

was a small round alternating calculus, made up of lithic acid and oxalate of lime. The patient was a male, aged twenty-one; the operation was successful, and after four months, all signs of the fistulous communication between the bladder and the rectum had disappeared.

XXV. *On different Forms of Primary Syphilitic Inoculation.* By HENRY LEE, F.R.C.S.—Mr. Lee in this paper mentions four cases in which patients labouring under primary syphilis were inoculated with matter taken either from their own sores or from those of another patient. The conclusion arrived at is, that *suppurating* syphilitic sores are readily inoculable with the point of the lancet upon the patients who bear them, but that the *indurated* sores—those affected with the specific adhesive inflammation, and which alone are capable of giving rise to secondary symptoms—are, as a rule, not capable of being thus inoculated. The author is inclined to believe that these suppurating and indurated sores have often been mistaken for each other, and in this way he accounts for the immunity from constitutional syphilis which has followed the ordinary practice of syphilization. Inoculation with pus from a suppurating sore would not be followed by constitutional syphilis under any circumstances, and although Dr. Sperino, the great advocate of syphilization, frequently asserts that the secretion was taken from an indurated chancre, yet Mr. Lee's experiments would show that the secretion from an indurated chancre is not inoculable upon the same individual. Hence it is inferred that what Dr. Sperino has designated indurated sores belonged in reality to the phlegmonoid or some other variety of suppurating syphilitic sores.

REVIEW VII.

The Nature and Treatment of Gout and Rheumatic Gout. By ALFRED BARING GARROD, M.D., F.R.S., Physician to University College Hospital, &c. &c.—London, 1859.

IT must be known to most of the readers of this Journal, that during a considerable period of time Dr. Garrod has been engaged in conducting a series of laborious investigations into the chemical pathology of gout and rheumatism. Some of the results of these labours have been published in the 'Medico-Chirurgical Transactions,'* and they are all embodied in the handsomely-printed and illustrated volume whose title appears at the head of this article. In this treatise Dr. Garrod has given a complete history of gout, commencing with an introductory chapter, in which reference is made to the opinions of some of the chief amongst the ancient writers on this interesting disease.

To attempt a full analysis of the volume is not consistent with our present design; our purpose is rather to direct attention to the chief facts which Dr. Garrod has succeeded in establishing, and to the doctrines, pathological and therapeutical, which he endeavours to build

* Medico-Chirurgical Trans., vol. xxxi. p. 83; vol. xxxvii. pp. 49, 181; vol. xli. p. 325.

upon those facts. Passing over the second and third chapters, in which the well-known outward phenomena of acute and chronic gout are described, we come to the fourth chapter, which treats of the "Blood in Gout."

The normal constituents of the blood in gouty patients are not necessarily changed, but when the disease has been of long duration, and especially when, as frequently happens, the kidneys are degenerated, the density of the serum appears to be somewhat lower than in health, the average density in cases of chronic gout being from 1027 to 1028.

But the great and the characteristic feature of the blood in gout is an excess of uric acid. We say an *excess* of uric acid, for Dr. Garrod has shown that the blood in health contains a trace of both uric acid and urea. The process for the determination of the actual quantity of uric acid in the blood is one which requires a considerable amount of time, care, and skill in practical chemistry. To obviate this difficulty, Dr. Garrod has devised a simple method of ascertaining the presence of an abnormal amount of uric acid, which is readily applicable for clinical purposes, and which requires the abstraction of only a small quantity of blood. This process, which he names the "Uric-acid thread Experiment," is thus performed:

"Take from one to two fluid drachms of the serum of the blood, and put it into a flattened glass dish or capsule; those I prefer are about three inches in diameter and one-third of an inch in depth, which can be readily procured at any glass-house. To this add ordinary strong acetic acid, in the proportion of six minims to each fluid drachm of serum, which usually causes the evolution of a few bubbles of gas. When the fluids are well mixed, introduce a very fine thread, consisting of from one to three ultimate fibres about an inch in length, from a piece of unwashed huckaback or other linen fabric, which should be depressed by means of a small rod, as a probe or the point of a pencil. The glass should then be put aside in a moderately warm place until the serum is quite set and almost dry. The mantelpiece in a room of ordinary temperature, or a bookcase, answers very well, the time varying from twenty-four to forty-eight hours, depending on the warmth and dryness of the atmosphere." (p. 110.)

In explanation of this process, it should be premised that the uric acid as it exists in the blood is combined with soda, and when it is present in quantities above a certain small amount to be presently noticed, the urate of soda being decomposed by the acetic acid, the uric acid thus set free crystallizes and collects on the thread, like sugar-candy upon a string. To detect the crystals, the glass containing the dried serum should be placed under a linear magnifying power of about fifty or sixty. The uric acid is seen in the well-known form of rhombs having a brownish tinge, the size of the crystals varying with the rapidity with which the drying of the serum has been effected, and the quantity of uric acid in the blood. To ensure the perfect success of this process, several precautions relating to the form of the glasses, the strength of the acetic acid, the quality of the thread, &c., are necessary, for the details of which we must refer to Dr. Garrod's book, p. 111, et seq.

