

On dysmenorrhoea and other uterine affections in connection with derangement of the assimilating functions.

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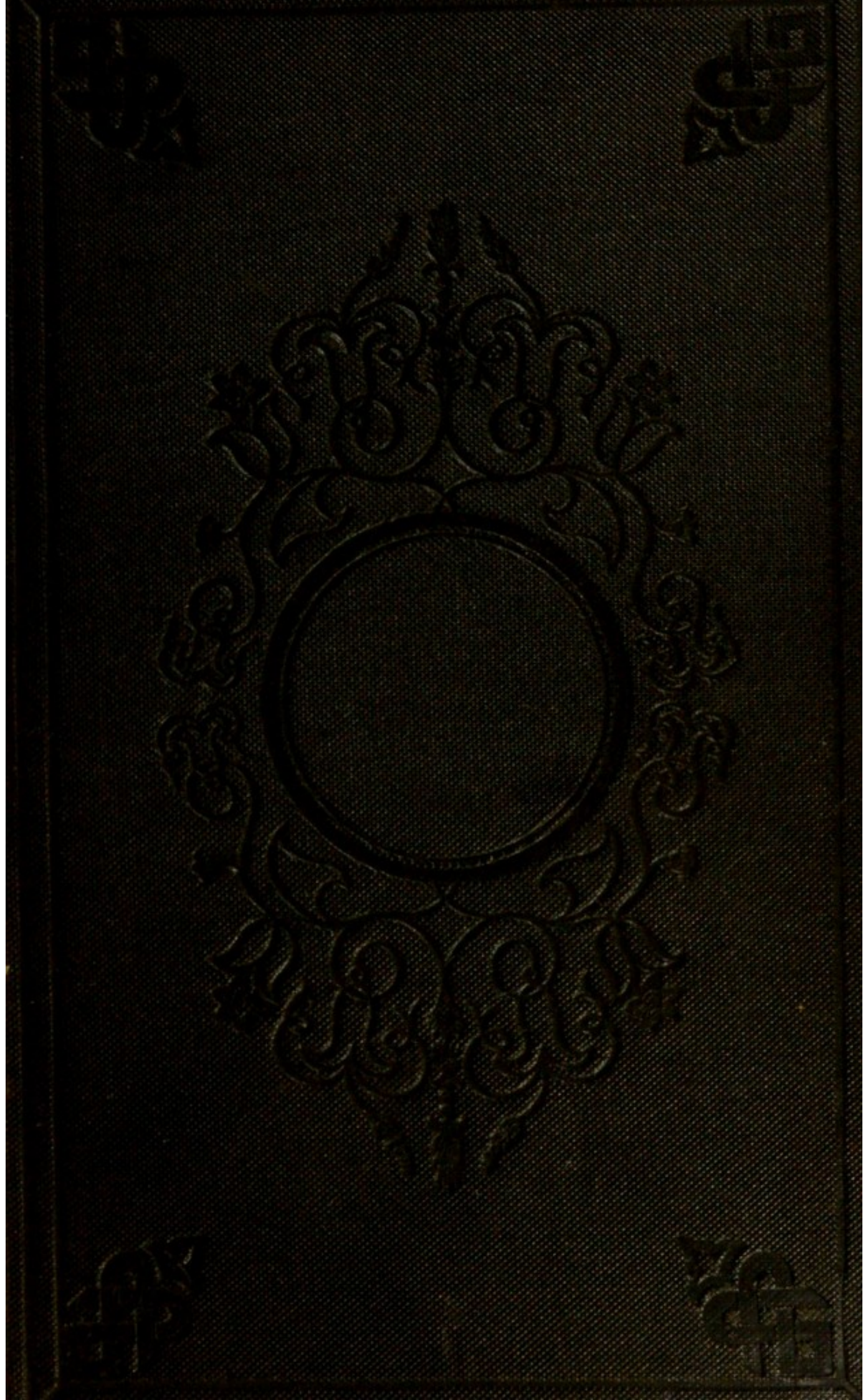
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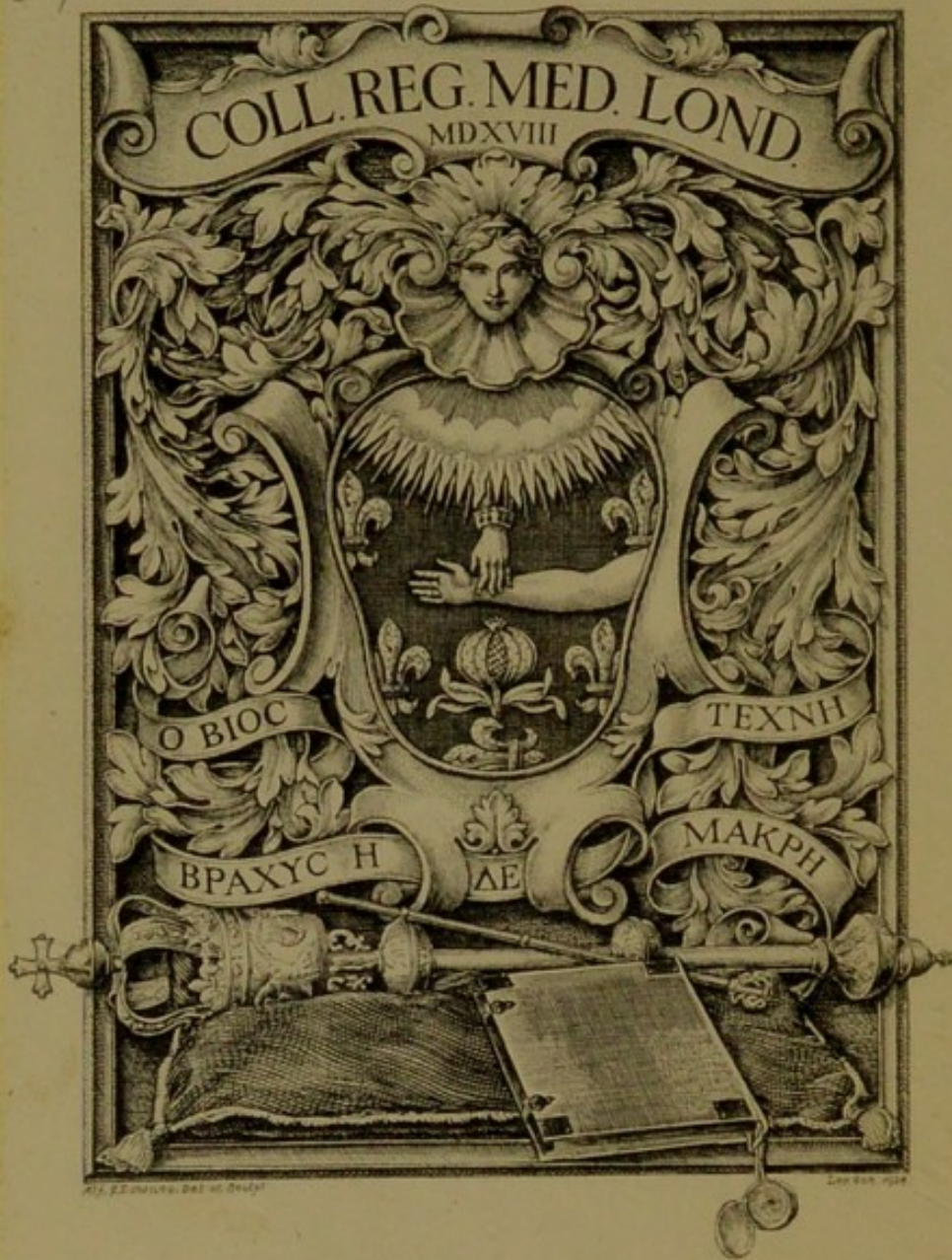
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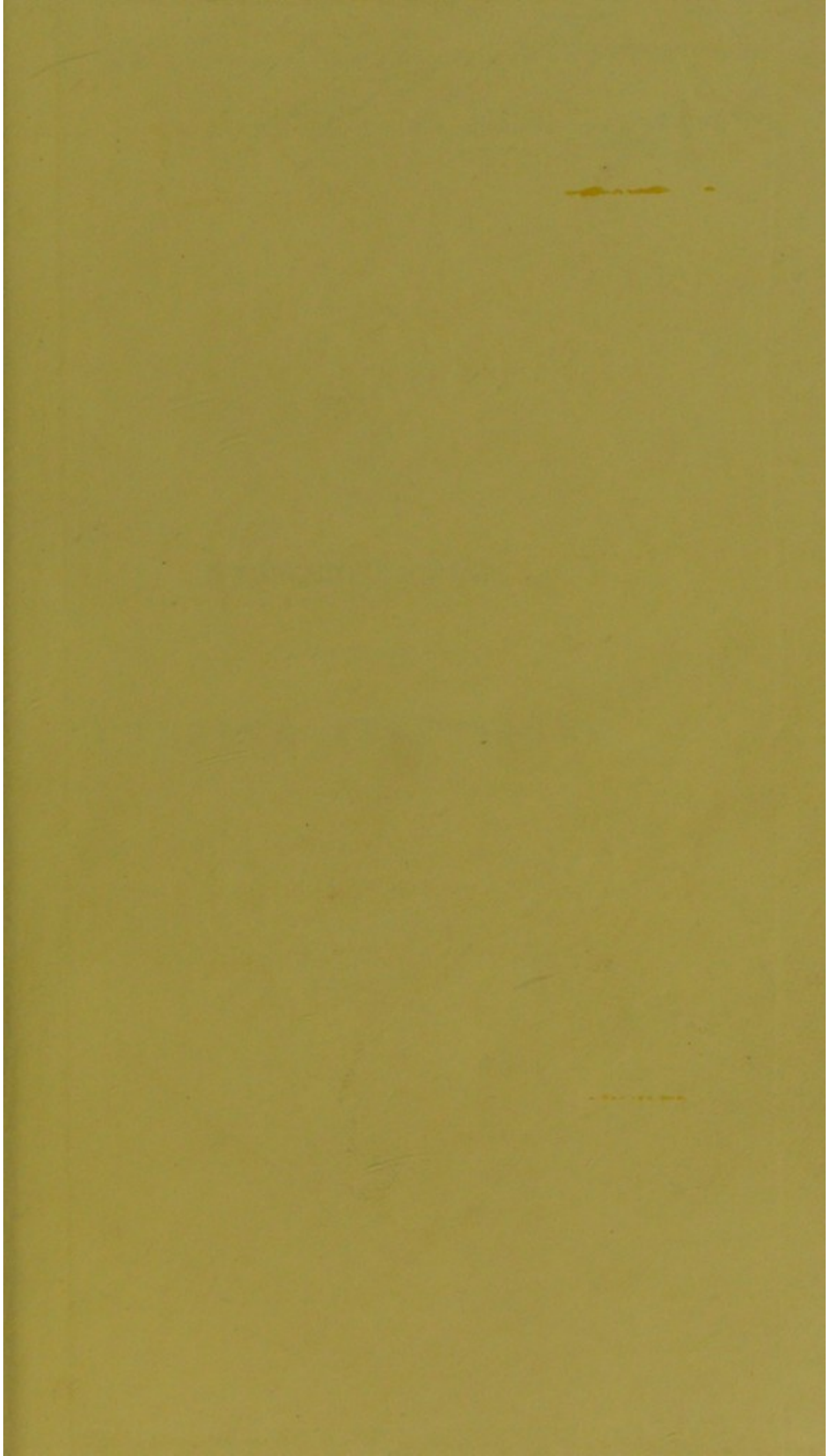


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*To the Royal College of Physicians
with the Authors respects*

ON

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AND OTHER

UTERINE AFFECTIONS.

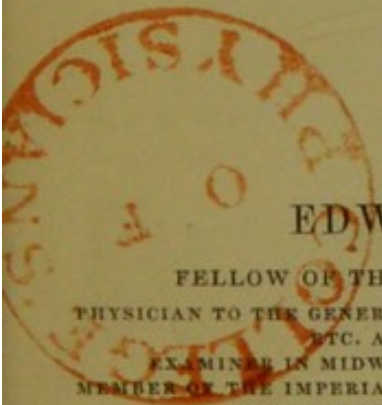
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ON
DYSMENORRHŒA
AND OTHER
UTERINE AFFECTIONS
IN CONNECTION WITH
DERANGEMENT
OF THE
ASSIMILATING FUNCTIONS.

BY

EDWARD RIGBY, M.D.,



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ROYAL MEDICO-CHIRURGICAL SOCIETY OF BERLIN.

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TO
WILLIAM PROUT, M.D. F.R.S.

THIS ATTEMPT
TO CARRY OUT IN ONE CLASS OF DISEASES
THE PRACTICAL APPLICATION OF THOSE GREAT LAWS
IN THE ANIMAL ŒCONOMY,
THE DISCOVERY OF WHICH HAS PLACED HIS
NAME IN THE
FOREMOST RANKS OF BRITISH SCIENCE,
IS INSCRIBED,
WITH EVERY SENTIMENT OF ESTEEM AND RESPECT,
BY HIS SINCERE FRIEND,

THE AUTHOR.

P R E F A C E.

I FEEL no slight hesitation in putting the following observations before the public ; not only because I am well aware that the investigation of the affections to which they refer is still far from being so perfect as I could wish it to be, but also because these affections on the whole excite less interest among the generality of the profession than any other class of diseases. They are but too commonly looked upon as either being trivial or incurable ; and in neither point of view are they likely to receive close investigation or elicit practical inference. Even what little notice they do excite, is chiefly directed to their local symptoms and treatment,

and but little attention is paid to the functional derangements which are so closely connected with them, and on which they so essentially depend.

Being aware that, in the following pages, I have enumerated symptoms, and, in some cases, proposed remedies which may strike my readers as fanciful or of little import, I can only beg those who are in the habit of seeing these affections to suspend their judgement until a fair trial of their merits has been given. The observations which I have made have neither been made hastily nor recently; they have been gradually collected for several years; and, having enjoyed the privilege, since 1831, of attending the uterine cases among the out-patients at two of the great Royal Hospitals of this metropolis, viz. St. Thomas's and then St. Bartholomew's, I need hardly say that my field for observation has been considerable.

To the excellent friend whose name honours my dedication-page I am indebted for much

valuable information in guiding my inquiries ; his masterly work on ' Stomach and Renal Diseases,' I consider to have been the foundation on which I have ventured to build this little superstructure.

I have added a few observations at the end, on the ordinary processes which are requisite for examining the state of the urine in these affections. My object was to give just so much as was actually necessary for this purpose and no more. Very few rules are required, and many are deterred from prosecuting this highly important part in the investigation of uterine derangements, by finding no short practical directions to guide them, among the more scientific details in works on animal chemistry.

E. R.

New Street, Spring Gardens,
March 1844.

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ON UTERINE AFFECTIONS

IN CONNEXION WITH

DERANGED ASSIMILATION.

PART I.

ASSIMILATION—ITS DERANGEMENTS.

ASSIMILATION is that process, or series of processes, by which certain principles of the food are digested and converted so as to form the elements of the blood, and furnish by this fluid a means for maintaining unimpaired the various structures and functions of the body.

It will therefore be seen that a process like this, which supplies the nutrition of the whole body, must be the great agent on which a healthy state of its whole organic mechanism depends, and upon which a due activity of its growth and development is regulated and ensured.

The circulation is that part of the system which is primarily and most directly dependent upon this pro-

cess, and which in its turn influences every structure and tissue of the body, by supplying the organs of secretion with those elements which the peculiar nature and purposes for which these parts are designed, demand.

Hence we may divide this great process under two heads—*primary and secondary assimilation*; the first, consisting of those changes which the food undergoes during its conversion into blood; the second, of those ultimate processes by which certain portions of the blood are converted into organic tissue and again removed from the system. The first comprises digestion, chylication, and sanguification; the second, the conversion of the elements which form the blood-corpuscles into the primary structure of cell life, on which not only the integrity, and growth, and development of the whole frame essentially depends, but also the great processes of secretion and absorption.

The all-pervading influence of assimilation upon the system not only shows its importance, but displays also the wide extent of injury which must result from such a process being performed in an imperfect or faulty manner. There are no organs, however remote, which may not be deranged in consequence; no tissues, however dissimilar, which may not suffer.

In the numerous and varied affections arising from

this cause, viz. deranged assimilation, one great pathological feature may be distinguished as common to all, viz. an imperfect, vitiated, or impure condition of the blood. In many of these affections (as is also the case in the contagious fevers and diseases akin to them) the altered condition of the blood may be distinctly seen both during life and after death. Thus in some forms of rheumatism and gout, a large excess of fibrin is frequently observed; in others the blood has been distinctly acid; in diabetes the peculiar saccharine character of the disease has been detected in the circulation, while in chlorosis and other affections arising from defective nutrition, the natural quantity of iron and saline ingredients, as also of fibrin, is considerably diminished; the same remark, in some degree, applies also to scrofula. In other affections the altered condition of the blood is evinced by faulty secretion and other functional derangements of organs concerned in eliminating certain elements from the blood, whether for the purpose of nutrition or excretion. To this last head may be added structural disease, ultimately produced in organs thus deranged.

Although it is not my intention to enter into a general consideration of the numerous affections arising from deranged assimilation, but to confine myself to a

short view of those disorders and diseases which it produces in the uterine system, still it will be necessary, in order to render the subject more intelligible, to premise a few observations on the nature of those phenomena and symptoms which are most frequently observed, and which are also connected more or less with the uterine affections to which I have just alluded.

The simplest, earliest and most common form of deranged assimilation, is that condition of the stomach in which either from an impaired or faulty state of function, or from food improper as to quality or quantity, its powers of digestion are so deteriorated that its secretions are greatly deranged. A large quantity of acid is usually secreted if the food is but partially digested, unnatural compounds are formed, and the chyme which results is highly unfit for conversion into chyle, and for supplying the circulation with that pabulum sanguinis which is so necessary for the due performance of those duties which are required of it. Chyle then of an unhealthy (acid) character is conveyed into the blood, deranging more or less, at the moment of its absorption, the functions of those parts by which this process is effected. The circulation becomes vitiated, and although at first the impurities are generally removed by the kidneys, skin, and other

emunctories, yet if the cause be frequently repeated (which is usually the case) the excretory powers of these organs either become impaired, or at least unequal to the task of removing the offending cause. The skin is generally torpid, and even if the impurities be pretty freely thrown off by the kidneys in the form of lithic acid and lithate of ammonia, the circulation is not entirely relieved, and by degrees other parts of the body begin to suffer in consequence. The muscles become irritable, and maintain more or less a state of continued contraction, even when at rest, producing that aching and painful lassitude of the limbs which is so well known as to need no description; they ache from the slightest exertion, and the sense of weakness and fatigue appears but little relieved even by long-continued rest. This condition is still more distinctly marked in children by the grinding of the teeth, clenching of hands, and strongly flexed limbs. It soon brings with it other symptoms arising from defective nutrition, as general pallor, debility, torpid or unhealthy secretions, and emaciation. In many of these cases, after a while, the joints swell with inflammation of an acute or chronic form, followed by effusion into their cavities, or deposition of lithate of soda both in and around them, so as greatly to impede their action and

produce further irritation, as in articular rheumatism and gouty arthritic inflammation of the acute or chronic form. Certain muscles become peculiarly painful, or, where the system has been more strongly impregnated, general fever with arthritic and muscular inflammation occur as in rheumatic fever.

In the child a similar condition is seen, although usually under a somewhat different form: "the imperfectly assimilated chyle," as Dr. Prout remarks, "in passing through the lacteal system, either does not undergo the necessary changes by which the chyle is converted into blood, or is mal-converted into the comparatively insoluble pseudo-albuminous matter of struma:" this is either arrested in its further passage through the glands, and lays the foundation of tabes mesenterica and other glandular diseases of the scrofulous diathesis, or passing through the circulation into the lungs and other organs, becomes the origin of phthisis and other organic diseases. In the child however we also frequently see it take a different direction. The energies of the system are now occupied in the great process of growth, and especially ossification; this latter becomes much impaired in consequence of the highly acid circulation converting the insoluble bone-earth into a soluble salt, which,

not being deposited by the secreting vessels, is removed again by the circulation, leaving the bone soft and flexible as in the common experiment of removing the phosphate of lime by steeping the bone in muriatic acid. A similar condition, viz. *mollities ossium*, is occasionally seen in the adult; but, as far as I know, never except in connexion with that acid state of the fluids which is known under the various titles of lithic, arthritic, rheumatic, or rheumatic-gouty diathesis, and arising from similar causes, viz. unhealthy food, impure air, and exposure to cold and damp.

The above-mentioned effects, however, may not only be produced by a deranged state of the primary assimilating functions, but to a certain extent from a similar condition in those of secondary assimilation. This latter state may show itself in a variety of ways. The stomach and upper bowels may not be the only cause from acid secretion, or by offering to the absorbents such imperfect materials for the supply of chyle as to require their speedy separation again from the blood by the kidneys and other organs, but the changes which constitute the function of secondary assimilation, and of which we still know but little, may be at fault, and those principles which ought to have been separated from the blood in order to supply the wants

of the system, not having been applied to this purpose, are subjected to the disorganising action of the kidneys and thus thrown off. In many cases (perhaps more frequently than otherwise) this removal by the kidneys of principles from the circulation which were destined for the process of secondary assimilation, does not result from derangement in this process, but simply from a larger quantity of healthy materials having been supplied by the organs concerned in primary assimilation than is requisite for the growth and developement of the body, and for the general wear of the system.

