

On gout : its history, its causes, and its cure / by William Gairdner.

Contributors

Gairdner, William, 1793-1867.

Publication/Creation

London : John Churchill, 1851 ([London] : C. & J. Adlard)

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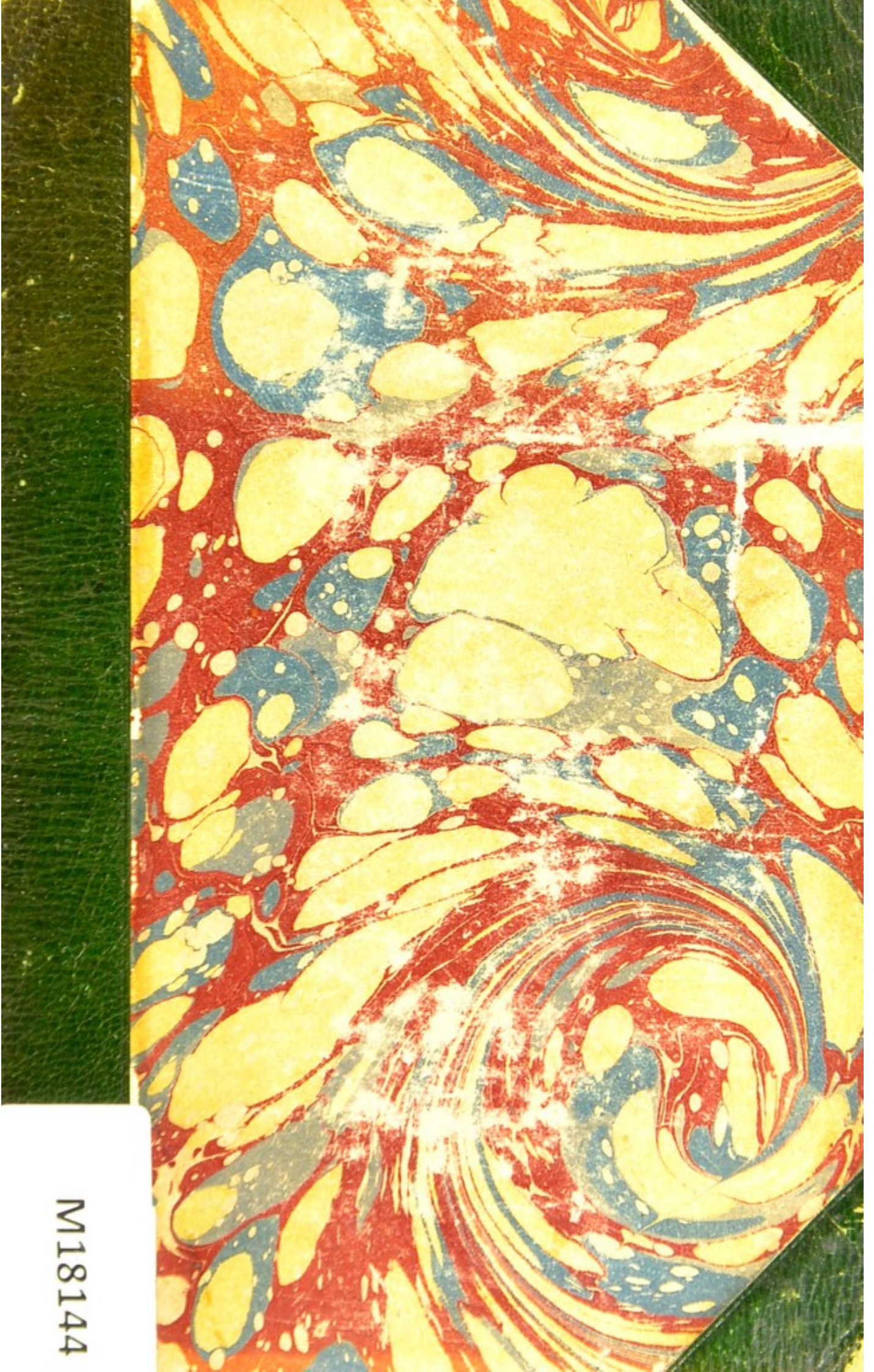
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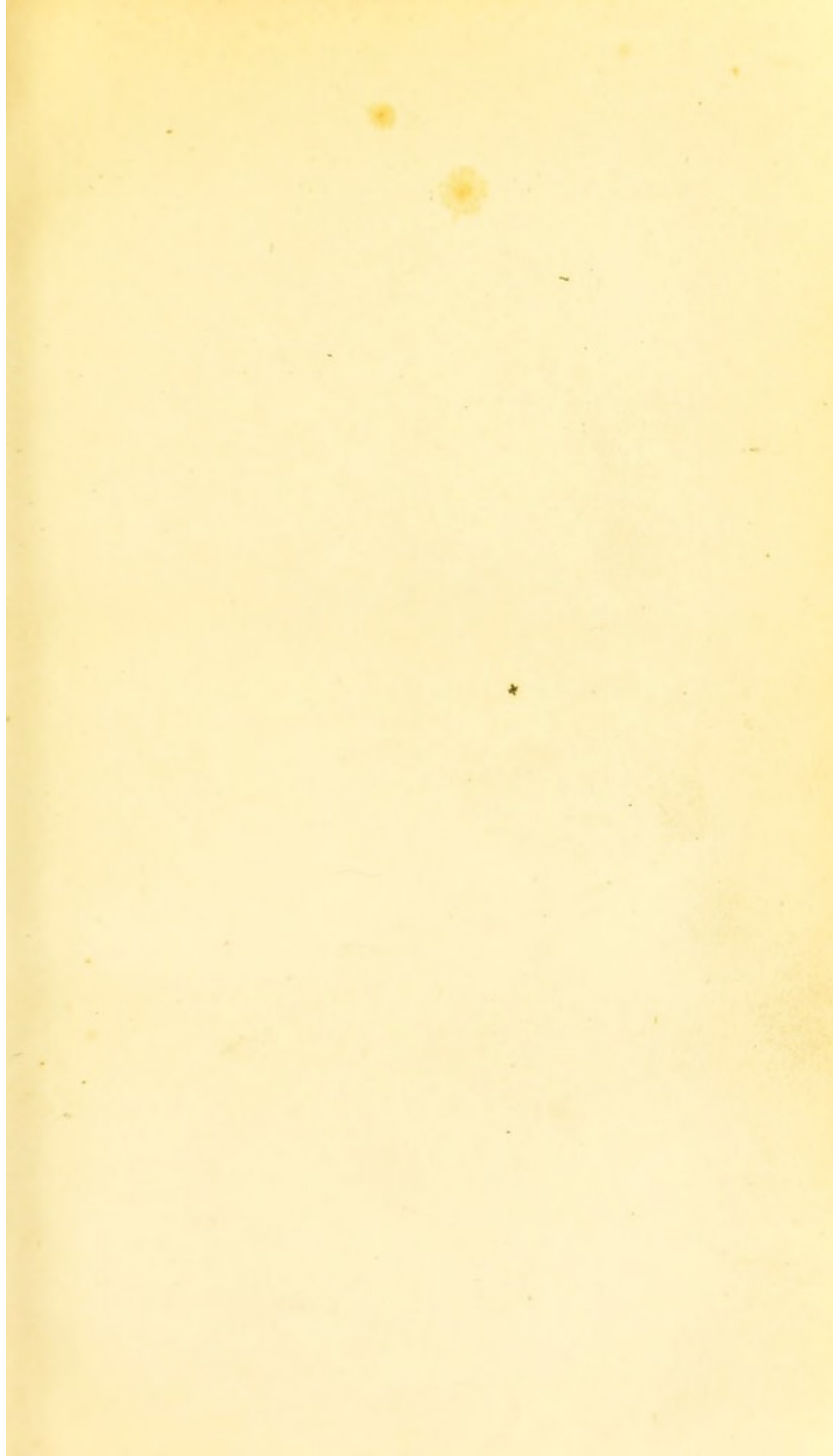