Degree of delicacy of the above test for uric acid.—The serum of

healthy blood, as also that of patients suffering from most diseases, although generally containing a trace of uric acid, gives no indication of its presence by the "uric-acid thread experiment," and this absence of extreme delicacy is practically a valuable quality. By a series of experiments, Dr. Garrod has determined the proportion of uric acid which must exist in the blood before its presence can be thus demonstrated. For this purpose he added urate of soda in definite proportions to the serum of blood taken from a healthy subject, and in which the most careful chemical analysis could scarcely detect the existence of a trace. The result was, that an amount of uric acid equal to at least 0.025 grains in 1000 grains of serum, in addition to the trace existing in health, was required before the thread experiment gave any indication of its presence. Hence, the appearance of uric acid on the thread is complete evidence of an abnormal amount in the blood. Our author, after entering into all the needful details relating to the above test for uric acid, gives in a tabular form a brief report of forty-seven cases of gout, in all of which, by the process in question, the serum of the blood was found to be "rich in uric acid."

He then proceeds to show that by means of the same test, when the blood serum contains an excess of uric acid, this material may also be discovered in the fluid which is effused under the influence of blistering agents applied to the skin. There is an obvious advantage in this means of testing the composition of the blood without the necessity for the performance of venesection. In conducting the thread experiment on blister serum the same precautions are necessary as when examining the blood serum, and this additional circumstance requires attention, namely, that the existence of inflammation of a gouty character has the power of destroying the uric acid in the blood of the inflamed part; so that the serum drawn by a blister over an inflamed gouty joint will give no indication of the presence of the uric acid which is abundant in the blood serum of the same patient.

Another material which the blood of gouty patients often contains in abnormal quantities is urea. This fact was communicated by Dr. Garrod, in the year 1848,* and the observation has been confirmed by his own later observations, as well as by those of Dr. Wm. Budd.† In many cases, doubtless, this excess of urea in the blood is a consequence of the renal degeneration which is so frequent a result of chronic gout, but in other instances this explanation appears not to be admissible. Thus, Dr. Budd gives the particulars of two cases, and refers to nine others, in which he detected urea in the blood, or blister serum, or both, of persons suffering from acute gout, there being at the same time no albumen in the urine, no casts of the uriniferous tubes, nor any other indication of renal disease or obstruction.

The urine in gout.—The clinical examinations of the urine of gouty patients are divided by Dr. Garrod into three classes. The first includes analyses of the urine in cases of acute gout: the second, the results obtained in the chronic forms of the disease: and in the third

* Medico-Chirurgical Transactions, vol. xxxi.

† Ibid., vol. xxxviii.

class are placed analyses of the urine of gouty patients during the intervals of the attacks.

Class I.—*Urine of patients suffering from acute gout.*—The analyses of seven cases of this class, occurring in hospital practice, are given. The general result is a decreased excretion of uric acid during the gouty paroxysm. Taking the average normal excretion of uric acid to be eight grains in the twenty-four hours, the details of the seven cases examined show that the highest amount reached was 8.12 grains, the lowest 0.425 grains, the average of the seven cases, 5.95—2.05—2.58—3.76—4.46—3.28—3.28 grains, and the total average derived from all the analyses, 3.62 grains in the twenty-four hours. The quantity of uric acid eliminated during different days by the same individual is liable to much variation. As a rule, in the earlier stages of an attack of acute gout the urine is scanty, and the uric acid, measured by the twenty-four hours' excretion, diminished; when the disease is passing off, the acid is thrown out in much larger quantities, so that the amount excreted may greatly exceed the patient's daily average; lastly, when the fit has terminated, the amount of uric acid is again lessened, though not to the extent observed prior to, or at the commencement of, an attack.

In one of the seven cases above mentioned, the daily amount of urea was found to be 320 grains, a fair average for a patient on a low diet. The excretion of urea appears not to be decreased in the same ratio as the uric acid, although, as before mentioned, an excess of urea in the blood has repeatedly been found during the attacks of acute gout.

In two of the above mentioned seven cases, a very distinct trace of albumen was found in the urine during the attack of gout. This is not a common occurrence during the earlier attacks of gout, but when the disease assumes a chronic form, the urine is frequently found to be albuminous during the paroxysm of gout, though quite free from that principle in the intervals of the attacks.

Class II.—*Urine of subjects affected with chronic gout.*—The particulars of seventeen cases of this kind are given. The results show a marked diminution of uric acid. Thus, in no case did the amount of uric acid in the twenty-four hours exceed 5.78 grains, and this on one day only; the next highest amount was 3.57 grains, and this occurred only on one exceptional day, the usual amount in that case being much smaller. The total average of all the analyses in the second class of cases was exceedingly low, in fact, much less than a single grain.

Several of these urines were also analysed for urea, with the result of showing that while the uric acid was deficient in quantity and subject to great variations from day to day, the amount of urea remained nearly constant, and but little below the normal average. In ten out of these seventeen cases, albumen was present in quantity sufficient to give a distinct haziness when the urine was boiled with the addition of nitric acid, and a notable precipitate after the tube was allowed to remain at rest for a short time. The frequent occurrence of albumen in the urine, and other signs of renal degeneration in

cases of chronic gout, had been noticed by other observers, and is quite in accordance with our own experience.

Class III.—*Urine of patients who had suffered more or less frequently from attacks of gout examined at the time of complete freedom from the disease.*—The analyses of six cases of this kind are given by Dr. Garrod, and the result was, that in no one of the six patients did the amount of uric acid excreted in the twenty-four hours exceed the healthy average, while in the majority it was far below. From these and other examinations, Dr. Garrod is inclined to think that in individuals who have suffered frequently from gout, even though no visible deformity of the joints or deposits may have resulted therefrom, the kidneys lose to some extent their power of excreting uric acid; while the blood is contaminated by an excess of the acid, and the excretion of urea is comparatively undiminished.