These observations necessarily apply in great measure to the assimilation of that albuminous principle which forms the basis of the chyle, blood, and ultimately organic tissue.

This primordial and all-pervading principle becomes developed in that pulpy layer of nutritious digested matter called chyme, which adheres to the surface of the mucous membrane, either soon or immediately after it has entered the duodenum, or perhaps even before, and is evidently not furnished directly from the food but developed by the combination with azote, which appears to be supplied from the circulation. Dr. Prout expresses it as his belief, "that under ordinary circumstances the azote [of the albumen] is principally

furnished by a highly azotized substance (organised urea?) secreted from the blood either into the stomach or duodenum, or into both these localities, and that the portion of the blood thus deprived of its azote is separated from the general mass of blood by the liver as one of the constituents of the bile; which secretion, as a whole, is remarkably deficient in azote*.”

The first changes in the process of sanguification which the albumen undergoes after the absorption of the chyle by the lacteals, appears to be effected during its passage through the mesenteric glands. Its colour assumes a pale rose tint, and it begins to show traces of that peculiar characteristic of vitality which is so striking a feature in the blood itself, viz. spontaneous coagulation, when removed from the vessel which contains it. These phænomena are still more developed in the thoracic duct, after receiving the large lymphatic trunks returning from the spleen, which, according to the investigations of Professors Tiedemann and Gmelin, must be considered as the great central gland of the lymphatic or sanguificatory system.

“The alimentary materials,” says Dr. Carpenter, “taken in by the absorbent vessels are not yet in a state fit to be applied to the nutrition of the tissues,

* On Stomach and Renal Diseases, 3rd edit. p. 27, note.

for they are in the condition of *chemical* compounds, not yet possessed (in any high degree at least) of *vital* properties. The chief constituents of the chyle, as first absorbed, are albumen and fatty matter; the former is destined to be converted into the material of the solid tissues; the latter is chiefly designed for the maintenance of the animal temperature by the combination it is afterwards made to undergo with the oxygen introduced through the lungs."

"It is with the *albumen* that we are at present concerned. This principle cannot be regarded as possessed of any properties which distinguish it from ordinary chemical compounds, save its peculiarity of composition, and its tendency to putrefaction when exposed to the air. In its coagulability by heat or by acids, in its combination with alkalies as an acid, or with acids as a base, and in the absence of the power of spontaneously passing into any forms more decidedly organic than the granules which are seen when it is made to coagulate slowly, it is closely analogous to many substances which belong to the domain of organic chemistry. Before it is ready to be appropriated by the tissues as the material for their nutrition, it must undergo a very important change. We find in the blood another principle, *fibrin*, which differs but little from albumen in its chemical compo-

sition, but is manifestly endowed with much higher vital properties. One of the most decided indications of this difference is, the tendency of fibrin to coagulate when withdrawn from the living vessels; and the appearance of distinct organization in this fibrin, especially when this concretion has taken place in contact with a living surface. Hence the coagulation of fibrin is clearly not the result of its *death*, as was formerly supposed; for this coagulation is the first stage of its organization, when plastic lymph is poured out on a living surface; and even when the process takes place after the complete withdrawal of the fluid from the living body, a fibrous arrangement as distinct as that which is presented by fibrin coagulated in the living body, up to the time when the vessels appear in the newly forming tissue, is seen in the clot. The fibres may form by their interlacement an areolar tissue, or by their parallel arrangement a distinct membrane*.”

From the albuminous principle, whether in a state of albumen or fibrin, is also derived, during the changes produced by the process of secondary assimilation, that

* Dr. Carpenter's Report on the Results obtained by the use of the Microscope in the Study of Anatomy and Physiology.—*Brit. and For. Med. Review, January 1843.*

principle, viz. *gelatin*, which forms so large a portion of the solid parts of the body, such as tendon, ligament, cartilage, bone, and existing nearly pure in the skin or dermoid tissue. In its composition it closely resembles that of albumen, with the exception that it contains 4 or 5 per cent. less carbon, which being therefore disengaged in the extreme vessels at the moment of transition from albumen to gelatin, unites with the oxygen of the blood to form carbonic acid, and appears to play an important part in the production of animal heat.

Where more of the albuminous or gelatinous principles have been supplied than the wants of the system demand, or where from some defective action in the process of secondary assimilation, of the nature of which we still know but little, these principles are not duly appropriated, they are returned by the circulation, and thrown off by the various excretories of the body, either but little changed, as in the form of serum, or assuming a very different arrangement of their component parts.

It is to the invaluable researches of Dr. Prout that we are enabled to trace the metamorphoses of these principles, especially when exposed to the disorganizing action of the kidneys and converted into the elements

or ingredients of the urine. Thus the albuminous principle appears in this secretion under the form of lithic acid and lithate of ammonia, or occasionally unchanged, as has been noticed by Rayer in some cases of rheumatism. But where the function of the kidney has been more or less deranged by long continuance of unhealthy materials for it to act upon, its function becomes impaired, and albumen appears in the urine but little changed, and the disease assumes a much more formidable aspect from the disposition it evinces to terminate in organic disease (see p. 26).

According to the same high authority, the gelatinous principle chiefly appears in the urine in the form of urea, which under such circumstances is therefore usually in excess, in the form of oxalic acid, which unites with the lime of the mixed phosphates, and of lactic acid. It must, however, remain a question still to be determined by future investigation, whether these changes are the immediate effects of deranged secondary assimilation, or take place in the course of the circulation, or are the results of the peculiar disorganizing action of the kidney itself, by which principles possessing a certain degree of vital properties are reduced to mere chemical combinations.

The great secreting surfaces of the body, viz. the skin

and mucous membranes, are also copious emunctories for the albuminous and gelatinous principles when either mal-assimilated, or (from being in excess) unappropriated by the process of secondary assimilation. The skin, when in full activity, is known to secrete both lithic acid and urea, as also lactic acid to a considerable extent; and is scarcely, if at all, inferior to the kidneys in the power of relieving the system from such impregnations as is seen so strikingly in certain rheumatic and gouty affections; but it is also capable, in at least one form of this diathesis, viz. rheumatism, of separating the albuminous principle unchanged, viz. in the increased sebaceous secretion of the skin, as pointed out by Dr. Todd.

The secretion of lithic acid and urea from the mucous membranes is not so distinctly shown as from the skin, and perhaps takes place under the form of lactic acid, as may be inferred by the intensely acid state of the intestinal contents, which is so frequently seen, especially in children, and where a similar prevalence of acid principles is almost invariably found to be co-existing in the urine.

The mucous membranes, although copious emunctories for redundant or mal-assimilated albuminous principle, do not generally subject it to any consider-

able change or disorganization in separating it from the circulation, as is the case with the kidneys, but the secretion from them still possesses the albuminous character to a greater or less degree.

Although the precise relation of mucus to the albuminous principle has not been satisfactorily ascertained, its ultimate composition shows a very close analogy with this, and that in all probability it is nothing else than the fibrinous or gelatinous modifications of the albuminous principle with a certain proportion of water, viz. in the form of a hydrate. This appears the more probable from the researches of Henlé, according to whom "it consists of the scales of the epithelium which covers the open cavities of the body. This epithelium or cuticle consists of minute cells, of various forms, which are continually wearing off and being renovated, it thus yields scales, which mix with the watery secretion and constitute mucus." (*Owen.*) Hence, therefore, as it is evident that a very intimate connexion exists between the assimilation of the albuminous principle and the function of the mucous membranes, it will be equally manifest that a healthy or unhealthy condition of the one will determine a corresponding character of function in the other. I have already observed that the secretion from these membranes is of a more or less modified

albuminous character; and experience shows, as a general rule, that in mal-assimilation of the albuminous principle this condition of the mucous secretion usually holds a pretty exact correspondence with the quantum of lithic matters discharged by the kidney. It is true that this will not hold good in some cases, where the secretion of the one or the other (mucous membrane or kidney) has been preternaturally active or torpid, a condition which must rather be looked upon in the light of an exception.

The correctness of this view is illustrated by numerous facts connected with the phænomena of deranged assimilation, and assists materially in elucidating the pathology of many affections, the nature of which have not been sufficiently understood, and which, although plainly referrible to the same class, had hitherto been looked upon as dissimilar and entirely unconnected with each other. Thus in different affections arising from mal-assimilation of the albuminous principle, as in the rheumatic and gouty diathesis, the altered state and action of the mucous membranes constitute some of the most remarkable and interesting features of the disease: the circulation in them (more especially the venous) becomes, in many of these cases, much congested, and the membrane assumes a relaxed, swollen,

injected, and even purplish appearance. This condition is well illustrated by the state of the throat and fauces in a certain form of cynanche connected with deranged, bilious and gastro-enteric secretion in gouty habits. In gouty ophthalmia a similar condition of the mucous membrane is evinced by the turgid state and increased secretion of the conjunctiva*. The watery and injected appearance of the eyes and lids in persons of intemperate habits is of the same character. The wheezing bronchial respiration in patients of this latter class, and their loud, sonorous, humid cough, with copious secretion of transparent tenacious mucus, are referrible to the same head. The symptoms frequently manifest the same erratic character as gout does in other parts, coming on and going off suddenly, and alternating with gouty pains and swelling in distant organs and joints. A remarkable instance of this is the sudden engorgement and swelling of the mucous membrane lining the air-cells and bronchial tubes in certain forms of asthma, producing severe

* Morgagni mentions of himself, that he had suffered from an ophthalmia in each eye without relief from the usual remedies. At length a mild attack of gout took place in one foot, doubtless solicited (though not expected, it being his first fit) by the pediluvium and friction, of which he had made a free employment. He adds, "Oculorum inflammationem statim minuit, ac diebus insequentibus sustulit."—*Scudamore on Gout, &c.*, p. 21.

dyspnœa, and terminating after a longer or shorter period in copious expectoration. These attacks not only occur in gouty habits, but alternate with gout in other parts of the body; are relieved by colchicum, guaiacum, and other remedies of that class, and are but too frequently followed by organic disease of the kidneys*.

The connexion between the lithic diathesis and asthma, and between asthma and renal disease, has for some time been recognised by practical observers, and by no one more distinctly than by Dr. Prout: it has been briefly alluded to by Dr. Holland †, who has also pointed out an analogous state of the mucous membrane of the bronchial passages, which he has very appropriately termed "gouty bronchitis." Dr. Todd has quoted a striking case from his own practice in illustration of this fact. "A man was brought into the hospital labouring under pleurisy of slight extent, with severe bronchitis affecting the minutest ramifications of the

* It is no more than fair to my friend Dr. Locock to state that my attention to the connexion between asthma and the gouty diathesis was first awakened many years ago by his relating to me an interesting case of inveterate asthma, which had defied all treatment, and which, on ascertaining the existence of strong hereditary predisposition to gout, he successfully combated by remedies adapted thereto.

† Medical Notes and Reflections, p. 129.

tubes. The former disease yielded readily to treatment, but the latter proved extremely obstinate, and did not give way until gout made its appearance in the foot, when it quickly disappeared and the patient was discharged quite well*." A similar condition of the throat and fauces, attended by a severe catarrhal attack, is also not unfrequently met with in gouty subjects. The same fact has been fully recognised by Dr. Graves in his admirable 'System of Clinical Medicine.' He appears to lay greater stress on the necessity of some pre-existing local injury or disease in order to determine the gouty affection to the part, than has been done in the preceding pages. There can be no doubt but that in many instances an exciting cause for localising the diathesis on any particular organ or structure is the ordinary manner in which these attacks of gouty affection have their origin; but in many other cases it is not so evident; and, as in the eruptive fevers, cholera, and certain forms of diarrhœa, the disease is determined to the skin and mucous membrane as an emunctory for discharging it from the system.

"Gout," says Dr. Graves, "may attack almost every tissue in the body; it may seize on the intestines,

* Practical Remarks on Gout, Rheumatic Fever, and Chronic Rheumatism of the Joints, by R. B. Todd, M.D., F.R.S.

producing irritation, colic and gouty diarrhœa. In like manner gout frequently attacks the mucous membrane of the trachea or bronchial tubes, causing a dry, annoying, and often a very obstinate cough. Where this cough comes on along with a fit of inflammation of the joints, its true nature is frequently overlooked, and it is believed to have originated in cold, and to be mere common bronchitis. No matter what be the cause of inflammation in a gouty habit; no matter what the organ attacked by the inflammation be; it almost invariably assumes the character of true gouty inflammation. If a gouty person sprains a toe or an ankle, matters, after progressing for a time in the ordinary way, are sure in the end to exhibit a change of character; and the inflamed parts are observed either to grow unexpectedly worse, or to become stationary at a time when a speedy termination of the local affection seemed approaching. This is owing to its being now modified by the constitutional tendency to gout, which localises itself in the affected part. Precisely the same relations may be often observed between common bronchitis, produced by cold in a gouty habit, and the gouty bronchitis it indirectly produces. Gouty bronchitis often becomes chronic, continuing until it is relieved by a regular fit of the gout in the extremities*.”

* A System of Clinical Medicine, by R. J. Graves, M.D., p. 247.

The occasional accumulation of thick gelatinous mucus in the stomach of such individuals is not less remarkable for its quantity than for its apparently sudden secretion; and in this respect the accession and recession of the symptoms form a peculiar feature in common with most or all of the above-mentioned affections of the mucous membranes under such circumstances.

That the mucous membrane of the intestines is capable of becoming a copious emunctory for ridding the circulation of its mal-assimilated albuminous principles, or where there is redundancy of them, can scarcely be doubted, although it may not be altogether so easy to afford illustrations in proof of it. The mere presence of highly acid intestinal contents, might be fairly questioned as being a case in point, because it is frequently a result of ascendent food and acid secretion from the stomach; but in many other cases, especially in children, a large quantity of acid matter is thrown off by the mucous membrane, the nature of which is not yet sufficiently understood beyond the fact that its discharge gives just as much relief to the system as a copious secretion of lithic acid and lithate of ammonia does by the kidneys.

I confess that I cannot see why the mucous mem-

brane of the intestines should not be as capable of assuming one species of renal secretion as another. It has been a well-known fact to me for several years, that the mixed phosphates (fusible calculus) in an uncrystallised granular form may be occasionally secreted in considerable quantities from the bowels in children, and where the fæces have continued for some time to be mixed or rather charged with this species of sand, the child's general health manifestly improving in proportion to the quantity thrown off. Dr. Prout has long been aware of this interesting fact, and I have since had reason to suspect that it takes place in adults, perhaps more frequently than is supposed. "The urinary organs," as Dr. Prout well observes, "are not the only parts of the body through which the incidental matters of organization are separated from the system. Immense quantities of the phosphates, and particularly of the triple phosphate of magnesia and ammonia, are sometimes discharged from the intestines, from the salivary glands, and from other outlets of the body, as well as the kidneys. The same is true also of the phosphate and carbonate of lime, which are deposited in and discharged from a variety of localities. . . . Sometimes the quantity of the earthy phosphates is so large, particularly in children, as to attract notice; while in

adults they occasionally form intestinal concretions, of which numerous instances are recorded*.”

Sir C. Scudamore has “found in two instances a discharge from the bowels of a substance very much resembling grains of white sand. In each case the liver was irregular in its office, and the whole of the digestive functions were considerably disordered.” His analysis showed that it consisted of the triple phosphate with a minute proportion of silicex†.

The mucous secretion from the intestines, as far as I have had the opportunity of judging, is not only increased in quantity, but of an albuminous, transparent and highly glabrous character in rheumatic and gouty habits, and, as I have before observed, appears to stand in the same relation to mal-assimilated albuminous principles in the system as lithic acid, &c. does from the kidneys. This is particularly distinct in the rectum, and seems to be closely analogous to the albuminous discharge from the cervix uteri and vagina in certain uterine affections, hereafter to be described, and frequently ensheaths the mass of fæculent matter so completely as to excite the patient's surprise that so large a mass should glide through the sphincter thus

* On Stomach and Renal Diseases, p. 287, 4th edition.

† *Op. citat.* p. 87.

easily. It is also by this faculty in the mucous membrane, of removing impurities from the circulation, that we can explain the well-known fact of a lithic diathesis being suddenly removed by the free action of a purgative upon the bowels.

“ Two patients of mine,” says Dr. Todd, “ in no way connected with or known to each other, manifest all the signs of this (the gouty) temperament; and I find always consequent upon a kind of exacerbation, to which they are almost periodically liable, a considerable discharge from the bowels of mucus coloured with bile; this will continue for three or four days, and never fails to bring great relief*.”

The mucous lining of the intestines presents also in the gouty or rheumatic diathesis the same disposition to venous congestion as has been observed to be the case with this membrane in other parts of the body. The rectum betrays evidences of this by the almost invariable concurrence of hæmorrhoidal symptoms in these cases. Indeed, I have seldom known the lithic acid diathesis to exist severely, or for any considerable time, without this condition of the rectum being associated with it.

The mucous membrane of the bladder gives evidences

* *Op. citat.* p. 32.

of similar action in rheumatic or gouty affections, as it has been shown to do in other parts of the body. A state of cystirrhœa or catarrh of the bladder is known frequently to depend on this diathesis, occasionally attended with sudden and severe pain, and probably congestion of the organ*; the veins of the bladder not unfrequently become varicose, and this disease, as in certain uterine affections hereafter to be mentioned, is mostly attended with a disposition to hæmorrhoidal fullness, arising probably, in some measure, from the co-existence of a similar condition in the mucous membrane of the rectum, as before observed.

That the urethra is liable to be affected with gouty inflammation, accompanied by much irritation and discharge, has been for some time a well-established fact; it was described by Mr. Lawrence in the 'Medical Gazette,' vol. xxiii. p. 506, and more recently by Dr. Prout, who states that there are two affections which appear to belong to the present subject, viz. "*gouty and rheumatic inflammation of the urethra.*" I am unable to state whether these two affections be distinct diseases,

* A remarkable irritability of the bladder and urethra, with increased secretion in the mucous membrane of these parts, prevails with some persons shortly before the fit.—*Scudamore on Gout and Gravel*, p. 18.

but I believe at present that they are; and that, like gout and rheumatism, they sometimes exist in conjunction. Gouty irritation of the urethra often assumes all the characters of gonorrhœa, and is not only attended by a profuse discharge, but with great irritation and scalding in passing water. I have seen repeated instances of such attacks; by far the greater proportion of which have occurred in those who have had a strong predisposition to gout, either inherited or acquired, but who have never had gout openly. Rheumatic-gouty irritation of the urethra sometimes attacks those who labour under the affection in other parts of the system*.”

How far the mucous membrane lining the ureter and pelvis of the kidney itself is capable of secreting the albuminous mucus in the rheumatic or gouty diathesis, and how far this is connected with the difficult subject of serous urine, must still remain a matter of doubt. That the kidneys frequently suffer in this diathesis, and that it is occasionally attended with serous urine, is now a well-ascertained fact; but the precise connection between this diathesis and those forms of albuminous nephritis, as described by M. Rayer, and more especially that variety attended with granular degeneration

* *Op. citat.* p. 377, 4th edition.

of the kidney, which has been so well pointed out by Dr. Bright, has not been sufficiently determined.

From what I have seen of the effects produced by diseases arising from long-continued derangement in the process of assimilation, I have reason to suspect that as long as the kidney continues acting upon the unhealthy materials which are presented to it without suffering any great degree of irritation, we have the ordinary appearances of certain principles of the urine in excess, viz. lithic acid, lithate of ammonia, occasionally urea, and perhaps also cystine; but when once irritation has approached so near to the confines of inflammation as to produce pain and tenderness in the region of the kidneys, their function becomes more or less impaired, the above-mentioned characters usually disappear from the urine, its specific gravity diminishes; instead of being acid it becomes neutral or even alkaline, and the opalescent appearance of incipient serous urine begins to show itself: this soon increases, and the serous character is gradually established. The state of subacute and chronic nephritis, which is now kept up, from the kidneys being less and less able to meet the demands which are made upon them by the system, ultimately passes into organic degeneration, their function becomes nearly suspended, and the serum of the

blood passes away unchanged, until at length the patient sinks, partly from the continued drain upon the system, and partly from the increasing extent of the organic disease.

In offering a view which supposes in cases of long standing derangement from mal-assimilation, that albuminous urine results from subacute or chronic nephritis, which will ultimately terminate in renal disease, and that these two conditions mark the latter stages of its progress, I freely own that further experience and observations are still required to confirm and establish it. The habits of the patient and the early symptoms and history of the disease are not always easily ascertained, since it not unfrequently happens that they have scarcely attracted attention until considerably advanced.

That the urine may become serous under many other and different circumstances than those connected with the gouty or rheumatic diathesis, admits of no doubt, as is seen in organic renal disease, in typhoid fevers, in malignant disease of other organs, acute dropsies, &c.; but I have great reason to think, where the system has long suffered under the debilitating effects of dyspeptic and other derangements, that the function of the kidneys, as is also seen to be the case with the stomach, liver, &c.,

must necessarily become greatly impaired, and eventually pave the way to organic derangement, to which the condition of the system must already strongly predispose it.