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ITS HISTORY, CAUSES, AND CURE.



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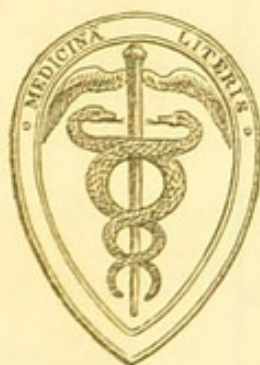
G O U T;

ITS HISTORY, ITS CAUSES, AND ITS CURE.

BY

WILLIAM GAIRDNER, M.D.

SECOND EDITION.



LONDON:

JOHN CHURCHILL, PRINCES STREET, SOHO.

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IN giving the first edition of this book to the public, many collateral subjects pressed themselves on my attention, for Gout allies itself more distinctly to every department of physiology than any disease with which I am acquainted. The necessity of confining a strictly practical work within narrow limits compelled me to exclude all except its most essential illustrations. Yet it was with reluctance that I omitted a short notice of the theory of sanguification, because, in the disturbance of this function, Gout may be said to take its rise. Had I been better satisfied with the received doctrine, I should have endeavoured to find in the organic changes of the blood the explanation of many important facts in the history of Gout. But I am not now more convinced than I was then, that to represent the great functions of respiration and sanguification as a mere chemical process for casting out carbon and

generating heat, is a very imperfect view of the most important office of living beings. How far I have succeeded in giving a wider scope to the vital alterations of the blood, the medical profession must determine. I, however, am not less urged by a consideration of the immediate phenomena than by reflection on their final cause, to the conclusion that their ultimate purpose and end are growth and nourishment, not mere destruction.

Of the remainder of the work I can only say that I have sought to make it more worthy the acceptance of the public, by enlarging and exemplifying all its practical parts, so as to embody clearly, though briefly, what I know of the disease of which it treats.

W. G.

BOLTON-STREET, PICCADILLY;

May 6, 1851.

CONTENTS.

CHAPTER I.	PAGE
Obscurity of Gout—Its great Frequency—Premonitory Signs— Anomalous Symptoms	1
CHAPTER II.	
Different Species of Gout—Stages of the Disease—Its History — Duration — Sequelæ — Terminations — Apoplexy — Menorrhagia — Melæna — Dropsy — Sudden Death — Cases — Hereditary Nature	13
CHAPTER III.	
Varieties of Gout—Atonic Gout—Its History—Metastasis .	48
CHAPTER IV.	
Theory of a Morbific Matter—Indigestion—Opinion of Cullen and Stahl—Uric Acid Diathesis—Origin of Uric Acid— Its Presence in Healthy Blood—Dr. Holland's Opinion— Dr. Garrod's Opinion	63
CHAPTER V.	
Organised Principles—Definition—Dr. Prout's Opinion of the Origin of Uric Acid—Urea and Uric Acid not found in Animal Substances—nor in the Stomach—Inconvertibility of Organised Principles—Hippuric Acid in the Urine of Herbivorous Animals—Relations of Urea and Uric Acid —Liebig's Opinion of the Origin of Urea—Effect of Respiration—of Sleep—of Exercise—of Food—Urine of Carnivorous and Herbivorous Animals and of Birds . . .	81
CHAPTER VI.	
Inflammation not Essential to Gout—Languid Circulation in Gout—Attacks the Aged—Spare Women and robust People—The Moxa—Allied Diseases	108
CHAPTER VII.	
True Nature of Gout—Visceral Congestion—Supposed Con- nection of Tubercle and Gout—Disorder of the Heart— Cause of Œdematous Swellings, and of the Local Disease —Suppressed Secretions	119