Microscopic examination of the urine in gout.—In the early stages of gout occurring in individuals otherwise healthy, the microscopic examination of the urine is of little moment; but in the advanced stages of chronic gout, the urine often exhibits microscopic characters of great practical value, more especially with reference to prognosis. In such cases it frequently happens that along with the small quantity of albumen which has been referred to as of common occurrence, we find in the urine which has been allowed to stand for a few hours in a conical glass, a cloudy sediment, composed of casts of the tubes, generally of a granular character, and consisting of disintegrated epithelium, moulded into the form of the tubes. These casts, like the albumen, are sometimes present during the acute exacerbation, but absent in the intervals, and we have repeatedly found them in the urine of gouty patients when no albumen has been discoverable. This appearance of granular casts indicates that a degenerative process is going on in the lining membrane of the uriniferous tubes, a morbid change which is closely connected with deficient secretion of some of the elements of the urine. When the renal degeneration is still further advanced, the granular casts are mixed with others which have been called "large waxy casts," their diameter being equal to that of the uriniferous tubes. The presence of these casts is an indication that the tubes from which they come have been deprived of their lining of gland-cells. Dr. Garrod alludes to the fact that several of the cases of chronic desquamative nephritis related by Dr. George Johnson in his work on 'Diseases of the Kidney,' were patients who had been subjects of chronic gout. There is evidently then a close relation between chronic gout and this form of renal degeneration.

Another noteworthy circumstance is thus referred to by Dr. Garrod :—

"In the latter stages of gout, copious deposits of uric acid or urates are not often met with, and the urine becoming much brighter, and more normal in appearance, usually impresses the patient with the idea that an improvement in his state of health has commenced; whereas in fact it is an indication that the excreting power of the kidneys has become deficient, at least for uric acid." (p. 184.)

The morbid anatomy of gout.—One of the best known, and still one of the most remarkable phenomena of gout, is the frequent deposit of urate of soda in the cartilaginous and fibrous structures which have been the seat of the disease. Dr. Garrod describes these deposits with great care and minuteness of detail, dividing the cases into three classes—namely, 1st. Cases of chronic gout with extensive chalk stones. 2nd. Subjects exhibiting points of deposition on the ears alone, a small nodule on the cartilage of the external ear serving, in some cases, to decide the question of diagnosis between gout and rheumatism. 3rd. Cases in which no external appearance of deposit or deformity existed, but concretions were found in one or more of the joints.

Some beautifully executed woodcuts and chromo-lithographs are introduced to illustrate the appearances produced by the deposit of urate of soda in the ears, the articular cartilages, and other parts. In connexion with this part of the subject, Dr. Garrod considers that he has established the fact that gouty inflammation is *invariably* attended with a crystalline deposit of urate of soda; and the histories of two of his cases certainly afford remarkable evidence in confirmation of this doctrine, so far, at least, as regards the articular cartilages and ligaments. The first case (p. 217) was that of a man who, dying with valvular disease of the heart, was known to have had but two attacks of gout, each in the right great toe. After death a large white patch of urate of soda was found in the cartilage covering the head of the metatarsal bone of the right great toe, and a similar patch on the corresponding hollow surface of the phalangeal bone. There was, besides, a distinct sprinkling of the same substance upon the inner surface of the ligaments. The corresponding joint of the left great toe was healthy, as were all the phalangeal joints of both feet. The second case (Appendix, p. 559) was that of a man, aged 59, who died from the effects of an accident. It was ascertained from his wife that for the last ten years he had been subject to occasional attacks of gout, affecting principally the great toes and ankles, and now and then a joint of the upper extremities. He had also experienced *one slight attack in the left knee*. After death, the urate of soda was found encrusting the metatarso-phalangeal joints of both great toes, and also the left ankle-bones. No trace of deposit was found in the right knee; but in the left knee, which had been the seat of *one slight attack* of gout, there were distinct patches of urate of soda on the articular surface of the femur and patella.

A deposit of the kind here referred to has never been found in connexion with any other articular disease. It never occurs in acute or chronic forms of rheumatism, nor in the disease commonly known by the name of chronic rheumatic arthritis. The deposit is, in fact, a characteristic feature of the specific gouty disease.

The deposited matter is composed of pure urate of soda, it is crystalline, and interstitial in its position. By digestion for some days in warm water, the deposited material may be slowly dissolved out of the articular cartilage. As the solution of the urate proceeds, the deposit assumes the appearance of being composed of small masses of crystals

separated from each other by clear interspaces; and after the further action of the water, it has been shown that such masses have occupied the situation of the nucleus cells of the tissue. Dr. Wm. Budd, in the paper before alluded to, pointed out that, in many instances at least, "the cartilage-cell is the focus of each individual deposit—the original centre, within and around which the crystallization occurs."*

Changes in the kidneys of gouty subjects.—Some years since, Dr. Todd drew the attention of the profession to a condition of the kidney which frequently occurs in cases of inveterate chronic gout, and to which he gave the name of "gouty kidney." This so-called gouty kidney has the following characters. It is usually much contracted, being often not more than one-half, or even one-third, the natural size, with a shrivelled appearance, the capsule thickened and opaque, and the surface granular. On section it is found that this decrease of size is chiefly at the expense of the cortical portion, which is sometimes so extremely wasted that the bases of the pyramids almost reach the surface of the organ. In the pyramidal portions of the kidney there are often seen white lines of chalk-like material taking the direction of the straight tubes. When examined under the microscope, this white material is seen to be crystallized in the form of prisms. Chemically tested, it is found to consist of urate of soda, and, in fact, it is identical with the so-called chalk stones in gouty joints. It is soluble to some extent in hot water, yields the murexide test when heated with nitric acid and ammonia, and forms crystalline rhombs when treated with a stronger acid.