One other fact connected with the mucous membranes under circumstances of mal-assimilation, where there is a gouty or rheumatic diathesis, is the secretion of gas from their surface. That this takes place in the stomach and intestinal canal of individuals labouring under these derangements there can be little doubt, although it is not always easy to be distinguished from where it has been extricated from the food during digestion. Thus one of the most troublesome penalties connected with the dyspepsia of a gouty drunkard is the enormous quantities of gas which are secreted in the stomach, producing oppressive distension from flatus, and frequently expelled by the loud explosive eructations peculiar to those individuals. In many of these cases the extrication of gas is so copious, and out of all proportion to the quantity of food taken, that it cannot be attributed to this source, but must evidently be a secretion from the mucous membrane itself. In the dyspepsia of spirit drinkers the stomach is re-inflated after each eructation with surprising rapidity; and this is repeated to an extent which no decompo-

sition of the food could produce. "The carbonic acid," says Dr. Prout, "is frequently developed not only from the food, but apparently from the stomach itself; and, in its gaseous form, occasionally proves a source of flatulent eructation. Another, and by far the most troublesome, source of flatulence, is azote. This in nervous subjects, is occasionally developed from the stomach in enormous quantities in conjunction with the lactic, and particularly with the oxalic acid, as formerly mentioned. At other times azote is probably derived from the food; but, from whatever source this gaseous principle be derived, it usually gives much annoyance; for while the carbonic acid, on account of its stimulating qualities, generally escapes from the stomach; the passive character of the azote, and the peculiar spasmodic constriction which usually accompanies its development, cause it to be retained, and thus, by distending the stomach, to add greatly to the miseries of the patient*."

The secretion of gas from the mucous membrane of the intestines in gouty habits is particularly observed in the rectum, and is usually associated with that secretion of albuminous mucus which I have already mentioned. Although the patient be not troubled with

* p. 79, 4th edition.

abdominal distension from flatulence, he is constantly aware of small accumulations of gas in the lower part of the intestine without any previous borborygmi, and which, after expulsion, are quickly renewed by fresh secretion into the bowel. What is the nature of the process by which this secretion is effected must still remain in obscurity*; but the phænomena connected with the tympanitis in certain forms of puerperal fever, lead me to conclude that it is connected with, and dependent upon, a congested or inflammatory state of the mucous membrane. It has been, I think, satisfactorily shown, both by Dr. Ferguson and myself, that puerperal fever essentially depends upon a vitiated condition of the blood from the introduction of animal poison into the circulation, and that, where the vital powers are not annihilated in the first instance, the system makes vigorous efforts at reaction, and endeavours to direct the virulence of the disease to certain organs, chiefly the serous and mucous membranes of the abdomen, for the purpose of throwing it off from the general circulation: in the one case immense exsudations of

* It sometimes happens that air is formed so abundantly in the intestines, either from undigested aliment, or possibly in part from actual secretion, that its effects in producing painful distension alone serve to cause a most distressing part of the complaint (gout).—*Scudamore, op. cit.* p. 86.

albuminous matter take place into the abdominal cavity, in the other we see the intestines rapidly distended with gas, which has been secreted by their mucous surface and producing enormous tympanitis, or at times attended with profuse diarrhœa, frequently of a peculiar character, and which in some cases appears to be almost critical.

The results of Professor Tiedemann's Experiments on Pulmonary Exhalation bear very strongly upon this subject, and show that the mucous membrane of the intestines, from the great activity which it is capable of displaying under certain states of vitiated circulation, is an excretory organ of no mean importance for ridding the system of any offending principle which may have been introduced into or developed within it. In the experiments where musk was introduced into the femoral vein of a small bitch, the effects upon the abdominal viscera were remarkable: the veins of the abdomen were distended with dark coloured blood, the mucous membrane of the stomach had a reddish tinge; that of the whole intestinal canal was of a dark red; it was swollen and in the highest state of engorgement; the canal contained a quantity of effused dark blood, and slimy liquid fæces mixed with it had passed for some hours before death.

When we bear in mind that in those cases of puer-

peral fever, where the powers have not been crushed in the first onset, nature has had time to make an effort at localizing the general affection on certain parts and structures of the body, and that these local attacks, whether in the joints, muscles, eyes, &c., assume a character bearing considerable analogy to gouty or rheumatic inflammation, the fact of gaseous secretion from the mucous membrane in the lithic diathesis (which is nothing more or less than the circulation being vitiated by a peculiar morbid principle) will appear the less improbable. From the same source of analogical observation, I have reason to believe that the tympanites of these cases is chiefly formed in the *small* intestines, on account of the length of time which these accumulations of flatus usually require before they reach the lower end of the canal, although there may be pretty distinct evidences of peristaltic action going on all the time.

I have great reason to think that the bladder is also capable of secreting or evolving gas under certain circumstances, having seen a numerous succession of bubbles discharged from the catheter in drawing off the last portions of urine from a corpulent patient who loved ease and good living. In the uterus this frequently takes place to a considerable extent, so as to

produce a sense of troublesome distension in the region of the pelvis, and instantaneously relieved by copious discharges of flatus from the vagina on any sudden movement of the body, and more especially coughing, sneezing, or any effort of the abdominal muscles.

Lastly, I may observe that the uterus is also liable to suffer under similar affections of the rheumatic gouty character to those which have been just described in other organs. It has been for some years a well-established fact, that there is a species of dysmenorrhœa which is relieved by the use of guaiacum, &c., although it resists the other remedies usually employed in the other forms of this disease. It was noticed by Dr. Dewees of Philadelphia, who has given a formula very similar to the *Tinctura Guaiaci Ammoniata* of the *Lond. Pharm.* and also pointed out in the '*Cyclopædia of Pract. Med.*' by Dr. Locock. "In a few cases," says he, "there has been a remarkable connection between this disease (dysmenorrhœa) and rheumatism in the same person, and the medicines, such as guaiacum and colchicum, given to relieve the rheumatic symptoms, have at the same time cured the dysmenorrhœa. This was accidentally noticed in a case some years ago by Dr. Gooch with regard to the guaiacum, and he consequently was induced to try that medicine where the

painful menstruation existed without the rheumatism, and sometimes with success." It may also be observed, in order to show how obnoxious the uterus is to affections of the gouty or rheumatic character, that this organ is occasionally affected with rheumatism at the commencement of labour in patients of rheumatic habits, or who have been exposed to alternations of temperature and other causes of this affection. In these cases, during the latter periods of pregnancy, the slightest precursory contractions of the uterus, which in a state of health would communicate no other sensation to the patient than that of equable tension and pressure around the abdomen, are now attended with severe pain, and form a species of spurious labour-pains, the real nature of which has been much overlooked in this country.

PART II.

UTERINE AFFECTIONS.

THE observations which form the subject of the preceding section are intended as introductory to the consideration of certain uterine affections intimately connected with, and in great measure depending upon, derangements of the assimilating processes; more particularly those which are implicated in the rheumatic and gouty diatheses. They are affections which must in great measure be looked upon as merely the local phænomena of a general condition of the system, and therefore present symptoms and effects which vary according to the organ and structure which is affected. Hence we shall find in mal-assimilation, particularly of the albuminous and gelatinous principles, that if the uterine system be the part on which the disease attempts to localise itself, the symptoms will closely resemble those which have been shown to exist in other parts under

similar circumstances, only modified more or less by situation, function and structure.

In applying to these affections the term uterine rheumatic gout, I wish it to be understood that I do so in default of any more appropriate term; but as this expression renders my meaning tolerably intelligible, I shall be satisfied to use it for the present.

Rheumatic gouty affection of the uterus, as of other parts of the body, implies a certain series of local phenomena or symptoms, preceded or attended by a corresponding state of the general system; they are chiefly of a congestive or inflammatory character, or at least in some degree resembling the phenomena of inflammation, being attended with local vascular excitement, of a more or less acute nature, with the chief features of inflammation, viz. heat, swelling, redness and pain; or of a chronic form, with much venous engorgement, swelling, induration, and ultimately alteration of structure. The first form is more sudden in its attacks and recessions, more erratic in its movements; the latter more gradual, but fixing on the part with a firmer hold, and relinquishing it with proportional difficulty. The acute form is usually seen in connexion with dysmenorrhœal attacks, or with the uterine excitement which is generally observed in such cases at the half-way time between the

menstrual periods. The other is mostly attended by chronic leucorrhœal discharge, and chronic or subacute inflammation of the cervix uteri, followed by induration and organic disease. It may also be observed, that if not arrested by proper treatment, the acute sooner or later passes into the chronic form, in which case they may be looked upon as different stages of the same disease, and therefore brought under the same description. It may, however, be stated, that the majority of these affections are of a chronic or subacute nature; whether so originally, or from the circumstance that the change from the acute to the chronic form frequently takes place at an early period of the disease, is not very easy to determine. "Examples of the gout assuming in its first invasion the chronic form, as early as the middle age of life, most frequently occur in females of weak constitution, whose parents have been, one or the other, gouty. It may be added by way of explanation, that the remote causes are applied more weakly in the female sex, and hence in women the gouty action is often less completely evolved than in men*."

As far as my experience in these cases enables me to judge, I should say that these symptoms mostly, if not always, appear in systems more or less predisposed from

* Scudamore, *op. cit.*, p. 379.

long-continued dyspeptic and other gastro-enteric derangements. Where the symptoms assume the acute character, they are not unfrequently ushered in by an attack of rheumatic fever or rheumatic gout; or the general diathesis has been directed towards the uterine system by exposure to cold during a menstrual period or by an early abortion. In these cases the attack is in fact one of dysmenorrhœa in a gouty or rheumatic habit.

I am at present unable to state with certainty the precise circumstances on which depend the formation and discharge of the fibrinous exsudations which every now and then attend these cases of dysmenorrhœa. Neither the severity of the attack, nor the peculiar type of the accompanying symptoms, nor the habit of the individual herself, seem to stand in any relation or connexion with the appearance of these discharges of fibrinous matter. If there be any fact which seems to be common to all the cases of dysmenorrhœa which have been attended with exsudation, it is the coexistence of some local inflammatory action of a neighbouring organ. In some it has been the kidney, in others (and on the whole more frequently) the ovary, which may easily be presumed from its close connexion with the uterus, and from the generally-received opinion of its being essential to the function of menstruation. In

others, the os and cervix of the uterus itself have been the seat of inflammation. If the ovary be the part affected, the patient suffers much pain in one or both groins, increased on pressure, or by putting the integuments of the part on the stretch in assuming the erect posture. It is greatly aggravated at each menstrual period, coming on for one or more days before the appearance of the discharge, and attended with much pain, throbbing, and sense of heat and swelling in the part, and generally accompanied by considerable irritation of the bladder or rectum. These are the ordinary phenomena which attend a paroxysm of this disease, but accompanied, as is seen, with symptoms of more than ordinary local congestion, and attended with rheumatic or gouty symptoms in other parts. In the more sub-acute or chronic form, the precursory stage appears to consist of that series of changes produced by increasing derangement of the assimilating functions by which the circulation gradually becomes vitiated, and local disease appears as the product of general disorder. The bowels are torpid, requiring medicine to render them sufficiently active, the evacuations are unhealthy and offensive, the tongue is furred, there is a disagreeable taste in the mouth, the breath is impure, the appetite is capricious and variable; food even in small quantity

produces much troublesome distension and flatulence, the urine is generally loaded with lithic deposits, the skin is dry and rough or moist and clammy, the muscles are flabby, the limbs ache on the slightest exertion, the extremities are cold, the face is pale and sallow, there is a bilious head-ache across the forehead and eyes, and much depression of mind. These symptoms are merely those of general dyspepsia, and are usually accompanied with more or less atonic leucorrhœa. If dysmenorrhœa be present, it is usually attended with fibrinous exsudations; at times, however, this appearance is entirely wanting. (See Case 6.) In many instances the uterus does not appear to be implicated in the disease, which seems chiefly confined to the vagina and rectum, and hence, therefore, is unattended with dysmenorrhœa. The patient is sensible of occasional attacks of congestion in the pelvic region, coming on and going off suddenly, producing pain, with sense of fullness, weight, heat and throbbing about the pelvis, more especially the vagina and rectum. The vagina feels full, swollen, and, as it were, impervious or stuffed up, like the nose in a severe cold; it is exceedingly sensitive and painful to the touch, so much so as to require considerable caution in sitting down, and rendering the motion of a carriage, or sometimes even walking, almost

intolerable*. The upright posture is of itself frequently sufficient to bring on a paroxysm of heat, fullness and sense of painful engorgement and distension in the part, thus confining her to the recumbent posture, and debarring her from bodily exercise, which would otherwise be so beneficial. The disease is remarkably uncertain in its attacks, going off and coming on very suddenly; at times it will leave her perfectly free from all sensation of congestion and the other above-mentioned symptoms, and she feels as capable of taking exercise as she ever was in her life; at other times it will return as suddenly, and sometimes from no very evident reason, coming on even when she is in the recumbent posture and enjoying perfect rest.

On examination, the labia and nymphæ are usually found swollen and flabby, and copiously moistened with a thick, creamy, albuminous discharge. Occasionally, however, they are hot and turgid, the vagina is in a state of soft flabby tumefaction, its parietes in close con-

* The sitting posture is generally attended with a good deal of uneasiness in these cases. If the seat is hard, the pressure on the tender swollen parts becomes insupportable; if soft, it seems only to increase the heat and congestion; hence patients under these circumstances learn by experience to prefer a cane-seated chair, or one of the circular air-cushions, which are peculiarly adapted for such cases.

tact with each other, and its calibre much diminished by the swelling. The mucous membrane is swollen, and shows evident marks of venous congestion; it is everywhere thickly covered with the above-mentioned white or yellowish-white discharge, and not unfrequently the canal is so exquisitely sensitive as to render the introduction of the finger very painful, and sometimes even impossible. In the earlier periods of the disease the uterus does not always appear to be the seat of much suffering during the menstrual periods, the os, cervix and inferior portion feel somewhat swollen and tense, but not particularly tender; how it is in this respect *during* a menstrual period, especially when complicated with dysmenorrhœa, I have not had the opportunity of judging, but a state of more or less vascular and nervous excitement may be presumed to exist then.

One remarkable symptom which I have noticed in several well-marked cases, is the frequent discharge of flatus from the vagina, apparently the product of secretion from the mucous membrane of this canal, or of the uterus itself. In the state of passive turgor, which may be called gouty congestion, and which I have already pointed out as occurring in other mucous membranes under similar circumstances, it takes place to a considerable extent, and appears to be formed very rapidly,

as the patient can hardly move without being sensible of flatus escaping from the vagina; in others it is in much less degree, and it is only at long intervals, as after the night's rest, &c., or from considerable efforts of the abdominal muscles, as sneezing, coughing, &c., that it occurs; in other cases it is observed only at the menstrual periods.

The urine also betrays very well-marked evidence of the gouty or rheumatic diathesis. It is generally high-coloured, strongly acid, with excess of lithic acid or lithate of ammonia. The phosphates, especially the phosphate of lime, are copious, and form a dense precipitate with ammonia. The specific gravity is usually considerable; thus, in thirty-eight analyses, the mean specific gravity was 10·26; it may, however, be observed, that in twelve instances it was below 10·25. One very remarkable feature, which I have observed in a large number of cases, has been the very considerable excess of urea, not occurring as an incidental and occasional phænomenon, but with a great degree of uniformity in those cases whose urine I have had constant and regular opportunities of examining. In every one of the analyses just referred to, urea was present in excess, and in most of them it was very considerable. Sir Charles Scudamore has remarked a precisely similar condition of the

urine during an attack of gout, a fact which tends no little to establish the identity of these uterine affections with gout. "The increased specific gravity of the urine depending upon an increase of its solid principles, which constantly takes place in a paroxysm, appears to me one certain evidence that the blood-vessels are surcharged with blood, unhealthy in quantity, and probably also in quality. In addition to the excess of the saline ingredients of urine, so constantly found in the paroxysm, with relation to the time of health, the fact, of which I have obtained abundant proof, that *urea* is also excreted in preternatural quantity, deserves particular attention. In several comparative examinations which I have made with reference to this point, I have invariably found that the urine secreted in the paroxysm, has furnished urea more abundantly than the healthy urine of the same individuals; and in some instances, its proportion has very much exceeded the measure of the general healthy standard. The excess of urea has, also, very remarkably corresponded with an excess of the phosphates*".

A well-marked hæmorrhoidal diathesis is observed in a large majority of these affections; indeed the reverse must almost be looked upon as an exception to the

* Scudamore, *op. cit.*, p. 147.

rule; for we rarely meet with uterine derangements, and a prevalence or excess of lithic acid and lithates in the urine, without the co-existence of considerable hæmorrhoidal congestion. I have observed the same as regards urea to a certain extent, but not so invariably. This condition manifests the same sudden accessions and recessions in such cases as I have already noticed in the attacks of uterine congestion; the mucous secretion of the rectum is increased, and sometimes to such an extent as to form a considerable portion of the evacuation: it is neither acrid nor watery, but presents much the same albuminous characters as that which comes from the vagina. A common effect of this condition is, that the fæcal mass is ensheathed by the mucous secretion, and although formed, and even solid, glides from the intestine with that degree of ease which has been already alluded to in the former section.

A similar secretion of gas to what I have described as taking place in the vagina, occurs also in the rectum. The patient is constantly aware of small accumulations of flatus forming in the lower part of it, by the sense of slight distension at that part, and by its subsequent escape: in many cases this is repeated pretty frequently, and yet without any previous sensation of the flatus having descended from the higher bowels. She is, in

fact, not aware of it until it is felt in the vicinity of the sphincter, and when it is expelled, it is renewed without any previous borborygmi, or other symptoms of flatus moving along the intestine.

The most prominent feature in the above enumeration of symptoms is the congested state of the pelvic vessels, which, although of transitory character at first, soon becomes more and more permanent, until at length that state of subacute or chronic inflammation is established which sooner or later must end in organic disease. The constitutional symptoms become greatly aggravated, the chylopoietic functions are nearly suspended; emaciation and great debility follow, and the face assumes the cachectic, cadaverous appearance, which is generally looked upon as indicating structural mischief. The local symptoms resemble those of chronic leucorrhœa, with inflammation of the cervix uteri. The pain of the back becomes more decided, and is less relieved by assuming the recumbent posture; the bearing-down when she is erect is increased; severe pain is produced by sitting down upon a hard seat and by pressing up the perineum against the inflamed os and cervix uteri, which being swollen and heavy from congestion, descend lower into the pelvis than usual. From a similar reason the evacuation of fæces, especially when the bowels are some-

what constipated, is attended with pain nearly in the same direction, the rectum during their passage pressing against the os and cervix uteri. Upon examination this part will generally be found hot, engorged, throbbing and tender to the touch of the finger; there is more or less leucorrhœa, which, although it may have been creamy and albuminous in the commencement, is apt after a while to become watery and discoloured. Slight movement, and even assuming the erect posture, or the warmth produced by sitting on a soft-cushioned seat, are sufficient to bring a considerable aggravation of her sufferings. The catamenia become more scanty and lose their natural colour; at length they cease, apparently more from the depressed state of the system being no longer able to afford this periodical evacuation than from functional inability on the part of the uterus to secrete it. Darting pains, of an altogether different character to what she has yet perceived, now make their appearance; at first but few in number and only at long intervals, but by degrees they increase in severity and frequency; the discharge becomes more watery, the os and cervix uteri more painful and indurated, the general health more broken down, the stomach more irritable; in fact, symptoms threatening the commencement of schirrus are but too distinctly established. The nature

of these darting or lancinating pains, as they have been called, is but little understood ; they have been, and are, considered by many as peculiar to, and therefore distinguishing, that disease which is commonly called *cancer*, where a peculiar matter is secreted from the circulation and deposited amidst the natural tissue of the uterus, which it gradually takes the place of as it increases in extent, until at length the proper tissue of the organ has nearly or entirely disappeared, a new structure being left, in which the disease essentially consists. Darting pains, however, cannot be pronounced to be peculiar to this disease even in its earliest stage of induration, viz. schirrus, because we frequently see them of great severity in uterine affections where no organic disease exists, and especially in these forms of uterine gout and rheumatism. It is true they do not appear until the disease has attained a considerable duration and extent ; but it is equally true that they are here quite capable of permanent relief, which could scarcely be the case if they were essentially connected with schirrous induration. It seems more than probable that in these affections they partake of a neuralgic character, and are called into action by the sudden paroxysms of congestion which take place in a gouty condition of the part ; in this respect they bear a close analogy to the twinge of a

gouty foot, and to the darts of excruciating pain in tic douloureux depending on gouty or dyspeptic irritation. A similar fact as regards the stomach has been observed by Dr. Prout. "An excess of acid, and particularly of lactic acid, in the stomach, is sometimes accompanied by gastrodynia; that is, by rheumatic neuralgia, similar to that affecting other nerves of sensation. This happens most frequently in gouty and rheumatic subjects, in whom the exciting cause of the acid development has been some foreign indigestible substance*."