	PAGE
CHAPTER VIII.	
Constitution of the Blood—Oxygenation—Fibrin and Gelatin— Assimilation—Composition of Albumen and Fibrin— Pathological Observations—Origin of Fibrin—Gelatin—its Properties—its Origin—Sanguification—Recapitulation .	130
CHAPTER IX.	
Respiration a process of Nutrition—its Importance to Health —the Red Globules—their Office—Pathological Observa- tions—Remora in Globules—Steadiness of Albumen— Origin of Constitutional Disease	170
CHAPTER X.	
Exciting Causes—Sensuality—Moderate Indulgence—Women not subject to Gout—Men of Business much liable—Cause of this—Cullen's Opinion—Nervous Influence—Mortality of different Classes—Cardinal Corneli's case—Case of a Man of Business—The Argument condensed	184
CHAPTER XI.	
Curability of Gout—its Origin in Infancy—Diet of Infants— of Youths—of Adolescents—Nutrition necessary in Gout —Subsidiary Forces of Circulation—Exhalation of Plants and Animals—Sir D. Barry's Opinion of Respiration— Effect of Muscular Exertion—Use of Exercise— Sydenham's Opinion of Morbid Matter—Low Diet Inad- missible—Milk Diet—Vegetable Diet—Cure des Raisins —Drink of the Gouty—Beer—Wine—Spirits—Meat— Idiosyncrasies—Delirium Tremens	206
CHAPTER XII.	
Treatment of Regular Gout—Morgagni and Sydenham's Opinions—Quacks and Impostors—Bloodletting—Purga- tives—Alkalies and Antacids—Tonics—Hydrophathy— Colchicum—Mineral Waters	238
CHAPTER XIII.	
Treatment of Irregular Gout—Hasty Interference condemned —Cases—Abuse of Brandy and Cordials—Benefit of Patience and Delay—Cases—Frequency of Organic Disease—its Nature—Diet—Colchicum—Purgatives— Tonics—Gallic Acid—Metastasis to the Head—Blood- letting—Colchicum—Laxatives—Diet	280

GOUT;

ITS HISTORY, ITS CAUSES, AND ITS CURE.

CHAPTER I.

OBSCURITY OF GOUT—ITS GREAT FREQUENCY—PREMONITORY SIGNS—
ANOMALOUS SYMPTOMS.

NOT any of the diseases to which man is liable is a cause of greater perplexity and disappointment than Gout; yet this does not arise from the oft-repeated reproach of its intractable nature. It may indeed be said, with truth, that it is more curable than many, and it is certainly more amenable to relief than most diseases which fall under the cognisance of physicians. The regular attacks of gout cannot be said to give more embarrassment to a medical attendant than the assaults of any other malady; and, inasmuch as they are, for the most part, quite exempt from danger, they give little solicitude for the event. But it is quite otherwise with its irre-

gular forms. In the beginning of a physician's practice especially, while he is yet unfamiliar with any but the noted and typical forms of disease, the changing and mysterious phenomena of gout, and particularly its complications with other disturbances of the system, or injuries of parts, are full of doubt and difficulty.

In the earliest years of my professional life, my mind was frequently called to its consideration, to the observation of its various forms, the unravelling of its strange and confusing associations with other known forms of disease, and meditation on its cause and nature. I well remember how often I was perplexed by its obscure indications, how often I was surprised to discover it lurking unsuspected in the system, disturbing the healthy functions, and how greatly the intermixture of gout swaying the symptoms of other diseases from their natural and ordinary course, puzzled and disquieted me. The records of medical science afforded a very imperfect solution of many of these difficulties. In them, indeed, were to be found laborious and often weary descriptions of the disease ; its phenomena set down with a methodical accuracy, but very seldom presenting to me a picture of the facts I witnessed, and rarely, indeed, shedding any useful light on their nature. In these minute and exact histories, the symptoms are often classed in such a manner

as to exhibit the great diligence of the observer, and yet lead the mind of the reader, as little as may be, to the ready appreciation of their nature. The best arrangement we find, is that of the order of their occurrence, yet this is not always followed. It is true, as might be expected, that a practising physician of the present day will scarcely find his attention arrested by a circumstance or symptom of this disease, unrecorded by his predecessors ; yet it is equally certain that, in the doubts which assail his mind, he will often turn in vain to their writings for the solution of his difficulties.

I have hailed with great interest the works which have occasionally proceeded from some of our ablest physicians during my time, and particularly some writings which have, within these few years, issued from the press. But though I have found much matter of instruction in them, I have been mortified not to discover certain observations and thoughts of my own, reflected in the minds of my colleagues. Recollecting that my own opinions had undergone great change, I have been led to further inquiry, and though on certain points I may feel doubts strengthened, there are others on which re-examination and reflection only bring additional conviction. What these are will sufficiently appear in the following pages. Whether my interpretations are true or false, my contemporaries must judge. But

believing it may be of use to promulgate opinions earnestly and honestly formed, not so much from reading as from observation and meditation, I venture, with diffidence indeed, to add another volume to the many already written on this subject.

