the precipitation of lithic acid are, an acid condition of the urine, but mainly an excessive elimination by the kidneys of free lithic acid, which had previously existed (either free or combined) in excess in the blood, and which we have seen to be formed mainly, at all events, in the liver. There are also good reasons for believing that renal calculi composed of other substances than lithic acid have an hepatic origin. Cystin ($C^3H^7N^2SO^2$), for example, which represents a different process of oxidation from that which produces lithic acid, closely resembles taurin, and, like it, contains a large proportion of sulphur;† and, moreover, it has been found by Scherer in the livers of patients suffering from enteric fever.‡ It would seem, therefore, that those rare renal calculi which are composed of cystin are due in the first instance to some functional derangement of the liver. Xanthin ($C^5H^4N^4O^2$), again, of which a few renal calculi, chiefly in young people, are composed, also appears to arise from imperfect oxidation of the products of albuminous matter. It differs from lithic acid only in containing one atom less of oxygen; so that it also is probably formed in the liver, in which organ it has been found by Scherer, as well as in the blood, spleen, and muscles.§ Even oxalate of lime, which Dr. Bence Jones found, either alone or combined with other substances, in 163 out of 450 urinary calculi,|| may in some way be connected with functional derangement of the liver, although the evidence on this point is less clear than in the case of other urinary concretions. I do not forget that it was maintained by so eminent an authority as our colleague Dr. Owen Rees, in the Croonian Lectures delivered before this College in 1856, that oxalic acid is never excreted from the blood, but is always formed in the urine after its secretion by decomposition of lithic acid; and that this opinion has more recently been advocated by another eminent Fellow of this College, Dr. Basham.¶ Facts, however, are now known which point strongly to an opposite conclusion. For example, oxalic acid and its compounds, when introduced into the stomach, will appear as oxalate of lime in the urine; while in one case, at least, oxalic acid has been found in the blood by Dr. Garrod.** It has also been found in saliva, in perspiration, and in mucus. The researches also of Beneke†† make it probable that the chief, if not sole, source of oxalic acid is impeded metamorphosis of the nitrogenous constituents of the blood and food; while, from its composition ($C^2H^2O^4$), it appears to be one of the penultimate stages in the oxidation of the more complex organic substances into carbonic acid and water. What part of the system is in these cases mainly at fault is not very clear, although we are quite certain that the liver contributes greatly to the disintegration of albuminous matter; and it seems not improbable that, when an excess of lithic acid is formed in the liver, a portion of it may be subsequently converted into oxalic acid. Wöhler has succeeded in obtaining oxalic acid from lithic acid out of the body; while Schunck‡‡ and other chemists distinctly state that, within the body, oxalic acid is formed by the oxidation of lithic acid. When lithic acid is imperfectly oxidised, it is believed to break up into oxalic acid and urea. It may be added, that oxalate of lime usually coexists or alternates with lithic acid or its salts, both in the urine and in urinary calculi. But whether the liver be concerned in the production of oxaluria or not, there can be no doubt that it is the organ fundamentally at fault in the great majority of urinary calculi; and that it is to it, and not to the kidneys, that we must mainly look for their prevention and treatment. This pathological inference is confirmed by clinical experience. One of the greatest modern authorities on urinary calculi states, as the result of his observation, that patients with calculous disease are only temporarily benefited by the alkaline waters of Vichy and Vals, which dilute the urine and render it alkaline, but do not cure the disease; whereas more permanent results are obtained by the use of

* *Urinary and Renal Diseases*, 2nd edition, 1872, p. 270.

† *Ibid.*, p. 84.

‡ *Archiv für Path. Anat.*, Bd. x, p. 228.

§ Roberts, *op. cit.*, p. 88.

|| *Lectures on Pathology and Therapeutics*, 1867, p. 99.

¶ *Renal Diseases*, 1870, p. 187.

** *Medico-Chirurgical Transactions*, 1848.

†† *Zur Entwicklungsgeschichte der Oxaluria*, F. W. Beneke, 1852.