"In the worst instances of the disease, a general *cachexy* takes place; or the former bulk of health is partial; so that the lower limbs are wasted and weak, and the abdomen becomes large. The secretions are more or less vitiated. The bowels are in opposite states, but for the most part costive; and the bilious secretion is deficient and unhealthy. The hæmorrhoidal veins are often painful; and blood, either arterial or venous, is occasionally discharged; but, when in much quantity, it is venous and very dark†."

The urine undergoes a considerable change in its characters; instead of having a high specific gravity with excess of lithic acid and lithates, and probably also of

* Prout, 4th ed. p. 78.

† Scudamore, *op. cit.* p. 374.

urea, the specific gravity is now as much below the ordinary average as previously it was above. It becomes pale, of a slight opalescent hue, and by degrees the presence of albumen is manifested. The lithic acid and salts, which hitherto have been in excess, now gradually disappear; the urine becomes first neutral, then alkaline; the phosphates form chief of its saline ingredients, it passes quickly into putrefaction; at length these diminish, and the urine ultimately seems to consist of little else than water and serum of the blood, the functions of the kidney being nearly suspended.

The course which the symptoms follow is not always precisely as has now been described. Not unfrequently the disease appears to change its locality, and after having been located in the uterus for some time, it will fix itself on other organs, as the liver, lungs, &c., leaving the uterus quite free from the symptoms above described. These changes are frequently observed during the treatment of a case; the local remedies appear to dislodge the mischief from its original situation, which then seizes upon those parts which are weakest or most disposed to assume a diseased action.

In a large proportion of these cases of uterine gout there have been co-existing evidence of the gouty or rheumatic-gouty diathesis in other parts. Many pa-

tients have had inflammation and swelling of the knees, ankles, and also the smaller joints of the fingers and toes ; others have suffered on some previous occasion from rheumatic fever, from which they dated all their complaints. In some the local symptoms have been arrested, but they continued to suffer from frequent flushings and sense of burning heat, both in the extremities as well as in the trunk, (particularly in the abdomen,) intense headaches, and considerable derangement of the stomach, liver and kidneys. I think I may say, that in almost every instance the pains of the limbs are a very constant symptom, and, in some instances, form a prominent feature in the patient's sufferings.

It would be an interesting inquiry to ascertain the connection between the flushings and sense of burning heat and the excess of urea which is so frequently found co-existing in these cases ; the development of urea is probably one of the steps in the transition from arterial to venous blood, essentially connected with the evolution of caloric, by which the temperature of the body is maintained ; and as we know that in certain states of great atony and torpor of the whole system, as in chlorosis, the blood does not undergo the necessary changes during its circulation through the body, and that the animal heat here is very defective, we may also conclude that in

other derangements of the circulating system this function may be occasionally as unduly active as in other cases it is deficient.

In considering the treatment of these affections my object is not to point out new remedies, but to call the attention of the practitioner to the peculiar condition of the system on which they depend, and thus furnish sure and stable data on which to found his indications and course of treatment. It is of great importance that he should possess fixed and certain principles for his guidance in these cases, because, as the local affections are little more than part of a general diathesis, little permanent relief can be obtained for the one, unless an effectual impression be made upon the other; and, as in most instances, this must be a process requiring more or less time to effect, it is highly necessary that he should be able to understand the nature of the different symptoms and phænomena which present themselves, and refer them to their true causes, and thus afford him sufficient confidence in the plan of treatment he has adopted, in order to carry it out with patience and perseverance.

One source of difficulty in treating these diseases is the want of sufficient patience in giving the treatment, which is indicated, a fair trial. A valuable remedy is but too often condemned and abandoned, because after

a week or so it appears to have produced little or no sensible effect. In one case it has not had time enough to establish its full effects upon the system; in another it has not been sufficiently supported by auxiliary remedies to regulate the functions and maintain the tone of the system.

In some cases the peculiar characters of the disease are so masked by general derangement, as to require the chief attention to be directed to the treatment of this condition; by which means layer after layer, if I may so express myself, of extraneous symptoms are gradually removed, until the peculiar and unmodified characters of the disease itself appear.

The uterus also, from the close sympathetic connection which it maintains with the whole system, particularly with the abdominal viscera, soon becomes the cause, as well as the effect, of functional derangement, and thus produces a number of symptoms and affections, which, although they cannot be overlooked, and indeed frequently require direct and peculiar treatment, must never be permitted to absorb so much attention as to make the practitioner lose sight of the original affection.

The other pelvic viscera have been shown almost invariably to partake in the above-mentioned affections of the uterus, and hence it is important to bear in mind

that we may often produce a more favourable effect upon the uterine derangement by treating it indirectly through a neighbouring organ, than if we had confined our attention solely to the uterus itself; but it is upon the stomach, liver and bowels that we must make our early attacks, for until their function has been duly regulated, little hope can be expected of a favourable progress.

From the deranged and torpid state of the stomach, liver and bowels, which usually forms so prominent a symptom in the earliest periods of the case, the circulation becomes loaded with impurities to an extraordinary extent, requiring some little time before it can be relieved of its excrementitious matter. Our first step therefore must be to rouse these organs and excite them to greater activity of function. One active dose of calomel, of from five to eight grains, followed by a mild purge the next morning of rhubarb and magnesia, &c., will frequently produce a degree of general relief which could scarcely be credited. The tongue is cleaned, the breath has become pure, the colour improved, the limbs active and free from pain, the extremities warm, and a marked relief to the pain, tension and bearing down in the pelvis, which before had rendered her almost helpless. In some cases, however, so far from

relieving the symptoms, the calomel seems rather to increase them ; the tongue, which was moderately clean, is now furred, the bowels have been insufficiently acted upon, and the stomach seems to be more deranged than ever, with the addition of nausea and disposition to sickness. A repetition of the dose is here indicated, and now the action of the purgative afterwards will bring away a vast quantity of dark unhealthy feculent matter with proportionate relief. Even where the bowels are stated to be pretty regular in their action, the precursory dose of a mercurial purgative ought not to be omitted. The action of the medicine here is not merely to expel the contents then existing in the bowels, but to cause them to separate from the blood a large amount of excrementitious matter, producing infinite relief to the feelings of the patient, and general improvement in the functions themselves. Our object is "to unload the gorged circulation of the stomach, liver and bowels, of the noxious excrementitious matters which nature has brought to these emunctories, in order that they may be discharged from the system. It is in these cases where, although little or no food has been taken for some time, and without any evidences of faecal accumulation, we find the exhibition of certain purgatives, especially calomel, to be followed by such copious fecu-

lent evacuations, which we have every reason to believe have been secreted by the liver and bowels under the action of this powerful remedy*." The green slimy but feculent evacuations, which are sometimes discharged in such astonishing quantities by an active dose of calomel, do not appear to be so much the result of increased action of the liver, as of the upper portions of the intestinal canal, a fact pointed out by Dr. Holland.

If there be marks of hæmorrhoidal congestion, a little sulphur præcipitatum may be added to the magnesia instead of the rhubarb, it forms a mild laxative combination which is well adapted for cases of this sort.

If the general pelvic suffering be attended with heat, pain, throbbing, and sense of swelling about the rectum, or well-marked hæmorrhoids are distinctly visible, the application of leeches to the anus, followed by a warm semicupium to promote the bleeding, is strongly indicated. As I have before stated, we rarely see symptoms of uterine congestion, when attended by marks of lithic diathesis, without more or less of hæmorrhoidal congestion, and it is a circumstance which may be turned to good account in the treatment of these cases, by

* Library of Pract. Med., vol. vi. p. 286.

drawing blood from the engorged uterine vessels through the medium of those of the rectum, for I am quite convinced that in many instances we relieve the uterine symptoms more perfectly by the application of leeches to the anus than if we had done so to the uterus itself; a circumstance which may readily be supposed when we bear in mind the close connection with each other of the venous plexuses which surround the lower portions of the pelvic viscera.

The advantages of applying leeches to the anus in cases of this nature, which are attended with torpid and overloaded abdominal circulation, although well appreciated upon the continent, have not been sufficiently estimated in this country. I have long felt convinced that the functions of the abdominal viscera, under these circumstances, may be greatly relieved by abstracting blood from the hæmorrhoidal vessels, and that the action of alterative and laxative medicines are remarkably facilitated thereby. This view is confirmed by the high authority of Dr. Holland, who, in speaking on the abuse of purgative medicines, observes, "I doubt not that in various cases of visceral obstruction, inflammation and disease, much more might be attained by drawing away blood from the hæmorrhoidal vessels than by the methods of treatment generally in use. Looking

to the connection of these vessels with the circulation through the liver and bowels, it is a strong presumption (and my experience justifies me in stating it) that no given quantity of blood can be abstracted elsewhere in cases of this nature with equally good effect. The remedy particularly deserves trial in topical inflammation with obstruction, and the influence of the state of the liver upon hæmorrhoids gives some proof of what may be obtained in disorders of this organ by bleeding from the vessels of the rectum*.”

The first application of leeches is not always attended with relief; the vessels seem to bleed with difficulty, and scarcely any blood flows away after the leeches are filled, even though aided by fomentations and the hip-bath. A repetition of them in a day or two is usually attended with very different success, and a considerable amount of dark-coloured blood is obtained with great relief. The sense of congestion and fulness about the pelvis, the bearing down pain of the uterus, the throbbing and sense of swelling about the rectum and vagina, the peculiar and painful closed-up feel of this latter canal, and the inability to move about or even sit down without pain, all disappear, and leave the patient for a time entirely freed from her sufferings.

* Medical Notes and Reflections, by H. Holland, M.D., p. 105
(note)

Where it is possible, we should endeavour to select the time for applying the leeches, either just before the next appearance of the menses, or equidistant between the two periods, at which time a distinct access of vascular excitement and pain in the uterine region and pelvis is frequently observed; so much so, that in some cases of considerable standing and severity, the pain which commences at the half-way time will continue with scarcely any interruption until the catamenial period is completed. By thus fixing the application of the leeches to certain periods, we anticipate the attacks of pain, and, by relieving congestion, enable the uterus to exercise its periodic function more fully and with greater ease.

If the inflammatory action be chiefly situated in the os and cervix uteri, leeches may be applied directly to the part by the tube which has been brought into use by Dr. Locoek for this purpose; but even in these cases, if there be much hæmorrhoidal congestion, leeches to the anus, as already directed, will be more effectual and convenient.

The vagina may be syringed with some emollient and sedative injection, the poppy-head decoction is one of the simplest of the sort; and if there be much discharge, or if it be watery and of an inflammatory cha-

acter, it may be conjoined with the liq. plumbi diacet. In some cases the passage is too irritable and swollen to bear the introduction of an instrument, in which case some almond oil mixed with a little extract of poppy, or liq. opii sedativus, may be applied by a camel's-hair pencil without difficulty.

For a few days the action of the calomel may be kept up by a dose of blue pill or Plummer's pill at night, the magnesia or some other laxative saline continued in the morning to regulate the bowels, and the tone of the stomach strengthened by the nitro-muriatic acid, with or without a vegetable tonic.

The attention of the practitioner must now be devoted to the more specific treatment of the case. If the circulation be plethoric and strong, the urine scanty, high-coloured, with considerable excess of lithic acid and lithates, colchicum in the form of the acetous extract, with extract of hop or henbane, may be given at night, or night and morning, and some mild saline with sp. ætheris nitrici occasionally during the day.

The salines, as recommended by Dr. Prout, are well worthy of attention; they not only diminish the disposition to the formation of lithic acid during the processes of primary assimilation, but allay the irritable state of the digestive organs, and the urine becomes increased

in quantity and more healthy in its characters. "I generally," says Dr. Prout, "prefer the carbonate of potash to the liquor potassæ; in those, however, who are incommoded by the carbonic acid extricated from the carbonate, the liquor potassæ is preferable. In almost all instances, likewise, I associate the potash with a few grains of nitre; from the sedative effects of which on the morbid irritability of the stomach usually present, the utmost benefit is often derived. In general, I make no other combination, and think that when alkalies are given as mere antacids, they are best exhibited alone. By giving alkalies in combination with tonics, the good effects of both are often lost; but their separate use is often highly beneficial. Thus I often give tonics (even the mineral acids) before and between the meals, at the same time that alkalies are taken after meals; and with the best effect. When it is necessary to give alkalies with reference to their diuretic as well as their antacid effects; or where more than usually powerful antacid effects are indicated, the alkalies may be often advantageously combined with a vegetable acid; such as the citric, tartaric, or malic acids. In this case the alkalies may be either administered still, or in an effervescing form, as the circumstances of the patient may require; they may be also beneficially combined

with some other diuretic, such as the spiritus ætheris nitrici, the spiritus juniperi comp., &c. This mode of exhibiting alkalies, it need scarcely be stated, is particularly indicated in cases of great irritability of the stomach; or of febrile action, accompanied by scanty and high-coloured urine of more than usual acidity*.”

The diet of the patient must be simple, and the hours regular. Animal food once a day is generally quite sufficient; a fact which the patient herself soon begins to learn by the presence of lithic acid or lithate of ammonia in the urine, when it cools, being invariably observed where she has transgressed in the quantity of animal food. Soups and broths are not desirable, more especially the rich gravy-soups of this country. Animal food in a condensed form is poured into an empty stomach as the first stage of a meal; and, from being fluid, probably passes the pylorus before the necessary changes have been effected by digestion. Hence it is that, in a weak stomach, uncomfortable repletion is frequently produced by a moderate meal which has been commenced with soup; whereas, if the same quantity of food had been taken without the soup, no such effects would have been perceived. It may be explained on these grounds why the digestion of animal decoctions is greatly facili-

* *Op. citat.* 4th edition, p. 212.

tated by being mixed with rice, pearl-barley, &c., or taken with a sufficient quantity of bread. Beef, mutton and poultry are the forms of animal food best adapted for the weak digestive powers in these cases, and may be sufficiently varied by cookery to be agreeable to the patient.

The vegetables ought to be only of the most digestible kinds, among which potatoes (especially new ones) cannot be reckoned. Plain boiled rice is an excellent substitute for vegetables, and is very palatable with every form of meat. Pastry and sweets of all sorts are bad, not only from being ill-adapted for conversion into healthy chyme by a feeble stomach, but also, from being usually taken when the first and natural appetite has been satisfied, are equally injurious from the repletion they produce. Fermented liquors are rarely to be permitted, particularly malt liquors; a little sherry, or in summer time claret and water may be conceded, not recommended. The patient will do well to restrain her thirst while eating, and in about two hours afterwards to allay it with some soda-water, rendered still more alkaline by a few grains of carbonate of potash. Fruits are seldom admissible, particularly after the chief meal of the day, as is usually the case in this country; under such circumstances they injure, not merely by adding to the

repletion already existing in more or less degree, but by adding a considerable quantity of acid and saccharine matter to the food already taken, must interfere considerably with the process of digestion. Sugar in almost every form is apt to produce flatulence and acidity; and a patient soon finds by experience that a cup of good black tea produces far more permanent refreshment without than with sugar, and is less apt to leave an unpleasant taste in the mouth afterwards. She would also do well to eat brown instead of white bread, not merely on account of its well-known laxative effect, but also because it is less likely to produce acid in a weak stomach than white bread is. It is not, however, my intention to enter further into dietetic details; I must refer the reader to the various works in which these subjects are more specially considered, particularly to that by Dr. Prout, which contains a large amount of experience in diet and regimen in connection with the very diseases now under consideration.

Too much attention cannot be paid to a healthy state of the skin in all these affections, for it is an organ which, when in full action, by no means yields to the kidneys and mucous membrane of the intestinal canal in its power of ridding the system of those principles which are the products of mal-assimilation. To compen-

sate for, and equalize, the alternations of temperature, it is highly important that a good non-conductor of caloric, like wool, should form the materials of the clothing in immediate contact with the skin; in other words, the patient should wear flannel, or, what is better, the "*elastic merino*," which being a mixture of wool and cotton, is preferred from its producing no irritation. A healthy condition of the skin must be still further insured by daily and copious ablution of the whole person, and by active friction afterwards. The water at the temperature of the atmosphere may be borne with perfect safety during a great portion of the year, even by the most delicate; and where this system has been commenced during the summer months, it may be continued through the winter with a very moderate addition of warm water during the severest part. Friction with a towel impregnated with salt adds greatly to the tonic effects upon the skin, and brings it into an active flow of healthy circulation.

There can be no doubt that a considerable portion of the good effects of hydropathic treatment are owing to the healthy state of the skin which is established by this system of bathing, diluents and exercise; and I am convinced that I have seen very beneficial effects produced by a patient drinking a full-sized tumbler of cold

water an hour or two before rising and performing the ablutions, &c. above-mentioned; the dry, rough skin becomes soft and moist; the high-coloured scanty urine more copious and pale; the aching lassitude of the limbs is diminished, and the action of the bowels decidedly promoted.

As the more acute symptoms gradually yield, fresh indications will arise to modify the nature of the treatment. The disease has lost some of its characters, but has added others. The treatment may have succeeded in modifying the gouty symptoms, which formed the chief features of the disease at its commencement, or it may have assumed more of a rheumatic character from exposure to cold, damp, and other exciting causes of this disease. Never very strongly marked by distinctive characters from each other, the rheumatic and gouty symptoms in these cases frequently become so mingled with each other as to form a compound disease called rheumatic gout.

“As the lactic acid,” says Dr. Prout, “developed principally during a secondary mal-assimilation of the gelatinous textures was considered as the characteristic feature in rheumatism; so the lithic acid, developed principally during the mal-assimilation of the albuminous textures, may be considered as the characteristic

feature in gout. Moreover, when the lactic and lithic acids are developed together, as they may be, and often are, the phenomenon may be supposed to show that the mal-assimilation involves both the gelatinous and albuminous textures; and that the accompanying disease partakes of a mixed character; or, in fact, constitutes what is not improperly termed *rheumatic gout*,—a form of disease, which every one knows, is usually of a much more deep-seated and obstinate character than either gout or rheumatism alone*.” Thus in many of these cases, where the rheumatic or rheumatic-gouty diathesis prevailed, I shall have opportunities of showing that urea existed in the urine in considerable excess; whereas in others, where the gouty character predominated, lithic acid abounded; and these facts, in combination with other concomitant symptoms, have guided the treatment accordingly.

Where the disease assumes the rheumatic or rheumatic-gouty character, we usually find it associated with less power of general circulation, and with local symptoms of less active character. Guaiacum and iodine are valuable remedies in these affections, either separately or combined. The tinctura guaiaci ammoniata may be taken in milk night and morning; or 10 grains of

* *Op. citat.* p. 203.

pulv. guaiaci and of magnes. carb. every morning, and from 2 to 5 gr. of potass. iod. with ext. of hop or henbane at night; or if it be deemed unnecessary to use the guaiacum, the potass. iod. may be given two or three times a day in sarsaparilla with liq. potassæ, and the bowels regulated by an alterative or laxative pill at night; or, if it be desirable to promote diaphoresis, by a dose of Dover's powder.

There are few remedies which keep up a healthy action of the liver so well as the taraxacum, especially when preceded by a dose or two of mercurial medicine. In most of the affections under consideration, where it is important to maintain this function in due activity, and yet where the *constant* use of mercurials is highly inexpedient, taraxacum becomes a valuable adjunct. It is prepared under a variety of forms, but I prefer the extract as being the most certain and convenient; half a tea-spoonful at night, dissolved in a little warm milk, forms a by no means disagreeable cocoa-like drink; or it may be taken with milk and lime-water if necessary. Besides its ordinary effect on the liver, and therefore indirectly upon the bowels by supplying them with healthy bile, I have reason to think that it also acts upon the skin like sarsaparilla, and for this purpose may sometimes be advantageously combined with it.

A mild but dry atmosphere is of great importance, from its favourable action upon the skin; this should be combined, if possible, with the use of some alterative saline mineral water. The Cheltenham and Bath waters answer this purpose very well, and assist the kidneys and mucous membrane of the bowels to throw off a large quantity of excrementitious matter from the system. A variety of saline combinations may be made in imitation of these waters, and taken hot or cold according to circumstances. The great point is, that they should not be swallowed down like a dose of physic, but in small quantities at a time, or even sipped, while the patient is taking exercise; by this means the medicated fluid is presented to the absorbents more gradually, and neither so liable to oppress the stomach nor to be thrown off by the kidneys; whilst the skin takes its due share in the increased excretory action which is now excited.

The combinations from which I have derived the greatest advantage in these cases have been the muriates of soda, lime and magnesia, with sulphate of soda, and a certain proportion of iodine. The muriate of lime, as an alterative, and I suppose also a deobstruent, having been extolled beyond its merits in scrofulous and other affections, has suffered the fate of many such remedies, and sunk into entire neglect. When taken

largely diluted, it evidently exerts a soothing effect upon the mucous membrane of the bowels, and seems to act thus by producing a healthier, and therefore less irritating secretion from its surface. This is frequently seen in cases of considerable mucous irritation, threatening even ulceration, as is seen towards the end of long fevers, or in cases of severe constitutional irritation, as from organic disease, &c. The good effects of lime-water with milk or sarsaparilla is well known here, but the quantity of lime taken in this form is far too minute to have any effect in neutralising the acid contents of the stomach or bowels, and may be supposed, with tolerable certainty, to be in most instances converted into the muriate before it quits the stomach; hence we may presume that the beneficial effect of lime upon the mucous membrane of the bowels is chiefly exerted under the form of the muriate. Whether the muriate of lime acts also upon the liver I cannot say with certainty, although I have reason to suspect it does.