I shall be more readily excused for calling upon physicians to read another book, if the opinion I entertain of the great frequency of gout be correct. We are apt not to consider a man as gouty, unless he has suffered under a regular fit of the disease. I believe the gouty diathesis is often very perfectly developed in individuals who never see its local manifestations, and I am convinced that the strumous is not more frequent than the gouty habit.* This appears likewise to be the opinion of Dr. Prout, who, though he has nowhere directly stated his conviction, yet treats the two diseases as having their origin in the same depraved assimilation of alimentary matters. At page 495 of the fifth edition of his work on 'Renal Diseases,' occurs the

* I have watched, with interest, the criticism to which the former edition of this work was subjected, with a desire to benefit by it, and have been much struck by the unanimity of assent which this opinion received; but I have been still more pleased to find that friends around me, whom the high opinion of the public has placed in the most conspicuous stations in practice, and whose judgment may therefore be relied upon, have also pointed to it as eminently truthful, and coinciding exactly with their own experience. Sir Benjamin Brodie has taken the trouble, indeed, of writing me: "I entirely agree with what you say as to the very frequent occurrence of the gouty

following passage: "When too much food is taken relatively to the constitution of an individual, either the primary or the secondary assimilating processes, or both, may more especially suffer. In some instances, the primary assimilating processes are so weak and so easily deranged, that individuals are constrained to be careful both with respect to the quantity and quality of their food, and such individuals often escape the more serious and deeper-seated diseases of a secondary kind arising from excess. On the other hand, there are individuals whose primary organs will permit them to take enormous quantities of all sorts of matters. In some of these instances, such matters pass off by the bowels very little assimilated. In others, a large portion of them undergo more or less perfectly the primary assimilating processes, and are carried into the mass of the blood; and individuals, in whom this takes place, suffer more especially from derangement of the secondary assimilating processes, as from hepatic congestion, gout, &c.,

diathesis. A large proportion of the persons that come to me with what are esteemed to be local diseases, are, in reality, suffering from the influence of the gouty poison in the system, though they may have nothing which would commonly pass for gout." Yet I wrote the sentences here alluded to with some degree of hesitation, not that I in the least doubted the truth of the observation, but it seemed to me that a fact which lies on the surface should have been noted before. It is an example of a loss too often sustained by society. The knowledge of the aged and experienced frequently dies with them from want of leisure to record it.

particularly about the middle periods of life, when the consequences of excesses of all kinds begin to be manifested." At page 492, the same eminent physician has the following words, which sufficiently clearly mark his opinion of the common origin of gout and struma: "Strumous, lithic-acid, and gouty diseases, are all the results of mal-assimilation of the albuminous principle, and often gradually run into each other. Thus gout and struma are frequently, if not always, associated, and the gouty chalk-stones of old age may be considered as little else than the modifications of the scrofulous tubercle of youth, both being alike formed from mal-assimilation of the albuminous principle."

Now though I cannot, from my own experience, confirm these statements of Dr. Prout, having, as I shall hereafter state distinctly, not found the strumous and tubercular diathesis generally to coincide with gout, and having had occasion rather to observe the truth of the common and proverbial saying, that gout defends against other diseases, this does not prevent me from admitting the great probability of Dr. Prout's opinion, that these diseases may be accompanied by a similar condition of the vascular system in constitutions not essentially alike, and having quite different tendencies. To this subject, I shall again call attention in a very earnest manner. It is one replete with interest. Nothing indeed more amply requites the labour of a physician

than the study of the constitutional origin of disease. Any progress made in this direction is almost sure to give disclosures directly applicable to practice ; and I believe there is not any malady which, in this point of view, ought more strongly to arrest our attention than gout.

It has been frequently remarked, that the first attack of gout occurs, for the most part, in the midst of perfect health. I believe that in this observation there is a very considerable deception. It is quite true that persons of great vigour and apparent health are particularly liable to this disease, and that its first invasion often occurs in the midst of undiminished strength ; but that state can hardly be reckoned a condition of health, under which lurk the seeds of a formidable and painful complaint. Persons, however, who are conscious of every aptitude for enjoyment, and who are much occupied with their affairs or their pleasures, are little attentive to the small beginnings, those incipient signs of disorder, which are the forerunners of gout, and are therefore frequently caught by it, as is commonly said, in perfect health. It is of great importance, both to the individual patient and to the proper understanding of the disease, to mark and determine such premonitory symptoms. And this is no easy matter, for we can rarely get from patients, who have no habits of observation

or self-examination, an exact account of themselves ; seldom, indeed, a reasonable one.

All definitions of gout affirm, that its external manifestations are preceded by dyspeptic affections of the stomach. This, however, is chiefly true of subsequent attacks of the established disease, and by no means applies to its first invasion, which undoubtedly often happens without any preceding dyspeptic symptoms. Persons, indeed, in whom the first stage of digestion is sound and vigorous, and in whom the assimilating process is also complete and apparently healthy, are singularly liable to gout. The earliest sign of an approaching fit of the gout, to which my attention has been drawn, has been a dull pain in the left side of the chest, accompanied by an inability to lie on that side, and sometimes by fluttering, irregularity, or intermission in the action of the heart. These symptoms often continue for a great length of time, without any perceptible increase. Patients not apt to take alarm about themselves, frequently suffer them in silence, and even forget them.