The microscopic appearances of the kidney in this form of disease have been carefully examined by Dr. George Johnson, and fully described by him under the name of "chronic desquamative nephritis."

"The change in the early stage of the disease, when the kidneys are still of their natural size and weight, and present to the eye nothing abnormal, appears to consist in an altered condition of the epithelial cells of the convoluted tubes, which become opaque, and have an unusually fine granular appearance. Dr. Johnson states that 'in some tubes there is an appearance of entire cells having been shed, so as to fill the tubes and render them opaque; while in others there is an equal filling and opacity of the tubes, from their containing epithelium in a disintegrated condition, and which has become so, either from the crumbling of the cells while they are still attached to the basement membrane, or from the disintegration of the epithelial cells which have accumulated in the tubes after being shed by a process of desquamation.' There is often besides this an excess of oil in the epithelium.

"After a time the material contained in the tubes becomes disintegrated, and gradually removed by the watery secretion from the Malpighian tufts; and when this is effected, the basement membrane is seen to be left almost denuded, and being partly concealed by the surrounding fibrous rings, it gives to the section a somewhat vesicular appearance. . . . After a time, and as a result of the removal of the epithelium, the tubes gradually become wasted and shrivelled, the Malpighian bodies consequently approach each other, and hence appear more numerous in the field of the microscope. This change I have observed in all the cases of advanced gout in which I have had an opportunity of examining the kidneys.

* Medico-Chirurgical Transactions, vol. xxxvii. p. 237.

"During the time the above changes are taking place in the urinary tubes, the bloodvessels of the kidney are undergoing a marked alteration; and this is more especially seen in the Malpighian arteries and capillaries, the coats of which are much thickened and hypertrophied. Dr. Johnson says that both the circular and the longitudinal fibres of the arteries become affected, but that the longitudinal (which are naturally thinner than the circular) are increased more than the other set, and hence when diseased they become of about equal thickness." (p. 243.)

The minute and, we believe, accurate description of the structural changes in the gouty kidney which we have here quoted at length, is illustrated by three woodcuts, and these are the only illustrations in Dr. Garrod's book which are not entirely successful. A linear magnifying power of 100 has evidently been insufficient to bring out the characteristic appearances in the tubes and bloodvessels of the kidney which the author desired to have represented.

This, then, being the condition of kidney which is commonly found in the subjects of inveterate chronic gout, the question arises—Is not the same state of kidney associated with other forms of disease than gout? Dr. Garrod admits that, "so far as the contracted or atrophied state of the organ is concerned, the question must be answered in the affirmative." A like contracted form of kidney, the result of chronic desquamative nephritis, is not unfrequently found unassociated with a history of gout. The urine, too, in these cases has been found to have the same physical characters, as to the low specific gravity, the pale colour, the presence of albumen, and likewise the occurrence of the granular and waxy casts of the uriniferous tubes.

At the time when the chapter on the Morbid Anatomy of Gout was passing through the press, Dr. Garrod was of opinion that the one characteristic feature of the gouty kidney was the presence of the white streaks of urate of soda in the medullary cones. But during the interval between this and the printing of the Appendix (p. 562), inquiries had been made, the result of which tends to show that the deposits of urate of soda in the cones are *not* characteristic of gout.

Mr. W. Hickman, late physician's assistant, now house-surgeon to University College Hospital, carefully examined the kidneys in 23 successive autopsies of persons dying from various causes, some from accident, but most from disease. One individual had suffered from gout, and in that case the deposits were found in the joints and in the kidney; in 19 out of the 22 remaining cases no deposits of urate of soda were discovered; in 3, however, in whose joints no evidence of gouty deposit was visible, crystals were seen in the kidneys, some composed of uric acid, others of urate of soda. Dr. Garrod considers that there are minute differences between the deposits in the two classes of cases; we think, however, that these observations show conclusively that a crystalline deposit in the medullary cones of a contracted kidney is no proof of the gouty origin of the renal degeneration.

Dr. Garrod is disposed to think that even in the very early stages of gout the kidneys begin to undergo considerable structural change; and in support of this opinion he lays particular stress on the case of a surgeon (p. 241), who had suffered from only eight attacks of gout,

extending over a period of thirteen years. The kidneys were apparently healthy, each weighed four ounces and a half, and the capsule peeled off without difficulty; but when closely inspected, the white crystalline deposits were found in the pyramids. The microscope also revealed the commencement of other mischief; and a portion sent to Dr. George Johnson, who was unacquainted with the case, elicited the following remarks:—

“The epithelium in some of the tubes is very granular, and there are a few denuded tubes; the chief change in the kidney is an excess of oil in the epithelium; the outline of the tubes is very dark, depending on an accumulation of small oil globules in the epithelial lining.”

Here, doubtless, we have evidence of considerable structural change in the kidney, but that this was simply a result of the eight attacks of gout, from which this gentleman had suffered, is by no means certain, nay, is highly improbable. On turning to the history of the case (at p. 215), we learn that “about six months before his death he began to suffer from symptoms of hepatic disease, and afterwards from ascites, for which he was tapped. His death resulted from the exhaustion of diarrhoea following the operation.” With such a history of serious chronic disease within the abdomen, we should not have expected to find the kidneys healthy, nor were the structural changes which they presented greater than are commonly found in the kidneys of men who die after long continued cardiac or hepatic disease. In a case, therefore, of disease so complicated, it is impossible to estimate the amount of influence which the gouty element may have had in causing the renal degeneration.