‡‡ *Proceedings of the Royal Society*, No. 95.

the waters of Friederichshall, Carlsbad, and Püllna, which produce activity in all the digestive organs, and eliminate by other channels the waste matters previously thrown out as lithic acid by the kidneys, but which mainly act by relieving the overloaded liver and restoring its normal functions.

4. *Biliary Calculi*, which consist for the most part of cholesterin and bile-pigment, are another result of functional derangement of the liver. They are chiefly met with in persons of middle or advanced life who have led sedentary lives, and they are particularly common in those who have lived too well and eaten much saccharine food, and who are the subjects of lithæmia. It may be difficult to explain how the functional derangement of the liver which results in lithæmia should also lead to the formation of concretions composed of cholesterin and bile-pigment in the biliary passages; but the frequent concurrence of the lithic acid dyscrasia with gall-stones is a clinical fact which I have had many opportunities of verifying. This observation accounts for the frequent occurrence of biliary calculi in gouty people, and it also explains the frequent coincidence in the same individual of gall-stones and urinary calculi. I cannot agree with Frerichs in regarding this coincidence as purely accidental.* Many years ago, Morgagni insisted on the frequent coexistence of urinary and biliary calculi. The late Dr. Prout also remarked that the formation of gall-stones of cholesterin was frequently associated with a tendency to lithic acid deposits in the urine; and Dr. George Budd, in his classical work on *Diseases of the Liver*, states that "the habit of drinking porter, which frequently leads to lithic acid deposits and to the most inveterate forms of gout in persons who inherit no disposition to them, may also frequently lead to the formation of gall-stones".† Lastly, the intimate relation between urinary calculi, biliary calculi, and gout was in accordance with the great clinical experience of the late Professor Trousseau.‡ In connection with these remarks, it may be worth adding that, in a few instances, lithic acid has been found in biliary concretions.§

5. *Degenerations of the Kidneys*.—From what has been already stated, it is clear that the kidneys and the liver are intimately connected in their functions, the main object of the kidneys being to eliminate certain products which are in great part secreted in the liver. Derangements of one organ are, therefore, very likely to lead to disorder of the other. In the first place, my experience has led me to regard lithæmia as one of the chief causes of "acute Bright's disease" or acute nephritis. Most cases of this disorder are traceable either to scarlatina or to a chill. In patients under 20 years of age, few cases cannot be traced to scarlatina. In adults, when the attack follows a chill, and there has been no antecedent attack of scarlatina, it will almost invariably be found that the patients have previously suffered from derangements of the liver with lithæmia, while many have led intemperate lives. Again, we find that functional derangement of the liver resulting in lithæmia, with dyspeptic symptoms such as those which I have described, is a common cause of the contracted, granular, or gouty kidney. Our colleague Dr. George Johnson, one of the greatest living authorities on diseases of the kidneys, thus writes respecting the causes of this form of Bright's disease:—"It is often associated with the gouty diathesis, as one of its synonyms indicates; and it is of common occurrence in persons who eat and drink to excess, or who, not being intemperate in food or drink, suffer from certain forms of dyspepsia, without the complication of gouty paroxysms." And further on, in the lecture from which I have just quoted, he observes:—"Dyspepsia is frequently associated with this form of disease, sometimes as a cause, sometimes as a consequence. You may often learn that a patient of strictly temperate habits has for months or years suffered from pain or uneasiness after food, flatulent distension of the stomach and bowels, habitual looseness or irregularity of the bowels, constipation and diarrhoea alternately. With this, there is often turbidity of the urine, which is high-coloured, excessively acid, and deposits urates abundantly. After a time, the urine, which had been scanty, becomes more copious, of pale colour, of low specific gravity, and is found to contain albumen and granular casts. In such a case, probably renal degeneration is a consequence of the long-continued elimination of products of faulty digestion through the kidneys. I have seen this sequence of events so frequently, that I have no doubt as to their causative relationship. Dyspeptic symptoms, such as I have described, and consequent renal degeneration, are in some cases excited or greatly aggravated by habitual excess of alcohol."|| Numerous cases which have come under my own observation, and which I have carefully watched, have satisfied me as to the strict accuracy of Dr. Johnson's description; but the dyspepsia which so commonly precedes the first

symptoms of contracted kidney is that which I have already described as accompanying persistent lithæmia, and as consisting in derangement, not so much of the gastro-intestinal digestion, as of the disintegrative processes which go on in the liver.