These are very often the only precursory symptoms of gout, and they are sometimes relieved by a single dose of medicine, or a gentle course of physic, before they proceed to an actual paroxysm. A visit to any aperient mineral spring, or even a fit of spontaneous diarrhœa, will remove them. But if

such signs of disturbed health be neglected, they increase so as to become distressing, giving rise to very inordinate action of the heart, to great throbbing and palpitation, which seriously interfere with comfort and well-being. This inordinate pulsation often makes itself very inconveniently felt in the head, making stooping, hurried walking and running, distressing or impossible. A difficulty of respiration and feeling of stifling sometimes accompany the marks of disturbed circulation. To these are added tumefaction of the right hypochondrium, and impeded action of the liver. In the train of the above symptoms is found dyspepsia, which does not in general show itself in the first instance.

The next symptoms in order of time are signs of impeded cutaneous circulation. The sweat and sebaceous exudation, which bedew the armpits and interstices of the toes, disappear, and, with the unnatural dryness, the patient is disturbed by heat and itching of those parts. Eruptions chiefly of the scaly kinds appear on the skin. Pityriasis, psoriasis, and lepra are very common. Acne and eczema are often met with. But no cutaneous affection is more common than nettle-rash. I have known it plague its victim many months, and even years, before the gout reached its paroxysm.

Hæmorrhagic complaints, and particularly piles, often attack those who are destined to undergo the

greater sufferings of gout. I have seen both hæmatemesis and hæmoptysis cured by a regular fit of the disease.

A great variety of symptoms, classed by practitioners and authors under the head of anomalous symptoms of gout, infest those persons in whom the malady is struggling for a vent. The gouty diathesis, indeed, almost invariably distresses, in a very remarkable manner, the nervous system. Such symptoms are very justly entitled to the name of anomalous, because they are not only subject to infinite variety, but it is oftentimes, from their very irregularity, and the impossibility of reducing them to any known rule, that practitioners are disposed to suspect the existence of gout. Hemicrania, neuralgia, pains affecting the eyeballs, the ears, the fauces, the teeth, and the lumbar regions, are all premonitory of gout. I have seen the tonsils so sharply seized with gout, as, in the absence of any considerable degree of inflammation, to induce me almost to accuse my patient of exaggeration, till an unequivocal symptom of gout explained the mystery. The same thing is very frequently witnessed in the teeth, where severe toothache, without the smallest decay of these organs, owes its rise to gout. I have more than once seen perfectly sound teeth extracted in such cases, without the least relief.

The local manifestations in the joints are usually

looked to as the most characteristic signs of impending gout. They are not more remarkable, and, in my opinion, much less constant precursors of the first attack of the disease, than those described above. Yet certainly persons who are threatened with a fit of gout, do very often experience great tenderness of the feet in walking, weakness and pain of the ankles and wrists, pain of the ischia in sitting, and frequently have swellings of the articulations of the fingers and toes.

The bowels are for the most part more torpid than is natural, and though the urine be bright, and without sediment, it is sharply acid; and, if the same vessel be always used to receive it without cleaning, it will soon become incrustated with urates, which does not happen at other seasons.

These are the premonitory signs of an approaching attack of gout. It is of much importance to form a clear conception of them, and mark them distinctly, for this is the best season for remedies. In the next chapter I shall give a somewhat detailed account of the usual course of the disease. I believe there is much truth in an observation of Dr. Craigie, in his 'Practice of Physic,' repeated by Dr. Todd in his 'Croonian Lectures,' that it is in the natural history of gout its real character and nature must be sought. Its natural history, I apprehend, is best seen in its external manifestations, not, however, grouped according to the methods

often followed by the students of the great kingdoms of Nature in artificial and local arrangements to aid the memory, nor even slavishly set down in the mere order of time. The history of gout has been thus written by the older physicians with a particularity which leaves no room for any new dissertation; but the descriptions of a malady, which distresses every part and every texture of the body, which perplexes and vitiates every function, if given after such methods, only leave a confused picture on the mind. Its various symptoms appear unconnected by any common bond. If the history of the atonic and irregular forms of gout be set down in the order of time, the observer is only led into doubt and amazement; by meditating over them, and tracing divers signs to a common cause, we shall gain a clearer light, and more faultless beauty of arrangement. It is true, that to describe a disease according to a preconceived notion of its nature is hardly admissible in a science of observation; but the well-instructed reader, and, still more, the experienced practitioner, do not require that I should weary them with the oft-repeated tale of gout. They will, however, take an interest in seeing its manifold symptoms classed according to some general idea, by which that which was before chaotic and unintelligible becomes organic and distinct, presenting to the mind a clear outline and satisfactory explanation.

CHAPTER II.

DIFFERENT SPECIES OF GOUT—STAGES OF THE DISEASE—ITS HISTORY — DURATION — SEQUELÆ — TERMINATIONS — APOPLEXY — MENORRHAGIA — MELENA — DROPSY — SUDDEN DEATH — CASES — HEREDITARY NATURE.

THE gout has been divided into a great variety of species by nosologists. These distinctions have chiefly had in view the part affected, or the manner of the attack ; they have been little attended to by practising physicians. Dr. Cullen reduced the number of these species to four. This, indeed, was avowedly done by that celebrated physician, and has been much followed since his time, less on account of any admitted difference in the nature of such species than for the sake of convenience ; but they seem to me not even to possess this very humble recommendation. They tend rather to mislead the mind, by fixing it on unessential, and therefore unimportant distinctions. The four species recognised by Cullen are the regular, the atonic, the misplaced, and the retrocedent gout. Of these, the regular and the atonic gout alone deserve a separate place ; they alone have a solid distinction in the nature

and form of the disease. It might be easy to devise a better nomenclature ; but these names are now well known, and I am averse to the introduction of new terms into a science already overloaded to such a degree, that the most distinguished practitioners feel the language of our profession more copious than useful, or easily remembered.