That the kidneys are often very seriously diseased in the subjects of chronic gout is a notorious fact, and that this peculiar form of renal degeneration is most insidious in its origin and progress is unquestionable; but we see no reason to believe that the kidneys have commonly undergone any material structural change after a few attacks of ordinary acute gout.

Causes of gout.—The subject of the causes of gout, whether predisposing or exciting, is one respecting which an author in the present day has little prospect of being able to advance any novelty. The common observation and the accumulated experience of patients and practitioners have placed most of the facts in so clear a light that he who runs may read them. In a very large proportion of cases, about fifty per cent. of the whole, the sufferers from gout inherit a tendency to the disease from one or both parents. Women are much less subject to gout than men, for the reason that they are much less exposed to the influence of the most powerful of the predisposing and exciting causes of the disease. Youth enjoys almost complete immunity from gout. Dr. Garrod remarks with truth, that—

“Between genuine gout and true rheumatism, such as is typified in cases of rheumatic fever, a marked distinction is seen in the influence of age, the former occurring most commonly for the first time after thirty-five, the latter seldom met with when that period of life has been attained.”

No truth in medicine is better established than that the free use

of *alcoholic liquors* is the most potent of the predisposing causes of gout, the one without which it is probable that all other influences would have been insufficient to originate the disease. Nothing again is more certain than that the power possessed by fermented liquors as causes of gout is not simply in proportion to the amount of alcohol which they contain. The lower classes in Scotland and Ireland drink strong whisky in abundance, and fall victims to hepatic and renal disease, but very rarely do they suffer from gout; while the London draymen, and coal-porters, and ballast-heavers, imbibe their full draughts of porter, and have gout in its fiercest forms. Amongst wines, however, the stronger varieties, which are largely consumed in this country, such as port and sherry, are more powerful as predisposing causes of gout than the lighter and less spirituous French and German wines. The knowledge which we possess of the composition of the different kinds of fermented liquors throws no light on their varying powers of inducing gout. In reference to this subject, the following are the only conclusions which, as Dr. Garrod suggests, can be safely drawn—

“1. Diluted alcohol, in the form of distilled spirits, has little power in causing gout, at least in those who are not predisposed to it.

“2. Alcohol, when in combination with other substances, as occurs in wines and malt liquors, becomes a potent cause of gout, and the greater the amount of contained spirit, the more powerful the influence in producing the disease.

“3. Neither the acid, sugar, nor any known principle contained in these liquors, can as yet be proved to impart to the alcohol its predisposing influence; for wines the least acid, and liquors the least sweet, are often among the most baneful.”

To which we may add with some probability of truth—

“4. Alcoholic liquids which have little tendency to cause dyspepsia, and those which act more especially as diuretics, can, as far as gout is concerned, be taken with greater impunity than beverages of an opposite character.”

It is difficult to estimate the separate influence which dyspepsia, a superabundance of animal food, and want of exercise, may have as predisposing causes of gout. It is certain that some forms of dyspepsia which may seriously impair the general nutrition of the body, have little or no tendency to induce gout; and it seems probable that those varieties of dyspepsia which are attended with an excessive formation of uric acid in the system are the most prone to end in gout.

With regard to the influence of inactive and indolent habits in favouring the production of dyspepsia and gout, it is not to be doubted that this is considerable; but the case of the ballast-heavers in the Thames, referred to by Dr. W. Budd, affords an interesting illustration of the fact that no amount of labour will serve as an antidote against the immoderate indulgence in certain kinds of fermented liquors. The occupation of these men is a most laborious one, occasioning profuse sweating and much exhaustion. Each labourer drinks from two to three gallons of porter daily, and generally a considerable amount of spirits besides. The result is, that although not a numerous body of men, many of them, affected with gout, are yearly admitted into the Seamen's Hospital Ship. The influence of prolonged and severe

study, of mental anxiety, and other depressing agencies, is notoriously great in favouring the operation of other recognised causes of gout. With regard to the influence of climate and season little need be said. The inhabitants of tropical countries are strangers to gout, they are equally strangers to the highly animalized diet, the strong wines and malt liquors, by the abuse of which Europeans have acquired the disease. That season has some influence in determining the period of the attack has been recognised since the time of Hippocrates, one of whose aphorisms is, "Podagrisci affectus vere et autumnno plerumque moventur." Dr. Garrod having examined a large number of gouty patients with reference to the time of the year when the attacks have been most frequent, finds that, in accordance with the opinion of the ancient writers, the earlier attacks most commonly occur in the spring; after a time, an autumnal fit is added; and when the disease has become inveterate, the returns of inflammation are more frequent, and the intervals irregular.