The efficacy of these saline combinations is decidedly increased by being taken warm; and although some of the iodine is apt to be volatilized when used in its simple form, as in the tincture, still a sufficiency will remain to produce its effects. The following form I have frequently prescribed, and with excellent results: when

taken hot, its taste considerably resembles that of the hot spring at Wiesbaden.

℞ Calcii chloridi, Magnesii chloridi* āā ℥ii.

Sodii chloridi, Sodæ sulphatis āā ℥vj.

Tincturæ iodinii ℥iss, aq. puræ ℥viiij solve.

Sumat cochl. magn. j bis die ex cyatho aquæ calidæ inter agendum.

In other cases, especially where the bowels have been torpid and unhealthy, the regular use of sea-water internally has been found of great service. Two small tumblers taken before breakfast, at the interval of half an hour whilst walking, will act effectually but gently upon the bowels; and although the appetite for breakfast may be somewhat spoiled at first, the stomach soon gets accustomed to it, and the appetite improves. It is in many of these cases that a course of sea-water will continue to bring away for many days in succession large quantities of unhealthy excrementitious matter from the bowels to an extent altogether disproportionate to the ingesta; in this respect closely resembling the Cheltenham waters of this country, and particularly those of Carlsbad and Marienbad abroad.

* This quantity of the magnesian salt may be obtained with sufficient correctness for all practical purposes by dissolving ℥i of carb. of magnesia in dilute hydrochloric acid, and then evaporating to dryness to expel the free acid.

Besides the general treatment which has now been recommended in gouty or rheumatic affection of the uterus, much may be done to relieve the paroxysms of suffering which so frequently attend the menstrual periods. During the last thirty-six or forty-eight hours before the appearance of the catamenia, the action of the bowels should be somewhat increased by a saline laxative; she should use a warm hip-bath every night, and, when the pain sets in, some mild sedative combined with camphor should be given. Although opium is an admirable remedy in these cases, as far as the pain is concerned, yet, as it never fails to disorder more or less the stomach or bowels, I prefer trying other sedatives before having recourse to it. Equal parts of camphor, ext. of lettuce and hop has proved a very useful combination, and I have seldom known it fail in relieving pain; two pills should be repeated every two hours until the pain abates, which is generally the case before a third dose is required. How far the Indian hemp may be adapted for this purpose must remain to be proved by experience. Much depends upon removing, by means of leeches, salines and warm bath, &c., as far as possible, everything like irritation and inflammatory action from the system before the paroxysm comes on; and it is more frequently from want of attention to this point,

than from insufficiency in the dose or strength of the sedative, that the pain continues its course in defiance of the measures adopted.

The temporary excitement of the system, which is usually observable at the half-way time between the menstrual periods, ought also to be carefully noticed, and any symptoms of general or local excitement allayed which may then appear; the effects of this will usually be perceived in the milder character of the next period; the pain becomes less severe, the discharge more free and florid, and the exsudations less in quantity.

During the treatment of the case, and especially when the patient has been some time under the use of tonics, this half-way period is occasionally attended with severe abdominal pain and intestinal irritation, amounting almost to a state of enteritis, accompanied with much flatulent distension and purging, and occasionally relieved by a sudden discharge of menstrual fluid. It would seem, from the circumstances under which I have observed these attacks to occur, that the irritable system would not bear anything beyond the most gradual increase of tone and general strength without showing a disposition to take on a state of high vascular and nervous irritability, if not actual inflammation, at certain periods favourable for the manifestation of such efforts. These attacks

I have chiefly observed during the treatment of severe and long-standing dysmenorrhœa, where the system had become habituated to this morbid state of circumstances. They ought to be treated with due regard to their peculiar nature and cause; local depletion is scarcely ever necessary; the immediate paroxysm will yield to mild laxatives, diaphoretics, fomentations and warm bath; after which the tonic must either be discontinued for a while, or modified by gentle salines and antimonial medicines.

In many of these cases, as I have already stated (p. 39), the dysmenorrhœal attacks are associated with symptoms of considerable inflammatory action in one or both ovaries. The patient complains of severe shooting pains coming on in paroxysms, the part of the groin corresponding to the situation of the ovary being painful on pressure, with sense of throbbing, fulness and heat. She is unable to bear the erect posture, from the skin of the part, being now put upon the stretch, producing considerable pressure on the inflamed organ. It is attended with much irritability of the uterus as well as of the bladder and rectum; the degree in which the last two organs are affected depending in great measure upon how far it is the anterior or posterior portion of the ovary which is most affected; thus, where the

anterior half is the seat of inflammatory action, the pain extends to the bladder, with much irritability of this organ, and even strangury. On the other hand, if the posterior half of the ovary be chiefly affected, the pain is deeper seated and extends backwards to the rectum, with disposition to tenesmus and irritability of that bowel. When enlarged by congestion or inflammation, the ovary can be distinctly felt by the finger per rectum projecting like a knuckle at the side of the uterus and intensely tender to the touch.

Where inflammation of the ovary has come on in consequence of the discharge being suddenly suppressed during a menstrual period, as from cold or other causes, it commonly assumes the acute character, and is attended with severe local pain and general febrile excitement; if seen early, the ordinary treatment for suppression of the menses, viz. by hip-bath, warm diluent drinks and a warm bed will frequently be sufficient to restore the interrupted function to its former activity; if not, local and general depletion and other antiphlogistic means must be adopted, the further consideration of which scarcely belongs to the present subject. In other cases it generally assumes a sub-acute or chronic character, and then requires a very different treatment.

It is a difficult thing to say, in cases where oophoritis

is associated with dysmenorrhœa, especially of the rheumatic or rheumatic gouty character, what is the precise relation between these two affections. Both organs seem to be in a state of considerable congestion, as has been already stated, and which, from their being so essentially connected with the function of menstruation, renders them peculiarly liable to high irritability, or even inflammatory action, at the catamenial periods; accordingly we find that at these times there is severe and shooting pain about the groin, and all the symptoms of ovarian congestion or inflammation; these are relieved more or less by the discharge, but generally leave the ovary in an irritable painful state, which, after a few repetitions of such attacks, begins to assume the decided characters of inflammation.

I have before stated that in oophoritis connected with arthritic dysmenorrhœa, the inflammation is usually, if not always, of a subacute or chronic character. In many cases where the affection is slight, the treatment already described for restoring the uterus to a healthy state of function will be sufficient: the catamenial periods return to a natural state, and the ovarian symptoms generally diminish.

Where, however, the symptoms of ovarian inflammation are well marked, and appear to be but little relieved

by the periodical evacuation; or where it seems that the dysmenorrhœal state is kept up by the affection of the ovary, our attention must be early directed to this point, and appropriate measures adopted for its removal. Leeches or cupping to the part afford but little relief. I know of no remedy so effectual in these cases as friction with the tartar-emetic ointment, if carried nearly to the extent of producing a slough. It is true I once applied leeches per rectum to the ovary itself with some degree of relief, but this was under different circumstances to those which I am now considering, and I have scarcely ever seen the antimonial ointment fail if carried to the proper extent. Mercurial inunction, which is beneficial in the acute form, after the inflammation has been reduced by local bleeding, does not appear to produce any permanent effect here; nor is it a desirable remedy in the state of the system which accompanies these attacks.

Lastly, it must be borne in mind that the affections which have now been described, being in fact little else than the local symptoms of a general diathesis or condition of the system, will require great patience and watchfulness in their treatment. A habit of the system, not merely a local disease, is to be overcome, and even under the most favourable circumstances, a considerable

period of time is necessary for this purpose. The system must, as it were, be accustomed to bear the improved tone of its functions and healthy state of its circulation with impunity, and this can only be effected by cautious and patient management. Under favourable circumstances success is very fairly certain and complete, but where the disease is the result of deep-rooted mischief in the functions of assimilation (especially the secondary), where the powers of the system have been radically affected, and its stamina sapped from their very foundations by a state of long-continued, and now habitually deranged and defective nutrition, we must scarcely venture to look forward to ultimate success. For a while the system answers satisfactorily to the effects of remedies and general treatment, and if an entire change of circumstances, as the removal to another climate, &c. can be obtained, such an improvement may be effected as may warrant the hope of a favourable issue. Too often, however, is this important step deferred till the mischief has gained fast hold upon the constitution; and when at length decided upon, the rapidly failing health shows that it has come too late.

In other cases, after going on favourably for a time, the treatment begins to lose its influence upon the disease, and yet seems to be too much for the breaking

powers of the system ; or the local symptoms which at first threatened to pass into organic uterine disease, and which yielded successfully to the treatment employed to arrest its progress, now return to the attack in some other and weaker organ, probably the lungs, and marasmus, advancing with rapid strides, tells us but too clearly that the last flickerings of life are coming to a close.

As most of the following cases for illustrating the remarks of the preceding chapter on the connexion between the rheumatic and gouty diathesis and certain uterine derangements, extend over a considerable period of time, they have, with one or two exceptions, been much condensed, in order to give the reader as short and comprehensive a view as possible of their symptoms and the treatment employed.

CASE 1.

Mrs. L., æt. 30, once pregnant but miscarried.

April 26th, 1841.—Pain and fulness of right hypogastrium, increased when the bladder is full. Pain extending from the region of the kidneys, numbness of the thigh, irritability of the bladder ; high-coloured and loaded urine ; pain across the abdomen above the pubes. Leucorrhœa, occasionally albuminous ; much heat ; throb-

bing and fullness of labia and vagina, both of which are very flabby; complains that the vagina feels closed from the swelling and relaxation of the part; walking produces painful friction; rheumatic pains in all her joints and limbs; much gastric derangement; evacuations dark and offensive; has piles and much congestion about the rectum; slight spitting of blood and constant expectoration of viscid mucus.

℞ Hydrarg. chlorid.

Ext. hyoscyami āā. gr. v. hâc nocte.

℞ Pulv. guaiaci, gr. viii. Ext. colch. acet. gr. ij. ft. pil. ij. o. n.

℞ Acid. hydrochlor. dil. Acid. nit. dil. āā. ℥i. Tæ. hyoscyami ℥ii.

Syrup. aurant. ℥ss. Infus. gent. co. ℥vii. misce.

Sumat cochl. magn. ij. ter die. Hirud. iv. ano.

May 1st.—Leeches bled well and medicine acted freely; less irritability of bladder. Urine more clear. Limbs and joints less painful; little or no pain of right side; slight pain across the pubes. Bowels confined.

Rep. pil. guaiaci et colch. rep. mist. ℞ Infus. ros. c. magnes. sulph. o. m.

I have given this short case nearly verbatim from the notes I took at the time. The state of passive congestion about the vagina, and peculiar swollen and closed

condition which I have described, were strongly marked. The rheumatic pains of limbs, the loaded urine and irritation about the bladder and kidneys, showed that these organs were suffering from the highly deranged condition of the assimilating functions. The congested circulation of the mucous membranes which accompanies this state was indicated by the viscid mucous expectoration, by the slight spitting of blood, and the hæmorrhoidal congestion of the rectum. There was no symptom to make me suspect that this mucus came from anywhere else than the throat; it was hawked, not coughed, up, and the few traces of blood which were stated to have appeared seemed to come from the same source.

CASE 2.

Mrs. C., a young Indian lady of very delicate frame, whom I attended a year ago in premature labour at the eighth month, has since that event suffered much from dysmenorrhœa.

November 21st, 1840.—Complains of pain in her left knee and wrist, and general aching of limbs; much irritation about the os externum, bearing down pain, with sensation of the vagina being closed by internal swelling and relaxation of the parts. Leucorrhœa. Bowels very irritable, almost amounting to dysentery.

States that the water latterly has been clear. Tongue dry; spirits depressed.

Has suffered from the bearing down, swelling and fullness about the vagina since February. Had an attack of nephritis six weeks ago in Scotland, and still feels pain occasionally in the region of the vagina. Urine has for some time abounded in lithates. The last menstrual period commenced with great pain, which I relieved by pills of camphor, ext. lactucæ, ext. lupuli, equal parts.

℞ Sp. ammon. arom. ℥ xxv. Confect. arom. gr. x.
Mist. cretæ ℥ iss. quartis horis. Pil. hyd., pulv.
ipec. c. āā gr. v. h. s.

December 1st.—Still some pain and bearing down; the state of the stomach and bowels much improved; urine natural.

℞ Tinct. guaiaci ammoniatæ cochl. med. j. ex lacte
om. nocte, Rep. mist. cretæ.

December 15th.—The guaiacum has agreed well. The bowels seem quite in a natural state. She has lost the sense of bearing down, heat and fullness about the vagina. The catamenia have again appeared, during which she used the camphor, lettuce and hop pills, with complete relief. Has still pain of limbs, but is cheerful and feels well. Dislikes the guaiacum.

Omitt. Tinct. guaiaci amm. ex lacte. Contin. mist. cretæ.

℞ Pulv. guaiaci gr. iij. Ext. colch. acet. gr. j. ft. pil. j. Mane et nocte.

December 31.—Has still the sense of vaginal swelling and congestion, although in a less degree; has a disposition to erysipelas of the face, which comes and goes with the state of her general health. Bowels rather confined; tongue dry; headache; urine natural; expects the catamenia in ten days. Omitt. pil. guaiaci et colchici et mist. cretæ.

℞ Pil. hydrarg. Ext. coloc. co. Ext. gentianæ, āā.
 ℞i. misce ft. pil. xij. Sumat ij. h. s. p. r. n.
 ℞ Ext. sarzæ co. fluid. cochl. med. i. ex liq. calcis cochl. magn. ij. t. d.

January 7th, 1841.—Much better; has been taking an overdose of the sarsaparilla, which, with the bowels being rather confined, has produced fullness of head. The catemerial period is close at hand.

℞ Hyd. chloridi. Extr. hyosc. āā. gr. v. hâc nocte.
 Contin. sarza c. liq. calcis.

The calomel acted well with much relief. I discontinued the sarsaparilla and lime-water for the infus. gent. co. with nitric acid.

February 11th.—Expects the catemerial period in two or three days; much bearing down and throbbing on

walking; much leucorrhœa; state of digestive organs much improved.

℞ Hyd. chloridi. Ext. hyosc. āā. gr. v. hâc nocte.

February 26th.—Menstrual period passed with little or no pain; has used the lotio plumbi to check the leucorrhœa with considerable relief.

The next period also passed under similar treatment, and with great ease; the vaginal congestion had also ceased, although she had suffered a relapse of the former symptoms from having been exposed to much anxiety of mind. I now substituted a mild form of chalybeate for the gentian and nitric acid which she had been taking: the health gradually improved. I increased the strength of the steel medicine, and as the season advanced she went for a time upon the Continent and visited the baths of Kissingen.

I regret that, at the time when this case came under my notice, I had not turned my attention to the close examination of the urine, which I have done since, as it would doubtless have elicited many important features, which would have greatly assisted me in the treatment. The swollen and closed state of the vagina from passive congestion were strongly marked here, and its true character shown by the general rheumatic symptoms which existed at the time. The mucous membrane of

the vagina was in the state of irritation and increased secretion which generally attends this condition of the system, and a similar state of that which lines the bowels existed to a still greater degree.

The urine appears to have been but little affected during the period over which this report extends, in proportion to the degree of the rheumatic symptoms, and I attribute it in great measure to the increased action of the bowels rendering them the chief emunctories of those results of mal-assimilation which otherwise must have been thrown off by the kidneys.

The effects of the guaiacum were well marked, and paved the way to the use of sarsaparilla and afterwards of tonics; and these were gradually increased from the simple bitter with mineral acid to steel medicines.

The management of a menstrual period is very important in cases of this kind, for more can be done at these times to eradicate a morbid diathesis or habit of body than at any other. Hence we generally gain a decided step by rousing the functions of the chylopoietic system to brisk action just before the accession of a menstrual attack; the periodical congestion is greatly relieved, and the suffering and constitutional disturbance are much diminished.

CASE 3.

Miss E., æt. 24.

January 9th, 1841.—Pale and delicate; is now suffering from an attack of dyspnœa exactly like that of asthma. An hour or two before my arrival it had amounted to very distressing orthopnœa, but a perspiration has followed some medicine which her medical attendant ordered; the expectoration became freer, and she now breathes more easily.

Pulse 100, irritable. Tongue with a thick white fur and clean edges (has taken a dose or two of blue pill); has no pain of chest even on coughing or full inspiration; air-passages much loaded; no crepitation. Urine scanty, high-coloured, and loaded with lithates. Bowels open.

Has long been subject to dysmenorrhœa, the attacks of which have generally been preceded by a cough; she is hysterical, with globus and much flatulence; has lately had much rheumatic pain of her limbs.

℞ Ext. colchici acet. gr. ij. Ext. lupuli gr. vj. ℥ ft. pil. ij. sextis horis sumend.

℞ Liq. ammon. acet. ℥j. Sp. ætheris nit. ℥ss. Vin. antim. potass. tart. ℥ xv. Mist. camph. ℥iss. Misce ft. haust. cum pil. sumend.*

* I had wished to have prescribed a draught of sodæ carb. sp. ammon. arom. et sp. æth. nit. ex mist. camphoræ, but the medical man opposed it, and seemed a little surprised at my ordering colchicum.

January 10th.—The mixture has sweated her a good deal without much relief, producing much debility; the pills were not given, and she had a return of the dyspnœa. Urine scalds her and is very thick and scanty. I gave her some sodæ carb. et sp. ammon. arom. in soda water, and ordered the pills to be taken immediately, and that she should repeat the sodæ carb. and ammonia in soda water whenever she wished to drink.

January 11th.—The colchicum vomited and purged her a good deal. Pulse soft and weak but slower; breathing better. Urine still scanty and thick.

℞ Sodæ carb. gr. x. Sp. ammon. arom. ℥ xxv. Sp. ætheris nit. ℥ xl. Mist. camph. ℥ iss.
Misce ft. haust. sextâ quâque horâ sumend. Let her drink soda water.

January 12th.—Slept well; pulse and breathing much better; urine copious and clear.

℞ Hydrarg. c. creta, gr. v. Morphiæ hydrochl. gr. $\frac{1}{3}$.
h. s.
℞ Infus. gentianæ co. ℥ iss. Acid. nitrici dil. Tinct. hyoscyami āā. ℥ xv. Syrupi aurant. ℥ j.
Misce ft. haust. ter die sumend.

I took my leave after this and advised the medical attendant to put her upon the use of sarsaparilla as soon as he thought the stomach would bear it.

In this case we see dysmenorrhœa and asthma in

close connexion with the gouty diathesis. The asthma appeared to be nothing more than the mucous membrane, which lines the air-cells and passages, becoming so swollen from the sudden metastasis of gouty congestion as seriously to impede respiration. The absence of pain on coughing or inspiration as deep as she could make it, and the wheezing respiration without crepitation, indicated the nature of the pulmonary affection, while the loaded urine and pains of limbs proved the existence of gouty or rheumatic diathesis.

The manner in which colchicum acts in these cases has been variously explained. It has been considered by many to be a sedative; and certainly its power of relieving pain when locally applied would seem to prove it to be so; but I have long had reason to think that when taken internally its chief action is in promoting the secretion of the mucous surfaces. In the bowels it decidedly has this effect—ensheathing the fæces in smooth albuminous mucus very similar to what is thrown off in a gouty condition of these membranes; whether it also produces a secretion of gas from the mucous membranes of the bowels, as I have shown to take place in the gouty diathesis, I cannot say with certainty, although a fact which I have for many years observed, viz. that in patients taking colchicum the

fæces float with a remarkable degree of buoyancy, would seem to prove it. Colchicum also possesses considerable expectorant powers, probably from a similar action on the mucous membrane of the lungs, and in cases of early phthisis is a valuable remedy for relieving the tight cough and promoting the secretion of mucus. In the kidneys it appears to act by promoting the discharge of lithic matter, and therefore the question may be fairly asked, whether the increased mucous secretion which is known to prevail in the gouty diathesis, and also to attend the internal administration of colchicum, is not an effort of nature to relieve herself of mal-assimilated albuminous matter, which, if it had been sent to the kidneys, would have been thrown off in the form of lithic acid, lithate of ammonia, urea, &c.

CASE 4.

E. J., æt. 38, has had seven children and four miscarriages; rather stout, and of a ruddy complexion.

Has been under my treatment some months for leucorrhœa with darting burning pains of pelvis, increased by constipation, straining, or sitting down suddenly. The os uteri was not painful to the touch, but there was evidence of much general pelvic congestion. Leeches to the anus appeared to give little immediate relief, but

her symptoms improved under occasional doses of calomel, salines, and decoct. papaveris c. lotionē plumbi as an injection. A considerable degree of hæmorrhoidal fullness still continued with turbid urine, and frequent escape of flatus from the vagina with more or less gastric derangement; for which alteratives and tonics were ordered.