But there is a distinction to be made in the history of the regular gout of far more importance than these artificial ones ; it is that of the different stages of the disease, marking its nature by the effect on the constitution, and guiding our practice by an accurate appreciation of the inroad it has made. In my experience of this complaint, it has appeared to me to divide itself most naturally, and very easily, into three stages. These, indeed, are not to be separated by any very clear outline, nor by any precise intermissions of time. They are characterised by their effect on the constitution, and are so plainly marked in the history of each individual case, that they cannot fail to impress the mind of a thoughtful practitioner.

In the first stage of gout, the patient, whose strength is yet undiminished, and whose constitution is unhurt, has experienced the attacks of the disease at irregular and distant intervals. These attacks, it is true, have been severe, and, for the time, have weakened him both generally and locally,

but the fury of the malady being once spent, and the balance of the constitution re-established, he feels little inconvenience, and for the most part altogether forgets his misfortune.

The second stage of the disease is marked by more serious affliction. The fits of gout, indeed, are seldom so painful as in its earlier period; but their frequent returns, and the greatly diminished strength of the patient, demonstrate the strong hold which the malady has taken. He now finds exertion much more laborious than formerly. The diminished strength of the limbs, and particularly of the ligaments which embrace the joints, is made painfully evident to him. His step has lost its elasticity, his tread its firmness and resolution; his hand-writing, once clear and strong, becomes tremulous and indistinct; he is subject to frequent dyspepsia, and finds it necessary to regulate his diet with great care; many articles of food, formerly taken with impunity, must now be carefully avoided, any excess being attended with serious inconvenience. Intermissions of the pulse, palpitations, and faintness mark the part which the heart takes in the general disorder; the complexion loses its clearness; enlarged subcutaneous veins creep over the face; the lips are livid; the eyes bleared, and the conjunctivæ loaded with blood; chronic cough, with ropy expectoration, proceeding gene-

rally from the bronchi, torments him, and destroys his rest. Slight variations of temperature affect him, and everything denotes a weakened frame, and an altered being.

In the last melancholy stage, the patient rarely experiences a decided attack, and yet it can hardly be said that the malady is ever absent. For a very short period in this country, in summer, he obtains an intermission of suffering, but only to relapse into pain, as soon as the approach of winter makes itself felt. Few articles of food now agree with him. Even the simplest and lightest give rise to the most painful symptoms of indigestion. His sufferings from irregular action of the heart are now much increased. Faintness and palpitations are his most familiar feelings. The debilitated and attenuated limbs hardly sustain him. The exercise of a carriage is the greatest that he can bear. Such is the state, not only of muscular but of nervous weakness, into which he has fallen, that he dreads everything which moves about him. A rude approach throws him into a state of alarm. Men who, at former periods of life, passed their time amid contention and noise, are reduced to a pitiable condition of childish weakness. Even nurses and attendants cannot comprehend it. The great Lord Chatham, who suffered much from gout, fell into this state, and during many years was accused of

intentional deception. It may have been so: but physicians, more readily than other men, will believe that his seclusion was the consequence of natural illness.

These symptoms mark the condition of the patient when the fit is absent, during the three stages of gout. It is of great consequence to keep them distinctly before the mind. They never fail to suggest themselves to me when I see a case of this disease. I do not mean, however, to affirm that every case will bear classifying under one of the heads above mentioned. There is here, as in all other natural changes, a nearly imperceptible gradation. It is undoubtedly, in some degree, an arbitrary act to take the patient at certain stages of his progress in disease, in order to describe his condition. But the above states are familiar to practitioners, they have a foundation in nature, they not only aid us in the study of the disease, but they fix the mind on changes of which it is of the last importance not to lose sight in estimating the chance of recovery, the choice of remedies, and the general direction of the cure.

In recent cases, the paroxysm of gout very frequently supervenes, without any kind of warning; but when the gouty diathesis is well formed, and the patient has already undergone repeated attacks, it is nearly always preceded by dyspepsia. The food

readily becomes acescent. The patient is afflicted with heartburn, flatulency, and anorexia; the bowels are confined. The urine is much diminished in quantity, and readily deposits a crust of urates on the vessel which receives it.* He has tenderness in the feet in walking, complains of a tight boot or shoe, or of being crippled in his fingers, or wrists. At the same time that these pains appear, he is usually relieved from the distressing feeling of indigestion. Should the local symptoms suddenly disappear, without the recurrence of dyspepsia, the fit is at hand. It generally comes on in the night. The patient awakes from a profound sleep to find himself in the agony of the disease: It rages for some hours with increasing violence. If the part attacked be then examined, it is sometimes found swollen and covered with a deep red or purple rash. More frequently it is slightly crimsoned over with a diffused blush; but often no local outward sign of the malady can for many hours be discerned. One of the most remarkable local symptoms is the state of the superficial cutaneous veins leading from the affected part. They are uniformly swollen and

* This amorphous deposit consists of urate of ammonia with urates of soda and lime. Its extreme insolubility leads me to believe that it sometimes, at least, contains pure uric acid. I have frequently thrown on it vast quantities of water, both hot and cold, without in any degree affecting it. Housemaids, too, well know that in such cases the knife alone will remove it.

turgid with blood, no matter what part of the body may be assailed, and this sometimes to such a degree as to give them a varicose appearance. When the foot is the seat of the disease, the saphena vein is felt hard, and painfully affected through its whole course. Patients, surprised by the sudden assault of so formidable an enemy, often describe their sufferings with a great deal of fancy, comparing them to the effect of a screw, of molten lead, &c. All are convinced that no such pain was ever before experienced. When it has lasted some hours, the affected part swells. It has hitherto been dry and hot, but is now moist. The pain at the same time sensibly abates, and the sufferer drops into a profound sleep. On awaking, the limb is swollen, disfigured, and œdematous. The dark purple rash, in some rare cases, is deepened in tint almost to blackness, and does not disappear for many days, passing through the variety of tints, yellow, green, &c., which characterise a true ecchymosis. The pain continues much diminished throughout the day, but is renewed at night, though with less intensity. In this alternation it lasts a greater or less number of days, according to the degree that the constitution is impregnated with the disease; the tumefaction and tenderness of the part gradually disappear, and the limb recovers its former agility.