Influence of lead as a predisposing cause of gout.—In a paper which was published in the 'Medico-Chirurgical Transactions' in the year 1854 (vol. xxxvii. p. 211), Dr. Garrod alluded to the fact that a very large proportion, at least one in four, of the gouty patients who had come under his care in the hospital had at some period of their lives been affected with lead poisoning, and for the most part followed the occupation of plumbers and painters. The later experience of Dr. Garrod, Dr. Burrowes, and other physicians, is to the effect that workers in lead are in a more than ordinary degree liable to be affected by gout. The result of our own observations is quite in accordance with those of Dr. Garrod; but we dissent entirely from his statement that "there appears to be nothing in the habits of these men capable of accounting for their peculiar liability to gout, with the exception of their being exposed to the influence of lead." Our experience amongst workmen of this class has led us to the conclusion that they are, for the most part, large consumers of fermented liquors. Dr. Garrod does not venture to affirm that lead impregnation can induce gout, without the concurrent influence of fermented liquors; and he alludes to one circumstance which, as he admits, tends to show that lead alone does not very powerfully predispose to gout—namely, that women engaged in white lead manufactories, and who often suffer from colic, are not afflicted with gout in like ratio with men. Admitting, as we must, that slow poisoning by lead does in some way act as a powerful predisposing cause of gout, the question arises—What is its mode of operation? We venture to suggest that its action may in part be explained by its anæmiating and debilitating influence lessening the vital power in the body of resisting the effects of a too free indulgence in alcoholic liquors. Dr. Garrod has chemically investigated the action of lead as a predisposing cause of gout, by ascertaining, first, the condition of the blood and urine of patients under the influence of this poison; and, secondly, by determining the effect which lead, when administered medicinally, has upon the secretion of uric acid. With regard to the first part of the inquiry, he finds that an excess of uric

acid is frequently, though not constantly, present in the blood in cases of lead poisoning, not only in those who have previously suffered from gout, but even when no symptoms of the disease had ever shown themselves. In the same cases, too, there appeared to be a diminished excretion of uric acid by the kidneys. In two cases the urine was repeatedly analysed while acetate of lead was being given in medicinal doses. In both patients a well-marked diminution of the excreted uric acid occurred under the influence of lead; in the first this was most decided, the amount excreted being less than one-half of that passed when the metal was not administered; in the second it was also evident, though not considerable. It would appear, therefore, from these observations of Dr. Garrod, that in the subjects of lead-poisoning the blood is apt to become loaded with uric acid in consequence of the imperfect excretion of that principle by the kidney.

Pathology and nature of gout.—We have now to inquire whether, by the aid of the facts which have been set forth, the phenomena of gout admit of a complete and rational explanation. Dr. Garrod's views respecting this interesting subject are succinctly stated in the following nine propositions, upon some of which we shall presently have to offer a few words of comment:

“First. In true gout uric acid is invariably present in the blood in abnormal quantities, in the form of urate of soda, both prior to and at the period of the seizure, and is essential to its production; but it can be equally proved that this acid may occasionally exist largely in the circulating fluid, without the development of inflammatory symptoms—as, for example, in cases of lead-poisoning, and a few other instances. Its mere presence, therefore, does not explain the occurrence of the gouty paroxysm.

“Secondly. The investigations recently made in the morbid anatomy of gout prove incontestably that true gouty inflammation is *always* accompanied with a deposition of urate of soda in the inflamed part.

“Thirdly. The deposit is crystalline and interstitial; and when once the cartilages and ligamentous structures become infiltrated, such deposition remains for a lengthened time, perhaps for life.

“Fourthly. The deposited urate of soda may be looked upon as the cause, and not the effect, of the gouty inflammation.

“Fifthly. The inflammation of gout tends to the destruction of the urate of soda in the blood of the part, and consequently of the system generally.

“Sixthly. The kidneys are implicated in gout, probably in its early, and certainly in its chronic forms; and this affection is not only functional, but subsequently becomes structural; the urinary secretion is also altered in composition.

“Seventhly. An impure state of the blood, arising principally from the presence of urate of soda, is the probable cause of the disturbances which not unfrequently precede the seizure, and of many of the anomalous symptoms to which gouty subjects are liable.

“Eighthly. The causes which predispose to gout, independently of those connected with individual peculiarity, are either such as produce an increased formation of uric acid in the system, or which lead to its retention in the blood.”

“Ninthly. The causes exciting a gouty fit are those which induce a less alkaline condition of the blood, or which greatly augment the formation of uric acid, or such as temporarily check the power of the kidneys for eliminating this principle.” (pp. 240-1.)

With regard to the first of the above propositions, we consider that Dr. Garrod has established its truth by a sufficient number of careful and accurate observations.

The three succeeding propositions must be taken in conjunction, and we think that the evidence respecting them is far from complete or satisfactory. The statement that gouty inflammation is *always* accompanied by a deposit of urate of soda in the inflamed part, is scarcely warranted by the fact, that acute gouty inflammation of a joint leaves a deposit in the extra-vascular cartilages and ligaments. Then there are weighty objections to the theory that the deposited urate of soda is the cause, and not the effect, of the gouty inflammation. The cartilages and ligaments being the only parts in which after a primary attack of gout in a joint we have any evidence of a crystalline deposit, is it conceivable that a deposit in those tissues can be the cause of the intense inflammation which affects the surrounding soft parts? Again, what explanation can be given of the fact that acute gouty inflammation almost invariably passes away in a few days, while its assumed cause, the deposited urate of soda, "remains for a lengthened period—perhaps during life?" After a careful study of Dr. Garrod's facts and arguments, we think that a mystery still hangs over the phenomena of the gouty paroxysm, which, with all his labour and ingenuity, he has not succeeded in penetrating, and which we shall not attempt to solve. And in opposition to Dr. Garrod's fourth proposition, we are inclined to the belief that the urate of soda in the cartilages is a consequence, and not the cause, of the inflammation: that it is, in fact, a deposit left by the ebbing tide of inflammation—a deposit which each successive flow tends to increase. Dr. Garrod suggests that the reason why deposits of urate of soda so constantly take place in ligaments and cartilages may be, first, that these structures possessing but little vascularity, the deposit is there placed beyond the further influence of the blood-vessels; and secondly, it is probable that the fluids of these tissues are less alkaline than those of many others, and certainly less alkaline than the blood itself.