Chronic degeneration of the kidneys with albuminuria is sometimes also a sequel of diabetes, the kidneys becoming diseased from the constant irritation of the saccharine urine. This is another way in which functional derangement of the liver may lead to structural disease of the kidneys.

6. *Structural Diseases of the Liver*.—It is highly probable that derangement of the disintegrative processes going on in the liver may lead to structural changes in the liver as well as in the kidneys. In the first place, fatty degeneration of the liver is well known to be a common lesion in persons who are large feeders or drink much alcohol and lead indolent lives, and in whose urine there are often copious deposits of lithates.* Under these circumstances, the change in the liver is sometimes associated with a similar change in the structure of the heart or kidneys, or with general corpulence. Again, in a large proportion of the cases of catarrhal jaundice, occurring towards middle or in advanced life, the patients have either previously suffered from actual gout, or they have been the subjects of lithæmia with some of the symptoms of dyspepsia already described as accompanying it. Thirdly, although cirrhosis is most commonly the result of the direct irritation of the liver by alcohol, there are certain cases in which it cannot be traced to such a source, but in which its symptoms have been preceded for years by the lithic acid dyscrasia and dyspepsia. Cases of this sort have come under my own notice, and have been described by Baglivi, Stoll, Scudamore, and Trousseau as a "chronic gouty hepatitis".† Lastly, if we carefully investigate the antecedent medical history of patients suffering from primary cancer of the liver, we often find that for many years they have been "bilious", or they have been liable to dyspeptic symptoms attended by copious deposits of lithic acid or lithates in the urine, either habitually or from the slightest error in diet. That protracted derangement of cell-function should ultimately lead to abnormal cell-formation, in persons predisposed to cancer, does not appear to be an unwarrantable assumption.

7. *Degeneration of Tissue throughout the Body*.—With the approach of old age, there is a tendency of the tissues throughout the body to undergo degeneration and decay, fatty, and sometimes calcareous matter, being substituted for the normal structures. More than twenty years ago, it was pointed out by Mr. Barlow,‡ that the "climacteric disease", described by a former President of this college, Sir Henry Hallford, and the "Decline of the Vital Powers in Old Age", described by Dr. Marshall Hall, were, in great measure, due to these degenerations, and the fact is now generally acknowledged. In no structure are these degenerations more marked, or the cause of greater danger to life, than in the heart and in the coats of the arteries, the degenerations of which lie at the foundation of apoplexy, paralysis, aortic incompetence, and other maladies of advanced life. The explanation of these degenerations of tissue is to be found in derangements of the nutritive and disintegrative processes in which the liver plays so important a part; and in many instances, I do not say in all, it is the liver which appears to be primarily at fault. The nutrition of the tissues becomes impaired, partly perhaps in consequence of the supply of faulty nutritive material, but mainly from the functional activity of the liver becoming weakened with advancing age, as the result of which the blood and juices of the body are impregnated with a quantity of disintegrated albuminous matter, not sufficiently oxidised to be eliminated by the kidneys. But what, in many persons, is merely a form of senile decay, may, under certain conditions, occur at a comparatively early period of life. Many observations have satisfied me that persons who habitually consume a large quantity of rich and stimulating food, and of alcoholic drinks, who take little exercise, and whose urine is constantly loaded with an excess of lithic acid and lithates, are particularly prone to fatty degeneration. Andral and Lobstein long ago connected atheroma of the vessels with "a particular taint of the fluids closely resembling gout",§ and it has been a common observation, by physicians practising at spas resorted to by gouty patients, and borne out by my own experience, that atheroma of the arteries, at an unusually early period of life, and diseases of the aortic valves, which are not congenital and are inde-

* Fatty liver is also very common in a very different condition of the system—viz., in wasting diseases, such as phthisis and chronic dysentery. It is supposed that the blood in these cases becomes charged with the oily matter which is rapidly absorbed from the patient's tissues, and that a portion of this becomes arrested in the liver.