The disease is throughout accompanied by marked

feverish symptoms, increasing in paroxysms every night with the assault of the pain ; but this fever is not that which accompanies ordinary inflammation. The pulse is not hard or throbbing, but rather that form of dilated pulse which characterises hæmorrhagic affections. The tongue is generally heavily coated with a brown fur, the stomach oppressed with wind, and the bowels torpid and confined. The urine is scanty and high-coloured, and on standing throws down a more or less copious deposit, which is usually affirmed to consist entirely of urates. This, however, is unquestionably an error. I very often see the close of gout marked by a very free discharge of phosphates, and Dr. Bence Jones has shown very clearly that the alkaline phosphates may be in excess even when the earthy ones do not appear. Indeed, nothing can be more striking than the fitful appearance of these salts. They show themselves, and vanish again in a few hours, according to the moral condition of the patient. But they are without doubt to be considered quite as much as the urates in the light of a critical evacuation at the termination of the fever, or period of increment of the disease. It is of consequence to mark this, because conclusions adverse to the truth have been drawn from statements at variance with fact.

Such is the history of the simplest form of regular gout. It most commonly makes its attack in the

spring of the year, more rarely in the autumn, and much less frequently at other seasons. Its return is very uncertain, but the paroxysm having subsided, the patient, especially if he be prudent, is exempted from it for a considerable space of time. The instances, however, in which one fit is the beginning and end of the disease are few indeed. After a more or less protracted interval, it renews its attack, and by degrees its returns become more and more frequent, till at last it is established as an annual visitor, or even an almost constant companion.

The ancient name of the disease (*podagra*) sufficiently denotes the fact that its most frequent seat is the foot. This, too, is probably the safest and least agonising form of the disease. As it approaches nearer the centre of the body, it seems to me always to give rise to a more exquisite degree of suffering. Gout in the hand is certainly more painful than that in the foot, and when it seizes the shoulder, which it often does, it gives rise to still greater torture, especially if the breathing be thereby embarrassed. I have seldom seen more exquisite pain than from gout in the nape of the neck and the occiput, of which I find no mention in authors, though it has very often presented itself to me; and when it lays hold of the fauces, stomach, or diaphragm, the agony it occasions is well known.

The state of mind during a fit of regular gout

has often attracted the attention of physicians. All have observed the singular irascibility of temper and impatience, with which the most amiable persons are seized. The faculties are far from being obscured by the disorder. On the contrary, it is admitted by all, that the play of fancy is more brilliant during a fit of gout than at other times. The capacity for mental labour is even increased. Not long ago, I saw a gentleman transact much business, requiring thought and calculation, during a long fit of very painful gout, and heard him declare that it was his best remedy.

On the subsidence of the fit, the patient generally enjoys much better health than before its invasion; but this is not always the case. Very often the system is not yet sufficiently relieved, and the symptoms of dyspepsia continue nearly as before. In such cases, when the patient has recovered the use of the affected limb, the other leg, or perhaps a hand, begins to ache. This pain gradually increases, and terminates in another acute and feverish attack, attended with a similar train of symptoms, in which may be perceived this difference only, that they are all less painful and more lingering than on the former occasion.

It has been admitted by most practical writers, that a certain outward conformation of the body marks a predisposition to gout. Persons with large

heads, of a sanguine habit of body, and who perspire very freely, have been stated to be in a particular manner prone to the disease. I cannot say that my own experience proves the truth of these observations; but I have certainly seen that people of a heavy muscular form, with a natural tendency to fatness, and those who have a large and protuberant abdomen, are singularly liable to gout.

Notwithstanding the severity of the symptoms I have described, this disease is often extended to a long period of three months; but such is by no means its most ordinary duration. A fit of the gout will usually run its course in ten days; and it is very common to see it attended with sufferings of far less gravity than those I have described. One or two painful nights, with a few days' swelling and weakness of the part, and but little constitutional disturbance, will finish the matter, and restore the patient to health. It is sometimes observed in this simple form, the part having a smooth and glossy appearance, without redness, pain, or other uneasiness. In cases of this kind, the parts most commonly assailed are those most liable to pressure, such as the ball of the great toe or the heel, and those parts most stretched and strained, as the plantar muscle, the fascia covering the instep of the foot, the thumb, the fascia of the wrist, or the metatarsal and metacarpal ligaments. These gouty

pains at times yield to rest, and are sometimes driven off by violent exertion.

When the patient has suffered repeated attacks of the disease, the effused fluids are imperfectly absorbed. The solid and earthy matters remain behind, to form knotty excrescences on and around the extremities of the bones, limiting the action of the joints. These tumours, called chalk-stones, are not painful, unless at the time of the paroxysm. When once formed, each successive attack of gout adds a layer of solid matter to that already deposited; and I have frequently observed these concretions grow much in size, though the patient may not have been conscious of the accession of any painful symptom. By the increase of the tumour, it invests the joint more and more, but it also approaches nearer and nearer the surface, till at last the thin film of skin covering the chalk-stone gives way, and the earthy deposit is exposed. Fistulous openings are then formed, and a fluid, containing much of the same earthy matter, mixed with a sanious discharge, is effused. This matter is often of a very foul and offensive quality, especially when it proceeds from the neighbourhood of the larger joints.