The statement that the inflammation of gout tends to the destruction of the uric acid in the blood of the part, is chiefly based upon the fact before mentioned, that the serum effused under the influence of a blister on the inflamed part, gives no evidence of containing uric acid, when the blood of the patient and the blister-serum from another portion not so inflamed readily shows its presence. It would thus appear that the gouty fit, although productive of local mischief, is a salutary process, tending to rid the system of part of the accumulated uric acid.

Treatment of gout.—The important subject of the treatment of gout in its various forms is very fully discussed by Dr. Garrod, more than one hundred and thirty pages of his treatise being devoted to its consideration. Without attempting to follow our author through this part of his work, in which he displays the skill and judgment of an experienced and careful practitioner, we select for analysis and comment one or two of the more important subjects which are there treated of.

One of the most interesting chapters in the book is that which has for its subject the use and therapeutic action of *colchicum*.

It is admitted by most physicians of experience that colchicum has a powerful therapeutic influence, not only in the regular forms of gout, but also in some of the irregular and masked forms of the disease. It has a decided effect in lessening the pain of gout, and this without necessarily acting as a purgative. Moreover, brisk purging by other means has no such alleviating effect. Colchicum often produces a marked sedative influence on the heart and other parts of the circulating system, as is manifest from the slowness of pulse which it frequently causes. But that its action in gout is not simply sedative, is shown by the fact that in its power of controlling other forms of inflammation it is much inferior to other sedatives, such as tartar-emetic, while the latter drug, though a powerful sedative, is much inferior to colchicum as a remedy for gout.

If, then, the action of colchicum cannot be explained either by its purgative property or by its sedative influence on the vascular system, it is reasonable to inquire whether its effect on the kidneys and the urinary secretion will afford any clue to its *modus operandi*.

Dr. Christison found that after giving colchicum to a patient for two days, the quantity of urea in a given weight of urine was nearly doubled, and the urine was turbid with urates. This experiment would appear to show that colchicum has the power of increasing the elimination of urea and uric acid; but on further inquiry, a source of error is discovered. It appears that Dr. Christison took specimens of urine for analysis without reference to the quantity passed in the twenty-four hours, so that, although after the administration of the colchicum a given sample was richer in urea and uric acid, no proof was afforded that their total daily elimination was augmented; on the contrary, they may, as Dr. Garrod suggests, have been decreased, for a notable diminution in the quantity of the urinary secretion often occurs from the purgative action of colchicum.

Dr. Maclagan, who made similar experiments, arrived at like results, the analyses being made on specimens of urine passed at particular times of the day, with no attempt to show the daily averages of urea and uric acid excreted. Professor Chelius, of Heidelberg, made some experiments, the results of which are apparently in favour of the idea that colchicum increases the excretion of uric acid. He found in one case that the amount of this acid was nearly doubled; but Dr. Garrod states that the observation was made on a patient who was recovering from an attack of gout, when an increased excretion of uric acid is a common phenomenon without the administration of any medicine. The late Dr. Graves was of opinion that the power of colchicum was due to its lessening the formation of uric acid in the system, and not to any increased elimination by the urine.

With the view of ascertaining the action of colchicum upon the urinary secretion, Dr. Garrod made a considerable number of analyses of the urine in several cases, and he gives the general results of his inquiry in the following terms:

"1st. There is no evidence that colchicum produces any of its effects upon the system by causing the kidneys to eliminate an increased quantity of uric acid—in fact, when the use of the drug is continued for any lengthened time, it appears to exert a contrary effect.

"2ndly. From the observations above detailed, we cannot assert that colchicum has any influence upon the excretion of urea or the remaining solid portion of the urine.

"3rdly. Colchicum by no means acts in all cases as a diuretic, but, on the contrary, it often diminishes the quantity of urine, especially when it produces a marked effect upon the secretions from the alimentary canal. . . . As the operation of colchicum can be explained neither by its purgative effects nor by its power of altering the character of the blood and urine, its real mode of action is still a subject for inquiry, and well worthy of occupying the attention of the therapist." (p. 403.)

It has been supposed by Dr. Todd and some other physicians, that while colchicum relieves pain and shortens the fit of gout, it also lessens the interval between the attacks. It seems doubtful whether a cautious and discriminating employment of the drug is attended with this unfavourable result; and with reference to this point, it should be remembered, that one of the most constant features in the natural history of gout, is that when the disease has frequently recurred, the duration of the fits is increased, and the intervals are shortened. Dr. Garrod refers to one case of fifteen years' duration, in which, the patient never having had recourse to medicines, this natural tendency in the gouty attacks to return with increasing frequency and severity was well illustrated. Dr. Garrod estimates the therapeutic value of colchicum very highly, and expresses his belief that it "possesses as specific a control over true gouty inflammation as cinchona barks over intermittent diseases."

Lithia salts in the treatment of gout.—One of the most remarkable properties of the fixed alkali, lithia, is its power of imparting solubility to uric acid, the urate of lithia being more soluble than any other urate. Some years since, Mr. Alexander Ure* instituted a series of experiments in order to determine the solvent powers of carbonate of lithia on uric acid. He found that when a solution of one grain of carbonate of lithia in distilled water was brought to a temperature of 98°, and pure uric acid added until it ceased to dissolve, the quantity taken up was 2·3 grains. He also ascertained that the solvent power of carbonate of lithia on uric acid is more than double that of carbonate of soda, nearly double that of carbonate of potash or borax, and about eight times that of bicarbonate of soda, which is the active ingredient of the Vichy water. Mr. Ure found that a human urinary calculus, composed of uric acid with alternate layers of oxalate of lime, when placed in a solution of four grains of carbonate of lithia, and maintained at a blood heat for five hours, lost five grains in weight. From these experiments he inferred that a solution of carbonate of lithia injected into the bladder might be used as a solvent for stone; but the extreme scarcity of the salt prevented him from carrying his proposal into practice.