December 17th, 1842.—The urine passed at night was found to contain excess of urea, much lithate of ammonia, and a considerable quantity of oxalate of lime crystals; sp. gr. 10.27. She was directed to take salines with Dover's powder at night for a short time, when she was put on the following medicine:—

℞ Potass. iodidi gr. v. Liq. potass. ℥ x. Decoct. sarzæ co. ℥ii. ft. haust. ter die sumend.

On this she improved considerably, although without any alteration in the urine, which still showed excess of urea, copious lithate of ammonia, and sp. gr. 10.31.

January 14th, 1843.—Suffering much pain about the hips, increased on sitting down or passing fæces. Much fullness and throbbing about the rectum; much thin leucorrhœa; it is the half-way menstrual period. Urine on the 28th had a sp. gr. of only 10.26, with but a slight excess of urea.

The mixture of potass. iod. liq. potass. and sarza was

discontinued about the middle of February; she was much improved in general health but felt weak, had lost flesh, and the uterine flatus still continued.

℞ Ext. taraxaci cochl. min. $\frac{1}{2}$ om. nocte ex lacte.

℞ Acid. hydrochlor. dil. Acid. nitr. dil. āā. ℥ vij.

Inf. gentianæ co. ℥ iss. misce ft. haust. ter die sumend.

Her health now improved greatly, and it is to be feared that the increased appetite led to a return in the unfavourable condition of the urine; its sp. gr. was 10.33, with immense excess of urea, copious lithate of ammonia, phosphates, oxalates, &c. The consequence of this was, that in a week or so afterwards she began to feel ill again, with much pain about the pelvis, increased uterine flatus and albuminous leucorrhœa; the os uteri still not tender to the touch. Two or three little warty tumours of a suspicious lancinating character on the labia were touched with arg. nit., and she returned to the use of the potass. iod. mixture. The health quickly improved again, the pain in the pelvis diminished, the excess of urea disappeared. Six leeches were ordered (March 25th) to relieve the fullness about the rectum.

April 1st.—Leeches bled well with relief; better in every respect; uterine flatus less; leucorrhœa is diminished but still albuminous. One or two other warts

were touched with caustic, the others have disappeared. Urine natural.

April 22nd.—Menstruated on the 8th with more pain than usual; much pain and bearing down in the pelvis; pain in evacuating the rectum, but less hæmorrhoidal fullness; is now at about half-way between the menstrual periods. Urine passed at night strongly acid; sp. gr. 10.32; excess of urea; copious lithate of ammonia and phosphates. The potass. iod. mixture seems to disagree with her. Omit. mist. \mathcal{R} Ext. hyosc. Ext. gent. $\bar{a}\bar{a}$. gr. v. on. Haust. sodæ tart. bis die.

May 20th.—Menstruated a fortnight ago with much pain; the discharge was more free than usual; urine has been constantly turbid; much rheumatic pain, especially of the left knee, which is swollen.

\mathcal{R} Hydrarg. chlorid. gr. v. h. s. Rep. mist. potass. iod. Shortly after this she went a coasting voyage for some time.

She returned in seven weeks much improved in health and strength, but still subject to paroxysms of fullness, bearing down and aching in the pelvis as before, and chiefly in the vagina. Slight leucorrhœa. Has not noticed uterine flatus for some time, except at the menstrual periods.

\mathcal{R} Extr. taraxaci \mathfrak{z} ss. om. nocte ex lacte.

\mathcal{R} Acid. nit. dil. \mathfrak{m} xv. ex haust. arom. ter die.

Urine (July 22nd), sp. gr. 10.24, acid; no excess of urea. Light precipitate of phosphates, a few minute crystals of oxalate of lime.

August 5th.—Better; less pelvic pain and congestion; much uterine flatulence; hæmorrhoids very painful; no leucorrhœa. Urine strongly acid, 10.25; no excess of urea. Phosphates copious and dense; numerous crystals of oxalate of lime.

August 12th.—Feels better than she has been for a long time; has menstruated this week, and, as usual, this has been attended with uterine flatus; otherwise the turgescence and pain of pelvis which precede these periods was much less.

Perstet Ext. taraxaci. R Acid. nit. dil. ℥ xv. Infus. gent. co. ℥ iss. misce ft. haust. ter die sumend.

I have selected this case next in order as being a tolerably good specimen of what may be called rheumatic gout of the pelvic organs. The pelvic congestion with pain, throbbing, bearing down, and uterine or vaginal flatulence, the albuminous leucorrhœa and the excess of urea and lithates in the urine, all indicated the presence of this diathesis. I think I may also cite the treatment as additional evidence of this fact. Although excess of urea was shown to a great extent in almost every analysis, yet if a comparison be made between it and the specific gravity it will be found that the excess only

occurred when this was 10.26 and upwards; below this it did not appear. A similar excess existed with the lithates and phosphates, so that it might have been supposed that the urine was merely defective in aqueous matter. If this had been the fact the urine would have been scanty in point of quantity, which was not the case, so that we are led to the conclusion that it really was charged with saline matter and other constituent principles in a greater degree than usual. Her being of a stout habit might justify the supposition that more albuminous matter being developed than was required for the maintenance of the different functions of the system, a portion of it was thrown off in the form of lithates and urea; and that residing in a low and more or less malarious district (Rotherhithe), the process of primary assimilation was exceedingly defective, as seen by the general gastric derangement which was present; possibly to this latter circumstance may be attributed the prevalence of oxalate of lime crystals which was observed in almost every analysis; it having been shown by Dr. Prout that oxalate of lime diathesis frequently occurs in connexion with malarious influence.

It is worthy of notice that during the winter the urine should have reached its highest, and during the summer its lowest degrees of specific gravity, which is

the reverse of what usually happens; and it may reasonably be supposed that this resulted partly from the greater activity of the skin, particularly after her voyage, enabling the system to throw off by this organ a large quantity of what otherwise would have been directed to the kidneys, and also from the improved tone of the digestive organs, and more perfect primary assimilation which resulted from the change of air.

That symptoms of rheumatic gout affecting the uterus may be produced by living in a damp malarious situation, even under the most careful diet, &c. possible, is a fact which may be readily enough conceived. I have met with very distinct evidences in proof of it, and I think it must be looked upon as the cause which has tended so much to prolong the case which follows.

The combination of potass. iodidi and liq. potassæ in sarsaparilla, for which I am indebted to my friend Dr. Prout, has frequently proved a valuable remedy, and I am confident would have sooner brought the case to a successful termination could she have had the advantage of a more favourable locality to reside in.

CASE 5.

Mrs. F., æt. 24, married nine years, one child six years ago; brunette; delicate features and person.

December 20th, 1841.—Much gastric and hepatic derangement, with pain of the right hypochondrium and shoulder; evacuations dark or clayey; much pain in the right ovarian region at the menstrual periods, extending down the thigh, making her stoop, and increased by the erect posture; much albuminous leucorrhœa, and symptoms of pelvic congestion. Has suffered from dysmenorrhœa for four years, with considerable irregularity of the menstrual periods.

℞ Pil. hydrarg. Ext. lupuli āā gr. v. h. s.

℞ Acid. hydrochlor. dil. Acid. nitrici dil. āā ℥ii.

Syrupi aurant. ℥i. Aquæ cinnamomi ℥iss. misce ft. mist. cujus sumat cochl. min. i. ter die ex aquâ.

Let her use copious ablution with warm water and the salt towel. After two doses, the pills were changed for ext. taraxaci, ext. lupuli āā gr. iv. pulv. ipec. gr. ij. o. n. and the nitro-muriatic mixture continued. On this plan she improved considerably in general health, and when the next menstrual period approached, I ordered her the combination of camphor with ext. lactucæ and lupuli as in a former case, and the period passed without pain. Blue pill was repeated for a short time, and she continued to improve.

March 10th.—Extr. taraxaci was ordered in a much larger dose (half a teaspoonful) every night; the men-

strual period occurred shortly afterwards, with little pain in the right ovarian region. She continued the taraxacum, and commenced sarsaparilla twice a day, keeping the bowels open with sulphur precipitatum and carbonate of magnesia in the morning.

March 29th.—Half-way menstrual period. Has had a severe attack of pain over the whole abdomen, with lancinating pains of the pelvis, increased by movement of the carriage or suddenly sitting down. Abdomen tender to the touch; bowels constipated; tongue loaded; pulse small and irritable; pain of limbs; intense pain produced by sexual intercourse.

℞ Hyd. chloridi gr. iv. Ext. hyoscyami gr. vj. h. s.
Magnesia and sulphur the following morning.
Hirudines vj. ano h. s.

She was much relieved by the leeches and calomel; the health improved, and the menses appeared on the 15th of April with but slight pain. At the next half-way period, however (May 1st), she was seized with violent pain over the whole abdomen, continuing for many hours, so that she could not move, and apparently of an inflammatory character; it occurred in the country. I ordered her five grains of calomel with James's powder, a sinapism to the abdomen, and a saline

draught with a small dose of vin. antim. tart. every three hours. As a considerable sense of fullness at the lower part of the abdomen continued for some days afterwards, some leeches were applied to the anus with great relief. At the approach of the next menstrual period the urine became turbid with lithate of ammonia, and she complained of severe aching of the limbs. Four gr. of calomel with six gr. of extract. hyosc. were given on the 12th of May, and on the following morning she commenced the use of pulv. guaiaci, magnes. carb. āā gr. x. om. nocte ex lacte, and continued the saline mixture during the day. The catamenia appeared on the 14th without any pain, except a little on the right side; she felt quite well after it, and on the 18th left off the taraxacum and saline, returned to the mixture of nitro-muriatic acid prescribed in the first instance, and continued the powders of guaiacum and magnesia.

May 29th.—Went to the sea-side; she continued the taraxacum and the guaiacum and magnesia powders until the day before the next menstrual period, when she returned for a time to the antimonial saline, as before, after which she continued the other medicines. Her health improved; she was able to bathe in the sea and take tolerably active exercise. The guaiacum powders were discontinued towards the end of July, and she

took an occasional dose of sea-water in the morning as a laxative. In this way four menstrual periods passed over with tolerable regularity, and with little pain. I saw her in December on account of a troublesome ulceration at the posterior edge of the os externum, which was relieved by carrot poultice and afterwards by solution of argent. nit. (gr. x. ex aquæ distil. ℥i.). She was enjoying good health.

March 17th, 1843.—The last two intervals between the menstrual periods have become shorter (viz. three weeks and a fortnight), the last time in all probability brought on by sexual intercourse, which has taken place since her return from the sea-side, and without the suffering which it produced before. The period lasted a whole week, preceded and accompanied by severe pain and considerable exsudations, and, towards the end of the attack, lumps of fibrinous matter, much albuminous leucorrhœa, and so much congestive tumefaction about the vagina as to give her the feeling of its being closed.

She distinctly describes having the sensation of fluid accumulating in the uterus just previous to the appearance of the menstrual discharge, and then, after severe labour-like pains, or by accidental straining, coughing, &c., something seems to yield, and the fluid passes with immediate relief. Has also noticed the discharge of

flatus from the vagina; pain of right hypochondrium and shoulder; bowels natural; appetite good; tongue pale and furred; headache. Urine at night bright, lemon-colour, acid; much nucleated epithelial matter. Sp. gr. 10.23; a minute trace of urea with nitric acid; free lithic acid; copious phosphates.

Rep. ext. tarax. et mist. nitro-muriatica.

July 21st.—Four catamenial periods have passed over without much pain, but with exsudations and a slight sense of the accumulation of the catamenia in the uterus previous to its discharge. She has continued to take the ext. taraxaci et mist. nitro-muriatica, as before, and five gr. of Plummer's pill once a-week.

She now complains of the following symptoms:—a sense of fullness and weight in the lower part of the abdomen, coming on suddenly in paroxysms, with severe bearing down, and with fullness and swelling of the vagina, so as nearly to close it; these symptoms disappear as suddenly. Discharge of flatulence from the vagina continues, especially in the evening.

℞ Pulv. guaiaci, magnes. carb. āā. gr. x. bis die cum
sp. ammon. arom. ex lacte.

℞ Potassii iodid. gr. ij. Ext. gent. Ext. hyosc. āā.
gr. iv. o. n.

Urine on the 30th clear and bright; large shreds of

epithelial matter ; sp. gr. 10.34 ; large excess of urea ; copious crystals of lithic acid ; copious phosphates, especially of lime.

August 17th.—Another menstrual period has passed ; it began on the 3rd or 4th, lasting six days : it came very freely, and with less exsudations than usual : she “ was pretty well the whole of the time,” but the day after was seized with much distension of abdomen and bearing down, obliging her to use the recumbent posture ; much pain of limbs and head ; she notices the escape of flatulence from the vagina, particularly during these attacks of abdominal and pelvic congestion.

Contin. Pulveres : let her take a Plummer’s pill occasionally.

I have condensed the details of this interesting case as far as possible, but the period of time over which it extends necessarily renders it of considerable length.

There is great reason to attribute many of this patient’s symptoms to the malarious locality of her residence, a small villa on low meadowy ground, close by, and on a level with, the bank of the Thames ; and a cursory review of the case will show, that although the early symptoms were chiefly dysmenorrhœa in connexion with general dyspepsia, and yielded easily to treatment, yet the increasing hæmorrhoidal congestion, the pains

about the pelvis, sometimes of a lancinating character, the albuminous leucorrhœa, the aching limbs and urine loaded with lithates, showed that they were gradually undergoing a change and assuming more and more the characters which I have assigned to rheumatic gouty affection of the uterus.

The liver has been in this case a torpid organ throughout, and required occasionally a brisk dose of calomel, in addition to the taraxacum and other treatment, for maintaining the necessary degree of functional activity. She was greatly relieved by the leeches to the anus, and also by the guaiacum and magnesia powders. On removing to the sea-side she instantly experienced a remarkable improvement in every respect, and continued during the following winter to enjoy good health.

During the spring of the present year (1843) additional symptoms of rheumatic gouty affection of the uterus have shown themselves: the gorged and swollen condition of the vagina, the discharge of flatus from it, and the presence of urea in the urine, especially deserve attention. At one time the canal of the cervix uteri appeared to partake so much in the general congestion and swelling of these parts as to become nearly imper-vious, and prevent the escape of the catamenial fluid, until the uterus, becoming distended by its accumulation

there, was excited to contract and thus expel it. At this time I made a careful examination per vaginam; the parietes of the passage were swollen and flabby; the cervix uteri was not painful, but the os uteri much contracted. I passed a small dilator with ease, and dilated the canal of the cervix without pain or unusual resistance, but cannot say whether the diminished obstruction to the escape of the menstrual fluid during the succeeding periods was attributable to this cause: at any rate the sensation of accumulation in the uterus occurred, but in less degree, and the organ appeared to relieve itself sooner.

That dysmenorrhœa may be occasionally produced by a closed state of the os uteri, has been satisfactorily shown by the late Dr. Mackintosh of Edinburgh several years ago; but this refers chiefly to cases of a congenital form, of which I have met with several. In some of these the os uteri was so small that the opening could scarcely be detected by the finger; the cervix was taper and firm; and when the menstrual period came on, it was not only attended by severe pain, but by all the symptoms arising from mechanical pressure exerted upon the rectum and the bladder. In one instance, particularly, the fundus uteri became distinctly perceptible above the pubes from distension; at length,

during a fit of intense suffering like labour-pains, the os uteri yielded, the discharge burst forth, and instant relief followed.

In the present case the obstruction to the passage of the menstrual fluid seemed to arise from the tumid state of the cervix; it was neither hard nor contracted, but swollen and relaxed, and hence my reasons for doubting whether the improvement in this respect was attributable to its having been dilated.

The attacks of pain and inflammatory action which occasionally showed themselves at the half-way period are worthy of notice. One of unusual severity has occurred in Mrs. F's. case, since drawing up the above report, attended with severe pain, swelling and hardness of the abdomen. It was preceded by sense of bearing down, followed by an appearance of the catamenia and severe vomiting, which lasted for many hours. I have already pointed out the disposition to temporary excitement like that of a menstrual attack, which the uterus frequently manifests at the intermediate periods in cases of dysmenorrhœa. In the present instance it showed itself on several occasions, coming on accurately at the half-way time. It was also attended with a state of great irritation of the stomach and bowels, amounting almost to actual inflammation. I have seen these at-

tacks of abdominal pain also occur in dysmenorrhœal cases at the catamenial period, as soon as the discharge had ceased; the system apparently not having been sufficiently relieved by the evacuation, and in two or three instances had reason to think that the attack was in consequence of tonics being carried rather further than the irritable vascular system would bear. In several cases they were successfully guarded against by giving a mild saline with vin. antim. tart. for a few days before the expected paroxysm, by which means the irritability of the system was allayed, and the patient enabled to return with greater security to her former plan of treatment.

The discharge of flatus from the vagina is a symptom which I consider to be well worthy of attention, although it is a circumstance which hitherto has been almost entirely unnoticed. As far as my own observations enable me to judge, it never occurs except in uterine affections of a rheumatic gouty character; and so far from being a rare phænomenon, I have every reason to believe that uterine derangement, in connexion with that diathesis, seldom or never occurs without the presence of this peculiar symptom. The nature of it is quite a sufficient reason for a patient not volunteering to mention it among her ailments; but in cases of this cha-

racter, my experience tells me that the question will seldom be asked without finding that the patient had been distinctly aware of it for some time. It varies a good deal in the manner and circumstances of its appearance; in some instances it is constantly present, in others it is only observed towards evening; whereas in others it merely comes on at the menstrual period. It seems frequently to alternate with pains of the limbs and other symptoms of rheumatic gout over the rest of the body, its diminution or cessation being usually attended with corresponding alleviation of uterine suffering and congestion.

In offering some remarks on the excess of urea which showed itself in this case, I regret that the distance of the patient's residence from town gave me so few opportunities of examining it. That the excess of urea was not merely depending on the increase of specific gravity, is shown by the fact that when it was at 10.30 the excess was far greater than at 10.34; and that even when it stood no higher than 10.23, a slight excess of urea was still perceptible.

I have already shown that the co-existence of lithates and urea in excess has been justly considered by Dr. Prout to indicate a state of rheumatic gout in the system, and the symptoms which have attended this con-

dition of the uterus, and also the general circumstances, as regards malaria, under which the patient was placed, tend strongly to confirm this view.

CASE 6.

Miss D., *æt.* 23, of a sallow, blotchy complexion; countenance indicative of extreme indolence and depression of mind; great lassitude and indisposition to exertion; constipation, headache, foul tongue, cold extremities, and all the other symptoms arising from great torpidity and derangement in the functions of the primæ viæ. Menstruation has been very scanty for the last four or five months, lasting only for a day, preceded for two or three days with severe dysmenorrhœal suffering, which is occasionally very intense; has never noticed anything like exsudations; has occasional fainting fits (query hysterical); is much emaciated.

I gave her alteratives and tonics with tolerable benefit, but could not persuade her to continue the cold washing, friction with the salt towel, early hours and exercise, which I had enjoined. Two months ago a barking, sounding cough commenced, with expectoration in the morning. The menses have become regular since she has been under my treatment, although she seems on the whole rather to have lost ground.

January 31st, 1842.—Very unhealthy-looking; much depressed; much headache; pains in the back, and general chylopoietic derangement. After a long and serious expostulation to excite her to rouse herself to a proper degree of exertion, I prescribed this artificial mineral water.

℞ Magnes. carb., Calcis carbon. āā ʒi.
 Acidi hydrochlor. q. s. ad saturandum.
 Calorem adhibe ad exsiccandum. Dein adde
 Aquæ distillatæ ʒviiij.
 Sodæ hydrochloratis
 Sodæ sulphatis āā ʒvj.
 Tincturæ iodinii ʒii. misce.
 Sumat cochl. magn. j. ex cyatho aquæ tepidæ pleno
 bis die inter agendum.

February 9th.—Much better, both in appearance and general feelings; clearer, brisker; bowels keep regular without any other medicine; appetite better; takes a third of her glass at a time, and then walks out, returns for another third, and so on. Sleeps more soundly; jumps up briskly in the morning; has lost the painful lassitude and aching of the limbs; much less cough; expects the catamenia on the 13th; motions dark. Urine, sp. gr. 10.26; considerable excess of urea; free lithic acid.

Pt. Mist. salina. ℞ Ext. tarax. cochl. min. $\frac{1}{2}$ o. n.
 ex lacte.

February 17th.—Colour of evacuations improved. Tongue pale, coated with red papillæ; expects the catamenia. Omittatur Mist. salina.

℞ Acidi hydrochlor. dil. Acid. nitrici dil. āā ℥ii.
Syrupi aurant. ℥i. Aq. cinnamomi ℥iss. misce.
Sumat cochl. min. j. ter die ex aquâ. Applic. sinapis-
mus epigast. dolore superveniente.

February 24th.—Catamenia appeared on the 17th, preceded for a short time with severe pain, which was relieved by the sinapism and hot pediluvium; the discharge lasted only twenty-four hours; it was sparing and dark. Expectorates a good deal of thick yellow sputa in the morning; feet and hands burn occasionally; coughs frequently; tongue as before; taste in the mouth much better; appetite bad. Bowels regular, but the motions are dark; has been sleeping, by my direction, in flannel with much comfort. Urine, sp. gr. 10.24; much epithelial matter; considerable excess of urea; free lithic acid.