† C. Scudamore, *Nature and Cure of Gout*, 4th edition, 1823, p. 43; Trousseau, *op. cit.*, vol. iv., p. 381.

‡ "General Observations on Fatty Degeneration," *Medical Times and Gazette*, May 15th, 1852.

§ C. E. Hasse, *Diseases of the Organs of Circulation and Respiration*, Sydenham Society's Translation, 1846, p. 82.

* *Klinik der Leberkrank.*, New Sydenham Society's Translation, vol. ii, p. 511.

† 3rd edition, p. 369.

‡ *Clinical Lectures*, New Sydenham Society's Edition, vol. iv, p. 231.

§ Frerichs, *op. cit.*, vol. ii, p. 497.

|| BRITISH MEDICAL JOURNAL, 1873, vol. i, pp. 161, 191.

pendent of injury or rheumatism, are met with far oftener in persons who are the subjects of the lithic acid dyscrasia, or who have had gout, than in those who have no such tendencies.

8. *Local Inflammations.*—Lithæmia predisposes to local inflammations. Persons in good health, not apparently so, but in the strictest sense, are little liable to local inflammations. For example, when a given number of persons are exposed in common to an exciting cause of pneumonia, comparatively few are attacked with that disease; and, when the previous history of those attacked is investigated, it is usually found that, prior to the acute attack, they have been in an abnormal state of health. This was a point much insisted on by our late colleague Dr. Todd. In one of his remarkable clinical lectures he writes as follows:—"Simple pneumonia is very rare in another sense also, that is, in its freedom from complication with, or dependence on, some peculiarity of constitution. To make this clearer to you, let me take an illustration. If two men, A and B, both in good health, be exposed to some noxious influence—cold, for example—at the same time, and for the same period, A will get a severe attack of pneumonia and B will not. Now, at first sight, one can scarcely conceive why the pneumonia should attack the one and not the other, for they were both apparently equally well at the time of exposure to cold; but, if we carefully examine into the previous history of these individuals, we shall find that A is of a gouty or strumous constitution, or has some peculiarity of diathesis which B does not possess, and it is by reason of this that A is seized with pneumonia when subjected to the noxious influence which produces no such injurious effect upon B."* One of the conditions predisposing to local inflammations is gout; but the dyscrasia, which I have designated lithæmia, and of which gout itself is only one of the local manifestations, acts in the same way. Having paid considerable attention to the matter, I am satisfied that persons with the lithic acid dyscrasia are much more prone than others to ordinary febrile colds, as well as to more severe local inflammations. They may appear robust and healthy up to the sudden occurrence of the inflammatory attack, but they have not really been in a normal state of health. I have also had occasion to observe that in certain persons who habitually pass an excess of lithates in the urine, the lithates cease to be eliminated on the advent of a local inflammation or of an ordinary febrile catarrh, to be again discharged in abundance on the subsidence of the pyrexia. In such cases, the retention of lithates in the system has probably determined the local inflammation.

9. *Constitutional Diseases.*—When blood-poisons are taken into the system from without, the liver is one of the organs which first and mainly suffers; but I trust that I have also made it clear that morbid states of the blood, or constitutional diseases, such as gout and diabetes, may be generated in the liver from derangements of the processes of disintegration and nutrition which normally take place in it. It is very probable, however, that other morbid states of the blood and constitutional diseases have their origin in the liver. In acute atrophy of the liver, the liver appears to be the starting-point of the pathological process, but all the subsequent phenomena show that the malady is essentially a blood-disease. In certain cases of erysipelas and pyæmia, I have long taught, in my lectures on medicine, that the *materies morbi* was engendered in the body; and I think it might be shown that, as in acute atrophy, the liver is the organ at first mainly at fault.

Again, it is not improbable that the large quantity of fibrin found in the blood in acute rheumatism may result from fibrin not being destroyed in the liver to the proper extent. We know, also, that in certain states of the body, as after surgical operations, childbirth, and acute febrile diseases, the blood is very prone to coagulate in the large vessels; and that, when these coagula form in the right side of the heart, sudden death may result. Our colleague Dr. Fayrer has shown that these phenomena are much more common in India than in this country;† and, since the commencement of these lectures, he has written to me to suggest that this may be due to the greater tendency to hepatic derangements in tropical countries.