* *Pharmaceutical Journal*, vol. iii. p. 71.

Within the last two years Dr. Garrod has made many trials of carbonate of lithia as an internal remedy, both in cases of uric acid gravel, and also in several cases of chronic gout, and he expresses himself "much satisfied with the results." He states that when given internally in doses of from one to four grains dissolved in water, and repeated two or three times a day, it produces no direct physiological symptom; but when patients are passing uric acid gravel it lessens or entirely removes the deposit. In many instances, too, in which he has administered this salt to gouty subjects, "the result has been to diminish the frequency of the attacks, and altogether improve the condition of the patient." No details of these cases are given; we are therefore not in a position to form an opinion as to the supposed curative action of the drug. *A priori*, we should not anticipate more benefit from the carbonate of lithia, than from somewhat larger doses of the far less costly carbonate of potash; but the question can be decided only by an appeal to careful clinical observation.

Rheumatic gout.—The concluding chapter in Dr. Garrod's work treats of the various forms of disease which have been included under the head of rheumatic gout, and the diagnosis of these affections. When either acute gout or acute rheumatism occurs in a typical form, the characteristic features of each disease are so striking that the diagnosis is attended with no difficulty. In the chronic stages of these maladies, however, the distinction is sometimes by no means easy. An investigation of the history will often throw much light on the question of diagnosis. If the disease originally commenced in the toe, and gradually in after attacks extended to other and larger joints, if it began about the middle age, and the patient had indulged freely in wine and malt liquors, then the case is in all probability one of gout. In many cases of chronic gout a small spot or two of urate of soda on the external ear will clear up the diagnosis. When there are no external signs of deposit, an examination of the blood or blister-serum may be made, bearing in mind that in gout the blood always contains an excess of uric acid, while in rheumatism no such excess has ever been found. A careful attention to the effect of drugs has often afforded additional aid in diagnosis, the inflammation of gout being relieved by colchicum in a much more decided manner than rheumatic inflammation.

Gout and rheumatism having been shown to be essentially distinct diseases, the question arises, can they co-exist, and is there a disease to which the term *rheumatic gout* can properly be applied? It is possible that rheumatic fever may attack an individual who is of a gouty diathesis, and a patient having suffered from rheumatic fever in youth may in after years be subject to gout, but Dr. Garrod denies, and we are disposed to agree with him, that a combination of the two diseases, as assumed by the title, is ever seen in nature. The term *rheumatic gout* is applied to different forms of disease—often to cases of true gout, when it has frequently recurred and affected the larger joints of the lower and upper extremities. Sometimes it is applied to cases of chronic or subacute rheumatism, more especially when not commencing with rheumatic fever.

But the name rheumatic gout is more frequently given by the profession to that distressing and intractable disease which has been fully described by Dr. Adams, of Dublin, under the title of chronic rheumatic arthritis. This disease having a peculiar pathology, in no way related to gout, and not necessarily to rheumatism, Dr. Garrod proposes to designate "*rheumatoid arthritis*." It produces great distortion, and often nodosity of the joints, but is not associated with an excess of uric acid in the blood, or a deposit of urate of soda in the cartilages and ligaments. Dr. Garrod gives a full description of this disease, with woodcuts illustrating the peculiar deformity which it occasions in the hands. He also gives a table setting forth in a very clear and intelligible manner the differential diagnosis of gout, rheumatism, and rheumatoid arthritis. For this and for many other interesting details of which we have here made no mention, we must refer our readers to the work itself, of which we may say, in conclusion, that it is in the highest degree creditable to Dr. Garrod as a scientific pathologist and a practical physician.

REVIEW VIII.

Lectures on the Development of the Gravid Uterus. By WILLIAM O. PRIESTLEY, M.D., &c.—London, 1860. 8vo, pp. 110.

THESE lectures were first delivered at the Grosvenor-place School of Medicine, and were subsequently published in the 'Medical Times and Gazette.' The didactic rather than original character of the lectures, and their recent publication in a widely-circulating journal, obviate the necessity for very minute analysis here. These circumstances do not however detract from the merit or usefulness of the work. The lectures are carefully wrought, and present an excellent view of a subject upon which it is very essential for student and practitioner to be well informed. That the author should have had the courage to devote eight lectures, out of the narrow three-months' course into which the examining bodies have seen fit to compress all that they think need be known of obstetrics, to the development of the uterus, is a title to praise. It behoves the teacher at least not to be borne down by the examiner. It is his duty to rescue the student from that condition of ignorance to which the regulations of colleges would condemn him. If corporations discourage obstetric knowledge, it is the more incumbent on the teacher to exert himself in order to counteract the depressing influence. If the pure physicians and surgeons whose sway is paramount in colleges do not know how important is obstetric skill, not alone to the welfare of the community, but to the peace of mind and reputation of the practitioner, the obstetric physician has no such excuse for conniving at the slur that others would cast upon his department of medicine. These eight lectures, devoted to the fundamental subject of the development of the gravid womb, may be taken as a fitting protest against the absurd limitation of "Midwifery and the Diseases of Women and Children" to a three-months' course. The subject is all-important, and the treatment cannot be