Pt. mist. nitro-muriatica et extr. tarax. Let her take a blue pill once a week.

March 10th.—Coughing a good deal, with tightness, dull pain of chest and dyspnœa. Expectorations mucous. Tongue pale and coated; pain of epigastrium; has vomited some watery fluid from the stomach; pain

of loins; voice weak; looks pale and feeble; sour taste in mouth; motions offensive. Urine, sp. gr. 10.32; thick sediment of lithate of ammonia; large excess of urea.

Sumat pil. hydrarg. gr. v. h. s. per duas noctes, et magnes. carb. cochl. min. j. primo mane ex aquâ. Sinapismus epigast. Liniment. Camphoræ co. lumbis.

Pt. mist. nitro-mur. et taraxacum.

March 17th.—Did not apply the sinapism; has still pain of stomach, and has vomited occasionally watery frothy mucus. Evacuations better; cough had nearly ceased, but has imprudently exposed herself to cold. Last menstruation this day month, but at present there are no indications of the period approaching. Pt.

℞ Camphoræ. Ext. lactucæ. Ext. lupuli āā gr. vj. misce ft. pil. iv.

Sumat ij. incipiente dolore et rep. post horas ij si opus sit.

March 24th.—The catamenia appeared on the 17th, when she returned home, and severe pain accompanied it for three days; the discharge was brighter-coloured than before. Appetite better; bowels dark; pain of stomach relieved by sinapism; cough better; chest still feels tight. Urine, sp. gr. 10.34; copious excess of urea; lithate of ammonia, oxalate of lime crystals. Omittatur mist. nitro-muriatica.

R Potassii iodidi. Ext. lupuli āā gr. v. ft. pil. ij. bis die sumend. Pt. tarax. o. n. et liniment. camph. co.

Is going to Sydenham.

April 1st.—Is much knocked up by her journey into town, but the appetite and bowels are better; pain of stomach is less; cough better. Urine opalescent; sp. gr. 10.20, neutral; slightly serous; no excess of urea.

Pt. pil. potass. iod. bis die. Tarax. o. n. et liniment.

April 14th.—Feels and looks better; has still pain of back, extending to between the shoulders. Yesterday morning the pain of a menstrual period commenced rather sharply, but by no means severe, and the catamenia appeared in the evening in about the usual quantity, but of a brighter and better colour than before; the cough and tightness of chest have disappeared; motions still dark; affirms that she has never yet in her whole life passed so easy a menstrual period. Urine slightly opalescent, pale, slightly acid; much epithelial matter; sp. gr. 10.13; no excess of urea.

Pt. pil. tarax. et liniment.

April 28th.—Much better in every respect. Urine, sp. gr. 10.24; slightly acid; no sediment; no excess of urea. Pt.

May 12th.—Looking quite a different person; has

menstruated a few days ago with comparatively little pain.

Pt. tarax. Omittantur pil. potass. iod.

May 26th.—Strength much improved; walks into town (seven miles); appetite good; bowels regular; no cough, unless she puts herself out of breath; scarcely any expectoration; half-way menstrual period. The urine the following night was of sp. gr. 10.31; considerable excess of urea; much epithelial matter; more muriates than usual.

Pt. tarax. et liniment.

June 7th.—Menstruated on the 5th with much less pain than the last time, and of a duller character; appetite, bowels, &c. regular. Urine slightly acid; much epithelial matter; sp. gr. 10.20; no excess of urea.

June 16th.—Looking well, and much improved in complexion; walks into London; continues her early rising, cold sponging and walk in the morning, &c., as recommended by me.

July 3rd.—Catamenial period has just passed without any pain during the first part; but when the discharge abated on the second day, it then came on for a time; the discharge was of a brighter colour. Appearance in every respect is greatly improved, and looks quite

healthy. Urine acid; slight epithelial matter; sp. gr. 10.24; natural in all respects.

It would be difficult by mere description to give the reader a just conception of the picture of complete prostration and depression, both of mind and body, which this patient presented at the time I commenced my report. She appeared absorbed in a state of languid, stupid apathy, from which it seemed impossible to rouse her, and although she took the medicines prescribed, I doubt much if she followed the dietetic rules, &c. which I had also enjoined. To a certain extent medicines acted favourably by compelling the torpid chylopoietic organs to a temporary increase of action; but I soon found that, instead of gaining, I was losing ground, and being unwilling to continue, beyond a certain time, the use of mercurial laxatives to regulate the secretions, particularly as they required frequent repetition, and even increase of dose, to produce the necessary effect, I determined to try a factitious mineral water, in which, besides a quantity of saline matters in order to produce laxative action, there were other ingredients which may be deemed of an alterative character, viz. muriate of lime and iodine. In my selection and proportion of salts I was in some measure guided by those of the "Old Well" at Cheltenham; in adding iodine, I preferred doing so in

the form of tincture, as it appeared to remove the harsh taste of the saline ingredients, and when the mixture is taken warm it gives it a considerable resemblance to the chicken-broth flavour of the Kochbrunnen water at Wiesbaden. The effects are distinctly increased by being drunk warm (about 100°), and by being taken in small quantities at a time whilst walking. By this means every portion is slowly presented to the mucous surface of the stomach and bowels, and has a far better chance of being taken into the system than if bolted in one rapid draught, as is but too frequently the mode of taking mineral waters in this country. In a patient whom I had sent the previous summer to Wiesbaden on account of greatly impaired health and general derangement of the assimilating functions, this artificial mineral water on her return to England proved of great service, and in her own opinion produced more decided improvement in her symptoms than the natural one.

I cannot help thinking that practitioners are too much in the habit of confining their attention to the more powerful and active agents of the Pharmacopœia in chronic cases of deranged function, and of passing over unnoticed many simple saline remedies, the action of which in their dilute and variously combined forms we are still but little acquainted with.

The entire neglect of sea-water as an internal remedy has often excited my surprise, for it is one of great activity and power; indeed there are few saline mineral waters which come near it in this respect; and from its containing other ingredients, rarely met with in them, as iodine, bromine, &c., it may be fairly expected to be capable of producing very different effects. I have tried it in a variety of cases arising from mal-assimilation, with or without uterine derangement, and can speak now, from considerable experience, in the highest terms of its effects. The patient has been directed to take a certain quantity every morning before breakfast in small portions at a time whilst walking. It acts briskly, though gently, as a laxative, and so far from producing a sense of exhaustion and debility, the patient feels lighter, more comfortable, and better capable of exertion. In some few it appeared at first to disagree with the stomach, but I suspect this was more from its not having been taken in a sufficient dose; in others, the inefficiency evidently arose from the dislike to its taste, and to the trouble of rising early for the walk before breakfast. It was used in the preceding case (No. 5.) whilst the patient was at Worthing, and evidently contributed not a little to improve and regulate the state of the secretions.

In describing the condition of the urine, I have mentioned little else than its specific gravity and excess of urea; for the further details of the changes which it presented I must refer to the tables on this subject at the end of the work. The excess of urea in this case also was not in exact proportion to the specific gravity, since we find that on one occasion (Feb. 25th), when it stood at 10.24, there was "considerable excess," whereas, on another (April 28th), when also at 10.24, there was no excess. On the other hand, it must be owned that on other occasions, when the specific gravity was considerably higher, the large excess of urea may in great measure be attributed to the deficiency of the aqueous portions, in comparison to the other principles of the urine. The urine examined on the 24th of March shows the greatest deviation in these respects from the healthy state, having reached a specific gravity of 10.34. It also contained a quantity of oxalate of lime crystals, which at the time I had supposed were merely accidental (from diet, &c.), but which the subsequent analysis on April 3rd seemed to indicate that the urine was gradually passing into a phosphatic condition. At an early period (Feb. 25th) the kidney had shown symptoms of irritation from the copious epithelial matter which appeared in the urine, and from the presence of

muriate of soda and ammonia; and as she also began to suffer uneasiness across the loins, I ordered the compound camphor liniment in the beginning of March.

The appearance of a certain quantity of muriate of soda in the urine is almost invariable, from its being used so extensively as an article of food: but muriate of ammonia can scarcely occur without the development of muriatic acid in the kidney, which has been shown by Dr. Prout to indicate the presence of irritation or inflammation in that organ. On April 3rd, the changes which had then taken place were of great importance; it had become neutral; the specific gravity was greatly diminished, and slight traces of serum were visible. This sudden alteration in the urine may, perhaps, be attributed in part to increased renal irritation from walking so as greatly to fatigue herself. The succeeding analysis was decidedly more favourable; the very low specific gravity this time being probably the result of accidental dilution from taking fluid shortly before.

Lastly, the reader will observe that neither the general nor the local symptoms in this case showed that the gouty or rheumatic-gouty diathesis, which formed so prominent a feature in several of the others, existed here; the peculiar local symptoms of this condition, when affecting the uterine system, viz. the uterine flatus,

and turgid swollen state of the vagina were absent. Even at the crisis of her dysmenorrhœal sufferings there were no traces of fibrinous exudation, thus to a certain extent associating this peculiar symptom with derangement of the albuminous principle of assimilation; and on the other hand, pointing out an equally important fact, that dysmenorrhœa may occur with the most intense degree of suffering without the necessary co-existence of exudation.

CASE 7.

Mrs. K., æt. 21. Married twelve months; brunette; thin, delicate, phthisical looking.

Feb. 25th, 1843.—Has suffered since her marriage, but more especially since what appears to have been an early abortion some months ago, a very severe degree of dysmenorrhœa. The pain commences at the half-way period, becoming very intense when the discharge arrives, and not at all relieved by it for some days. The discharge is very dark, and with fibrinous exudations; much gastric derangement; cold extremities, headache and lassitude; urine clear. States that she has been for some time subject to arthritic pains and swelling of the left elbow-joint, and that until lately the urine was much loaded with sediment; this

used to appear at the half-way time, and last until the period itself; she attributes the rheumatic symptoms to having caught cold shortly before her marriage; previous to which she suffered from crusted lips; expects to be unwell in a day or two; has got into a habit of constantly taking laxative medicine.

℞ Ext. taraxaci cochl. min. $\frac{1}{2}$ o. n. ex lacte.

℞ Acid. hydrochlor. dil. Acid. nitrici dil. āā ʒii. Syrupi aurant. ʒi. Aquæ cinnamomi ʒiss. misce ft. mist. cujus sumat cochl. min. j. ter die ex aquâ.

℞ Camphoræ. Ext. lactucæ. Ext. lupuli āā ʒi. misce ft. pil. xij.

Sumat pil. ij. incipiente dolore, et repet. omni bihorio p. r. n.

Let her wear flannel next the skin, and use friction with a salt towel every morning.

Feb. 28th.—Much relieved by the pills; has passed an easier time than she has done for some while. Perstet.

March 6th.—Bowels act without medicine; tongue clean; general health improved; is clearer in her complexion; little appetite. Omit. mist. nitro-muriatica.

℞ Acid. hydrochlor. dil. Acid. nitr. dil. āā ʒi. Tinct. hyosc. ʒii. Syrupi aurant. ʒss. Infusi gentianæ co. ʒvij. misce ft. mist. cujus sumat cochl. magn. ij. ter die. Perst. tarax.

March 26th.—Commenced the use of sarsaparilla and lime-water a week ago. The pain came on at the half-way period, but was relieved by the pills as before; still she complains of dull pain about the lower part of back; bowels are regular; tongue clean; pulse stronger; expects the catamenia in a day or two. Perstet.

The catamenia appeared with less pain than usual, although with a considerable quantity of exsudations; general health and strength better. As she still complained of pain at the lower part of her back, and the urine was described to be pale and limpid, I examined some which had been passed at night-time; it was colourless, opalescent; sp. gr. 10.07, slightly alkaline, serous; the phosphates very sparing; no epithelial matter. She left town immediately afterwards.

April 22nd.—Her husband, a medical man, writes word that the serous urine and pain of back continue; the latter is constant and severe. Another menstrual period has passed with less pain, but the discharge was scanty; there seems to have been some exsudation; general health much improved.

Perst. Sarza c. Liq. calcis. et Ext. tarax. Applic.
hirud. viij lumbis.

May 16th.—The application of the leeches has been

delayed on the plea that the pain of loins is easier ; but she has just had a very severe menstrual period with copious exsudations. Urine as before. I strongly urge the leeches to be applied at the half-way time.

June 9th.—Has been cupped to \mathfrak{z} vj at the half-way time, and again just before the menstrual period, up to which last the pain was much less severe, but on the first day of the period itself the pain was very acute, since which it has abated. General health better, with the exception, during the last ten days, of severe headaches, with which she rises in the morning. The report says that the urine is “in every respect healthy; the pain in the back much less frequent and severe, and altogether she is much improved; her strength is much increased, and she has decidedly gained flesh.”

℞ Quinini disulph. Potass. iod. āā gr. ij. Ext. taraxaci gr. vj. misce ft. pil. ij om. nocte sumendæ. Omitt. Sarza et Ext. tarax. Sumat Liq. calcis c. lacte ter die.

July 5th.—Has passed an easier menstrual period than she has done since her marriage; the quantity of discharge was not increased, but the exsudations greatly diminished.

I have placed this case thus low in the list from the report of it commencing at a later period of the disease

than in the other cases, viz. when the symptoms were about to pass into those of renal disease. The history of it shows that the arthritic or rheumatic-gouty diathesis had existed for some time; the severe dysmenorrhœa was moreover attended with exsudations, which have continued more or less; but the urine had latterly changed its characters, the kidneys having passed into a state of subacute inflammation, with their functions so impaired that the urine was not only as low, in point of specific gravity, as 10.07, but alkaline and also serous. The assimilating functions appear to have been for some years very considerably deranged, as shown by the fact of her having suffered from crusted lips before the arthritic symptoms made their appearance; so that there is good reason to suppose that the circulation must have been long in an exceedingly impure state, and the activity of the kidneys taxed not a little to throw off the morbid principles which had been brought to them by it. It is to the long-continued irritation of these organs that I attribute the state of subacute inflammation which soon showed itself, and which demanded the local depletion I recommended. The relief afforded by the cupping showed the propriety of such a step, and much suffering might doubtless have been spared her if it had been resorted to sooner.

The prognosis in a case like this, where the processes of assimilation have been so long deranged, must ever be of a doubtful, at least, if not unfavourable character. Growth and developement, long dwarfed and enfeebled by partial nutrition and unhealthy circulation, pave the way to an organism so undermined in all its powers and actions, as not only to be incapable of performing those great duties which are assigned to the female system, but in too many instances unable to maintain even the vital functions themselves with a machinery so imperfect. Organic disease becomes almost a necessary result, and youth and talent and beauty are cut off in their prime and loveliness, or only respited, as it were, to linger out a few more years of suffering and disease.

I have collected the Analyses of the Urine in Cases 4, 5 and 6, under the following Tabular Form, to give a more comprehensive view of the changes, &c. which they present:—

CASE 4.

Date of the observation.	Passed at night or morning.	Colour.	Acid, neutral or alkaline.	What sediment, if any.	Specific gravity.	Urea.	Lithic Acid and Lithates.	Phosphates.	Oxalates, &c.
1842. Dec. 11.	Night.	Lemon.	Slightly acid.	Dense sediment.	10.27	Excess.	Lithate of ammonia.	Copious phosphates.	Numerous crystals of oxalate of lime.
1843. Jan. 2.	Night.	Not noted.	Acid.	Dense sediment.	10.31	Excess.	Copious lithate of ammonia.	Copious phosphates.	
Jan. 17.	Night.	Lemon.	Acid.	Much epithelial matter.	Not noted.	noted.	.....	Copious phosphates, particularly of lime.	Oxalate of lime crystals.
Jan. 28.	Night.	Not noted.	Acid.	Thick sediment with epithelial matter.	10.26	Slight excess.	Cubic crystals of lithic acid.	Very copious phosphates.	Muriates.
Feb. 25.	Night.	Orange.	Acid.	Thick sediment.	10.27	Large excess.	Lithate of ammonia.	Pretty copious.	
Mar. 4.	Night.	Orange.	Strongly acid.	Much epithelial matter. Copious dense sediment.	10.33	Immense excess.	Lithate of ammonia.	Copious lime.	
Mar. 25.	Night.	Bright yellow.	Acid.	Epithelial matter. Dense sediment.	10.27	Copious excess.	Copious lithate of ammonia.	Very copious.	Numerous oxalate of lime crystals.
April 1.	Night.	Greenish orange, opalescent.	Slightly acid.	Slight cloud.	10.25	No excess.	Crystals of lithic acid. Copious lithate of ammonia.	Pretty copious.	Muriate of soda and ammonia. Oxalate of lime crystals.
								Copious but very light.	No oxalates.
								Sparing lime.	

CASE 4—continued.

Date of the observation.	Passed at night or morning.	Colour.	Acid, neutral or alkaline.	What sediment, if any.	Specific gravity.	Urea.	Lithic Acid and Lithates.	Phosphates.	Oxalates, &c.
1843. April 22.	.....	Orange.	Strongly acid.	Dense sediment of lithate of ammonia.	10.32	Excess.	Crystals of lithic acid. Lithate of ammonia.	Copious dense.	
May 20.	Night.	Reddish orange.	Strongly acid.	Epithelial matter. Dense sediment.	10.28	Excess.	Crystals of lithic acid and lithate of ammonia.	Copious dense.	Crystals of oxalate of lime.
July 22.	Night.	Reddish orange.	Acid.	Slight epithelial matter.	10.24	No excess.	.....	Light.	A few minute crystals.
Aug. 5.	Night.	Reddish orange.	Strongly acid.	Ragged epithelial matter.	10.25	No excess.	.....	Copious dense. Copious lime.	Numerous oxalates.
Aug. 25.	Night.	Greenish orange.	Acid.	Light cloud; query mucous.	11.24	No excess.	.....	Moderate and light.	Copious oxalates.

CASE 5.

1843. Mar. 17.	Night.	Bright lemon.	Acid.	Moderate. Much nucleated epithelial scales.	10.23	A minute trace by nitric acid.	Free lithic acid.	Copious dense. Copious lime.	
July 30.	Night.	Bright sherry-colour.	Acid.	Large shreds and ribands of epithelial matter.	10.34	Large excess of urea.	Copious crystals of free lithic acid.	Copious dense. Copious lime.	
Sept. 2.	Night.	Bright sherry-colour.	Strongly acid.	Lithate of ammonia.	10.30	Immense excess. Whole tube full.	Lithate of ammonia.	Rather copious. Copious lime.	

CASE 6.

1843. Feb. 11.	Night.	Lemon.	Acid.	Slight cloud.	10.26	Considerable excess.	Lithic acid crystals.	Pretty copious. Copious lime.	Muriate of soda and ammonia.
Feb. 25.	Night.	Orange.	Acid.	Slight cloud. Much epithelial matter.	10.24	Considerable excess.	Lithic acid crystals.	Copious dense. Copious lime.	
Mar. 10.	Night.	Pale orange.	Acid.	Thick sediment of lithate of ammonia.	10.32	Large excess.	Lithic acid crystals. Lithate of ammonia.	Copious and dense.	
Mar. 24.	Night.	Yellow.	Acid.	Moderate sediment of lithate of ammonia. Much epithelial matter.	10.34	Large excess.	Lithate of ammonia.	Copious and dense.	Oxalate of lime crystals.
April 3.	Night.	Greenish opal.	Neutral.	Slight cloud. Much epithelial matter.	10.20	Slightly serous. No excess of urea.	.....	Copious and dense. Sparing lime.	Urine soon became putrid.
April 14.	Night.	Pale, slightly opal.	Slightly acid.	Slight cloud. Much nucleated epithelial matter.	10.13	.....	.....	Moderate and light.	
April 28.	Night.	Straw, opal.	Slightly acid.	Much epithelial matter.	10.24	.....	.....	Moderate and dense.	
May 27.	Night.	Lemon, opalescent.	Acid.	Much epithelial matter.	10.31	Considerable excess.	.....	Copious and dense. Natural.	
June 7.	Night.	Lemon.	Slightly acid.	Slight cloud. Much epithelial matter.	10.20	.....	.....	Copious lime. Natural.	A very few oxalate of lime crystals.
July 1.	Night.	Straw.	Acid.	Slight epithelial matter.	10.24	.....	.....	Natural.	

I have ventured to offer a few brief observations on the mode of conducting an examination of the urine under the more ordinary conditions in which it occurs. I do not pretend to enter upon any chemical description of the urine, still less to touch upon the quantitative analysis of it; for all this I must refer the reader to the approved works upon the subject; two of the shortest and best are the English translation of Scharling's 'Essay,' and Dr. Rees 'On the Analysis of the Blood, Urine, &c.*' I merely wish to give a few simple directions by which a practitioner, without much previous knowledge of the subject, may soon learn to observe and appreciate the more important phænomena which the urine presents in the diseases to which I have been alluding, and turn them to account in his treatment.