On the other hand, the deficiency of red blood-corpuscles in anæmia, chlorosis, scrofula, and some other maladies, is also probably traceable, in the first instance, to functional derangement of the liver. There can be no doubt that patients with protracted functional derangement of the liver are often very anæmic. They present a pale, pasty appearance, and bear losses of blood or acute diseases badly. Many years ago, Messrs. Todd and Bowman‡ observed that persons suffering from functional derangement of the liver are often pale, as if from loss of blood, although no such loss has been experienced; their nutrition is enfeebled, digestion impaired, and there is slight yellowness of the complexion as in cases of hepatic disease, and yet after death no lesion is

discernible, except perhaps slight enlargement of the liver. In these cases, iron may disagree until the liver has been restored to its normal functions.

Indeed, it seems not improbable that most so-called constitutional diseases are due in the first instance to some defective action of the liver. The child of a gouty father is not born with the *materies morbi* or poison of gout either in his blood or in his tissues; but he is born with a morbid tendency in his liver to produce that poison. The same may perhaps be said of cancer and of tubercle. Both are unquestionably, like gout, constitutional and hereditary diseases; but the child of a cancerous parent is not born with the *materies morbi* of cancer in his blood or tissues, but only with a tendency to a certain form of abnormal nutrition, which results in a cancerous growth. This morbid tendency, resident at first, no doubt, in the entire ovum, is in the adult probably located in the blood-forming and blood-depurating organs, among which the liver holds the most important place. It is no argument against this view that the liver is not the part of the body most often affected with primary cancer, for neither is it the seat of the local explosions of gout.

[To be continued.]

THE GOULSTONIAN LECTURES ON THE ORIGIN AND RELATIONS OF NEW GROWTHS.

Delivered at the Royal College of Physicians.

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LECTURE III.—*Abstract.*

THE word cancer, like all terms of science, has been used in very different senses at different times; but these are only important so far as it has been distinguished from other tumours. Abernethy described cancer as a variety of sarcoma, but his description is drawn almost entirely from scirrhus. The characters he gives are wholly physiological or derived from growth, not at all anatomical, though he endeavoured to form an anatomical classification of simple tumours. Sir James Paget adopted most of the characters of Abernethy, and added another, namely, that of structure, which seems, logically, to belong to a different category. Müller's definition is not very different from that of Abernethy and Paget, except that he introduced the ill-omened word "constitutional". The physiological characters of cancer thus distinguished are of the highest importance; by themselves, they constitute a definition possessing a very considerable degree of accuracy and quite logically consistent. They are not, strictly speaking, the signs of malignancy; rather, they are malignancy. The difficulties which occur in the practical application of these rules are chiefly two; viz., that malignant tumours thus defined pass by imperceptible gradations into others which are perfectly innocent, and that even a tumour which may in the end become highly malignant is not so at first. Hence the test is not always applicable. This often occurs in the case of tumours affecting some specially vital organ, such as an orifice of the stomach or the trachea, when death is produced before time allows any development of the so-called malignant properties.

Hence has arisen the search for some anatomical test, always applicable, which shall serve as a constant indication of malignant properties. This search has been only partially successful. No one type of structure is either peculiar to, or characteristic of, malignant growth. We cannot draw a direct inference from structure to malignant properties; still less can we draw any positive conclusion as to the structure of a tumour merely from the fact that it has manifested malignant properties, any more than from the fact that an animal is predacious or carnivorous we can refer it to any one order, since predacious or carnivorous species may occur in several orders. The two definitions derived from structure and from physiological characters respectively will not, then, coincide, neither can they be precisely contradictory; they are not comparable, or do not lie in the same place. From a failure to see this fact, have arisen the misunderstandings between the practical physician or surgeon and the histologist.

* *Clinical Lecture on Acute Diseases*, 1860, p. 367.

† *Clinical and Pathological Observations in India*, 1873.

‡ Todd and Bowman, *Physiology of Man*, 1856, vol. ii, p. 264.