All that is required in the way of apparatus is a small compound microscope, with a watch-glass and a few pieces of thin flat glass, a urinometer, half-a-dozen test-tubes and rack to hold them, some litmus paper, and the following tests in stoppered bottles: strong nitric and acetic acids, liquor ammoniæ, and solution of oxalate

* Since this was written an excellent work on the urine and its deposits, by Dr. Griffith, has appeared; and a still more extended one by Dr. Golding Bird on the same subject has been announced.

of ammonia; to these may be added liquor potassæ and hydrochloric acid, but they are not absolutely necessary.

I should recommend the urine to be examined much in the same order as given in the annexed tables. What is passed on going to bed or on rising in the morning is least liable to be affected by the food. It should have been allowed to stand in a white glass phial for an hour or two; any sediment which may be present will then have fallen, the quantity of which and its colour, as also that of the urine, must be noted. If it be mucous, it can generally be detected by the light cloud which it forms, and the streaky appearance which it presents on close inspection, not settling so closely and densely to the bottom of the phial as the other sediment; and also from its ropiness, especially by the addition of liquor potassæ and liquor ammoniæ. The nature of the sediments, which are salts of the urine, precipitated from their solution in it by cooling, may generally be inferred by the acid or alkaline state of that fluid. Thus, when acid, they consist of lithic acid or lithate of ammonia; the one being usually in the form of deep yellow or reddish-brown crystals, the other as a dirty-white amorphous precipitate. If alkaline, the precipitate consists of phosphates; if light and glittering, they will be the natural

triple phosphate of ammonia and magnesia* ; if white, dense and amorphous, carbonate or phosphate of lime is present.

The *colour* of the urine must be observed : if alkaline and phosphatic, it is usually pale, or of a sickly greenish tinge ; and a similar appearance also is generally observed when it is serous. The various tints of yellow are usually attended by the presence of lithic acid and the lithates, and the deeper these tints become, the more in excess are these principles mostly observed to be. An orange colour indicates renal irritation, and in proportion as it verges to red may we consider that the condition of the kidney approaches to that of inflammation ; under which latter circumstances the urine is generally alkaline.

The specific gravity next deserves attention : this is necessarily higher in summer and lower in winter, from the increase or diminution of the cutaneous perspiration. Thus the average of health in winter is about 10.15, in summer 10.25 (Prout). A very low specific gravity shows defective action of the kidney in not separating from the circulation those principles which are

* If oxalate of lime crystals are in large quantities (which is not very common), a highly glittering deposit, almost like diamond-dust, is observed.

brought to it for that purpose; hence the secretion is more watery than natural, and frequently, from the same cause, it contains more or less albuminous matter, the kidneys being unable to disorganize or decompose it into the ordinary renal products. A high specific gravity indicates a small proportion of the watery part of the urine in comparison to its saline ingredients.

The acid or alkaline state of the urine is best tested by litmus paper, a process which needs no description.

The last step, before proceeding to any chemical manipulations, is to drop a little of the urine to be examined upon a watch-glass and place it under the microscope. The phial should be previously shaken in order to mix all its portions together, and when a small quantity of sediment has collected in the centre of the glass, some of the supernatant fluid may be carefully drawn off by blotting-paper or a pipette; thus we shall concentrate the objects for examination into a smaller compass, and avoid the risk of wetting the lens. A knowledge of the phenomena which a microscopic examination of the urine discloses to us is of great importance, and frequently enables us to recognise at a glance the peculiar characters of the specimen before us. The practised eye can thus read off, as it were, an analysis of the urine as from a book, and can detect many important

features as regards the treatment of the case which mere chemical analysis would fail to detect, or at least show imperfectly. On bringing the lens to the proper focus a variety of interesting objects start into view: of these, the epithelial matter, when present, is particularly conspicuous. This occurs in a variety of forms: sometimes in shreds of what appears like thin membrane or ragged patches of a granular or retiform appearance like a piece of dirty gauze; at others it occurs in rhomboidal or hexagonal plates, which are generally nucleated; sometimes a number of them are united together like a tessellated pavement. Blood-corpuscles, globules of milk, pus, mucus, and seminal globules or spermatozoa are occasionally met with in the urine, for the characters of which I must refer to works upon these subjects; besides these, convex pearly discs are frequently observed like drops spread out on a flat surface, and which I have been in the habit of calling oil-globules from their resemblance to those of oily matter, as they never occur in such a quantity as to be capable of being collected; their real composition is unknown to me.

The crystals which we meet with in a microscopic examination of the urine are lithic acid, ammoniaco-magnesian or triple phosphate, oxalate of lime, and cystine or cystic oxide. Lithate of ammonia occurs in a

semi-crystalline, pulverulent form, and phosphate and carbonate of lime as common amorphous sediments.

The lithic acid assumes the form of rhomboidal prisms, being in its earliest stage little else than rhomboidal plates, having rather a dark thick edge, and frequently a rhomboidal or irregular nucleus in their centre. These crystals vary considerably in their shape, being sometimes much elongated, at others approaching very nearly to a square. In this their simplest form they present a pale yellowish-brown tinge; but when numerous crystals are united together by their flat surface, their colour becomes much deeper, and the mass assumes a cuboidal form if seen edgewise, which is the position it usually takes. Lithic acid crystals present a great variety of modifications, some of which I have shown. See Plates.

Lithate of ammonia, as already stated, occurs either as an amorphous powder, or mixed with minute, radiating acicular crystals, indicative of its being in the form of superlithate.

The oxalate of lime is conspicuous for its brilliancy and regularity of form, which is a flattened octohedron. Most of the modifications which it presents are owing to the position in which it is viewed, resting either on its flattened surface or upon one of its edges. When small, the oxalate of lime crystals frequently occur in

aggregated or moniliform clusters of quadrangular stars, fig. 15. Some of its varieties, however, are not due to this cause: thus the dumbbell crystals (fig. 13), first shown by Dr. G. Bird, and also those of figs. 12, which I presume are modifications of them.

The crystals of the triple or ammoniaco-magnesian phosphate are of two kinds, the neutral, and the bibasic with an excess of ammonia; the former is that which occurs most commonly in the urine, the latter is usually produced in the precipitation of the phosphates by ammonia. The neutral triple phosphate presents the appearance of a rectangular prism, variously modified, but most usually assuming a penthouse or roof-like form, as shown in fig. 16. The bibasic species assumes an appearance very similar to the crystals of watery vapour as seen during an intense frost; like these it usually consists of a crystalline star of six rays or branches, more or less serrated or plumose, which is a common character of ammoniacal salts.

The cystic oxide, or cystine, is characterized by its well-marked hexagonal laminae, which are very thin and frequently nucleated; occasionally also it presents varieties as seen in fig. 20.

Having completed our microscopic examination, we next proceed to some of the more common chemical

manipulations. The first step is to boil a little of the fluid in a glass tube, and observe the changes which are produced. We will commence with the acid forms of urine. If the urine has a dirty-white sediment and is therefore turbid when shaken, it will probably become clear on attaining a certain temperature, and indicates the presence of lithate of ammonia, which, although insoluble at the ordinary temperature, readily dissolves on an increase of it; a fact which enables us to separate the lithate of ammonia, when in solution, from other insoluble matters. A light semi-transparent or almost gelatinous cloud is sometimes observed after standing a few hours, and will also give a degree of turbidity to the urine: in this case, when heat is applied and the urine made to boil, it becomes clear, the cloud having evidently resolved itself into an insoluble precipitate, which falls to the bottom in the form of an amorphous powder, which is lithic acid; the gelatinous cloudy appearance which it presented having been precipitated in the form of hydrate by some acid (lactic), and which, on the application of heat, assumes the pulverulent form alluded to.

Another form of acid urine presents very different characters; it becomes turbid on boiling, and also neutral or alkaline: the precipitate which takes place consists of the mixed phosphates (the chemical characters

of which will be shortly examined), and which have been held in solution by the presence of carbonic acid, the escape of which in minute bubbles may be seen whilst heating the tube.

Albuminous urine may be acid, neutral or alkaline, although it is most frequently the latter. The changes which it presents by the action of heat are too well known to need description. There is, however, a species of intermediate form where the urine is opalescent, and where little or no change is produced either by heat or other tests of albumen; the acidity and specific gravity have probably diminished, and the characteristics of serous urine become gradually more and more distinctly developed.

Having noted the changes produced by the action of heat, it will be advisable to ascertain whether there be an excess of urea, a condition which can scarcely occur except with acid urine and of a specific gravity of 10.21 and upwards. A small quantity of urine may be poured into a tube and an equal quantity of strong nitric acid added; an effervescence generally takes place from the partial decomposition of lithic acid, &c.; it should be kept cool, and in three or more hours if there be excess of urea it will be shown by the presence of large crystalline scales, which are the nitrate of urea.

If no crystals of lithic acid have been detected by the microscope, and it be desirable to know in what quantity it is present, some hydrochloric or acetic acid may be added to another portion and also set by; the acid precipitates the lithic acid from the alkaline base with which it may have been in combination; and it appears either in the form of lithic acid crystals, or in the state of hydrate as already mentioned.

The quantum of mixed phosphates (triple phosphate and phosphate of lime) will be best ascertained by the addition of a little caustic ammonia, by which a light precipitate of bibasic triple phosphate mixed with phosphate of lime is formed, which gradually settles to the bottom of the tube; the light or dense appearance of it, the rapidity of its precipitation, and the loose or close aggregation of the sediment which it forms, &c. &c., are all worthy of notice, and are phænomena which an attentive observer will soon learn to associate with other characters of the urine*.

A few drops of the supernatant liquor may be evaporated over a candle upon a flat glass and examined by the microscope, in order to see the quantity and quality

* The ammonia ought not to be added in considerable excess, especially when very concentrated, as it is then capable of precipitating the lithic acid which may be present, a fact first pointed out to me by Dr. Prout.

of the crystals thus formed, especially of the muriate of soda, which may be known by its assuming an octohedral form under a great variety of modifications; and also the muriate of ammonia, known by the peculiar plumose, or rather coniferous character of its crystallization.

The precipitate of the mixed phosphates may be treated with dilute acetic acid, by which the triple phosphate is dissolved, and may be poured off from the phosphate of lime which remains behind as an amorphous powder; this is soluble in strong acetic acid, especially if aided by a little heat, and thus may be separated from any oxalate of lime which may have been mixed with it. This latter may be tested in the usual way for detecting oxalate of lime, and its presence will have been previously ascertained by the microscope.

As the other forms of morbid urine, such as diabetes, cystic oxide diathesis, &c., very seldom or never occur in the class of patients to which the foregoing observations have been devoted, it will be unnecessary for me to enter into any details about them.

THE END.

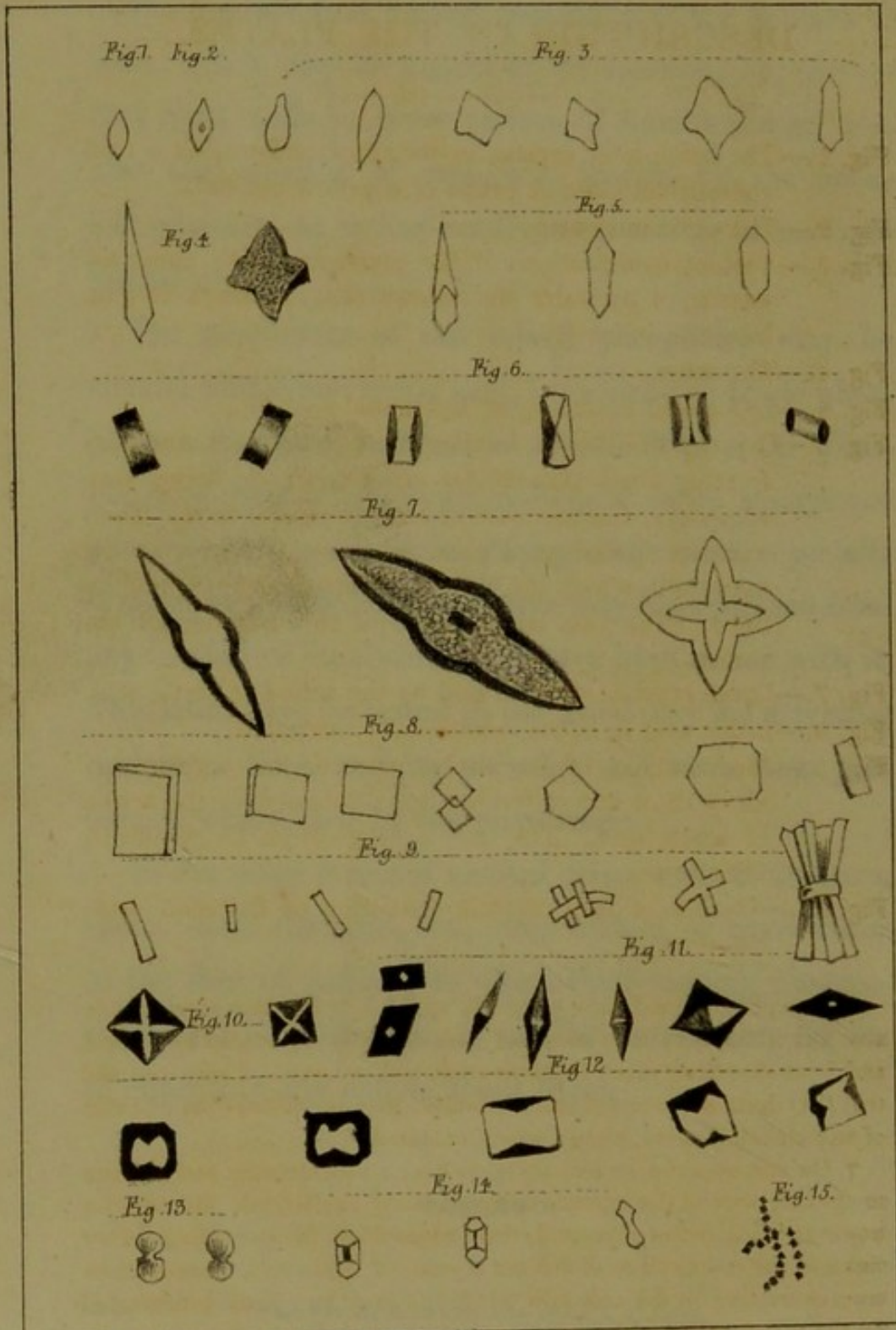
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PLATE I



On Zinc by W.A. Delamotte.

DESCRIPTION OF THE PLATES.

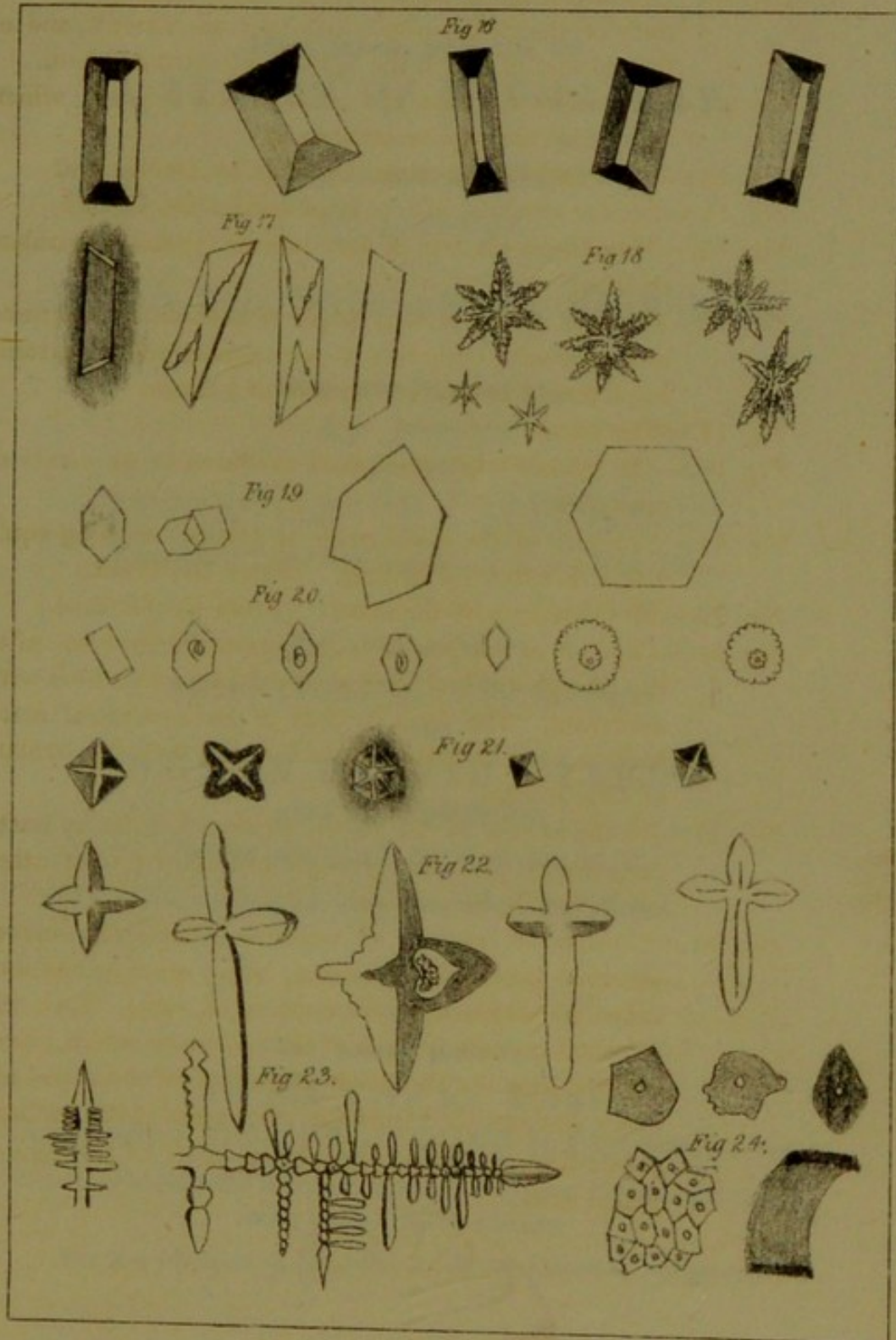
- Fig. 1.—The lithic acid crystal in its simplest form, as a thin rhomboidal plate or prism of a yellow colour*.
- Fig. 2.—The same nucleated.
- Fig. 3.—Various modifications of the above crystals; some assuming a pyriform or bellows-shape, others verging into that of a cube.
- Fig. 4.—The same.
- Fig. 5.—Lithic acid assuming an hexagonal form†.
- Fig. 6.—Crystals of lithic acid united by their surfaces, and thus forming thick rhomboidal masses, which being seen edgeways, assume more or less a cuboidal form. Their varieties depend in a great measure, I believe, on the manner in which the light is refracted and reflected by them. The two last crystals of this number are the rarest.
- Fig. 7.—Large crystals of lithic acid by the action of acetic acid.
- Fig. 8.—Lithic acid in cubes, occasionally nucleated.
- Fig. 9.—Modifications of the above, more or less aggregated: all of these except the last were obtained by the action of acetic acid. The last is taken from Dr. Griffith's 12th figure.
- Fig. 10.—Oxalate of lime crystals consisting of flattened octohædrons.

* Excepting when I have expressly stated it to be otherwise, all the above crystals have been observed and carefully delineated by myself, and I can therefore vouch for their truth and accuracy. I may also add that they have all occurred spontaneously, that is, without the addition of any chemical agent, except where so stated.

† On one occasion so exactly as to bear a considerable resemblance to cystine, some of the crystals being perfectly equilateral; the majority however being rather elongated, their edges thick, the pervading yellow tint and the co-existence of distinct crystals of lithic acid, showed their true character: in the case now alluded to they had been precipitated by the action acetic acid.

- Fig. 11.—Modifications of the above, probably arising from variety of the position in which they are viewed, and of the manner in which the light is refracted by them.
- Fig. 12.—Varieties in the form of oxalate of lime crystals, which I presume are approximations to
- Fig. 13.—The dumb-bell crystals described by Dr. G. Bird.
- Fig. 14.—Similar crystals, also pointed out by Dr. Griffith.
- Fig. 15.—Moniliform clusters of very minute crystals of oxalate of lime.
- Fig. 16.—Crystals of the neutral triple phosphate of magnesia and ammonia, occurring as rectangular prisms, assuming a form like that of the roof of a house.
- Fig. 17.—The same.
- Fig. 18.—The bibasic triple phosphate produced by an excess of ammonia.
- Fig. 19.—Crystals of the cystic oxide or cystine, forming equilateral hexahædral laminæ. (From Dr. Prout.)
- Fig. 20.—Modifications of the same. (From Dr. G. Bird.)
- Fig. 21.—Crystals of muriate of soda, obtained from urine after the phosphates had been removed by precipitation with ammonia. The form is that of an equilateral octohædron, not flattened as is the case with the oxalate of lime crystal.
- Fig. 22.—Modifications of the above, produced either by hasty evaporation or by the presence and admixture of other crystallizable ingredients.
- Fig. 23.—Crystals of muriate of ammonia; these are seldom obtained pure from the urine, being more or less modified by admixture with muriate of soda. Thus the terminal crystals in each of the specimens which I have selected bear the characters of muriate of soda, and are easily distinguished from the other parts of the feathery crystallization which characterises most of the ammoniacal salts.

PLATE II





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