Renewed and oft-repeated attacks of gout do not fail to make sad havoc with the health and strength of the patient. It is matter of great interest to observe the mode in which his powers are under-

mined, the gradual inroad made on his digestive, secreting, and excreting powers, on his vital functions, and on his nervous and circulating systems. The first complaint is generally of the great loss of muscular power. Not the fibrous structure alone, where the disease had taken up its abode, but the whole muscular system of the body, loses activity and strength; this, conspiring with the indolence so natural to the gouty, yields them up more ready victims to the disease. The process of nutrition in the muscles is less perfect than before. They lose bulk and perish; and this decline goes on, till, in the last stages of the complaint they may be felt, as it were, dissected beneath the skin, and rolling under the finger like so many separate ropes.

The most remarkable change is in the functions of the stomach. The appetite becomes more capricious; it is greatly impaired for all the simpler kinds of food, and seeks the stimulus of condiments and dainty preparations. Even with their aid, and often because of their aid, the patient endures much from flatus, acidity, cardialgia, and spasmodic pain of the stomach; but these obvious evils are less than those which reveal themselves to the eye of the physician. The comminuting and dissolving, which Dr. Prout has named the reducing power, is much impaired. Many kinds of wholesome food seem to defy the action of the gastric juice, pass into the

bowels in a solid state, and may be detected, after having undergone small change, in the excrements. It is probable that the fluid articles of food also do not pass through the requisite process, though this can be less readily ascertained. The consequence is not only great irritation in the bowels, but deficient nourishment of the whole frame.

It might naturally be expected that the heart, which so readily shares in the disorders of the stomach, should exhibit signs of suffering; but the functional disturbance of the heart transcends anything which can be explained by the sympathy of neighbouring organs. Though the patient suffers much when the stomach is replenished with food, his complaints are hardly less when it is empty. Formerly, when his digestion was rapid, he was able to pass many hours without food; he now feels faintness and failure if not frequently supplied with it, and craves the assistance of cordials to defend himself against the sensations of exhaustion. These sufferings beset him not in the day only; they often seize him in the stillness of the night. I have seen patients of this kind who had passed into a complete swoon during their sleep, and greatly alarmed their friends by their haggard looks when they recovered from their syncope. At this stage of the disease, the pulse, by its feebleness, irregularity, and intermission, always denotes the condition of the circulation.

The superficial veins, in these extreme cases, often lose their tumid and varicose appearance, and instead of the light blue colour they exhibit in healthy persons, or in those who are a little advanced in the disease, they become a much darker hue. I have seen them like mahogany or mulberry stains, threading their way under the skin. But in protracted cases, where some vigour of constitution remains, it is on the contrary not unusual to observe increased plethora of blood, and this more and more remarkable as the disease makes deeper and deeper inroads on health. Chronic phlebitis is sometimes seen associated with this state. More than one case of this form of disease has occurred to me as well marked as the phlegmasia dolens of puerperal women, and running the same course.

Defective nourishment of the brain and defective innervation of the whole system are the consequences of the state of the heart's action. This is demonstrated by the increasing feebleness of the whole man, his tottering gait, his frequent vertigo, his imperfection of sight and hearing, his inaptitude for mental exertion, his loss of memory and other faculties, his yawning, his listlessness, and his torpor and drowsiness after food. Hence also the increased weakness of his digestion, while it is probable that the diminished energy of the brain reacts also on the heart, augmenting the disorder of the whole system.

The bowels partake of the universal torpor: unless regulated by medicine, they are seldom if ever relieved. The patient is subject to severe nephritic pains, and the urine is loaded with urates. To this is nearly always added a discharge of mucus, more or less copious.

After this history, it is not difficult to understand that ruin of the system which I have endeavoured to pourtray in the three periods into which I have divided this disease; nor will it be difficult to admit the different ways in which nature terminates her work.

One of these is apoplexy. The same disposition to the deposit of earthy matter, which is so manifest in the articulations of the limbs, is equally evident in the arteries and veins. Their friable coats can no longer bear even the diminished impetus of the blood. But, though the heart is now acting with less energy, the pressure of the circulating blood is, for various reasons, oftentimes greater than before. The limbs and moving powers, it is true, have diminished in bulk, but the belly is more protuberant. Fat has accumulated around the great viscera, which, joined to the congested state of these organs themselves, and the impeded circulation through them, forces an unnatural flow towards the head and brain. The records of medicine are full of examples of apoplexy consequent

on and arising from gout. It is unnecessary to cite instances of that which is notorious to all physicians.

Another termination of gout is menorrhagia in women at the age when they usually cease to menstruate. This is very frequently seen in a mitigated degree. As it is generally at this period of their lives that women are attacked by gout, the discharge of blood often serves the purpose of a vicarious disease and a cure. It generally alarms them much. There are cases, however, in which they are very justly alarmed. The loss of blood goes the length of extreme and dangerous flooding. But such cases are rare, and generally occur in women of loose fibre, of indolent life, and of self-indulgent habits in matters of diet.

The same observation will apply to the case of bloody discharges from the bowels—a far more frequent termination of gout. Hæmorrhoidal bleedings are very profuse, but they give less alarm, though they are liable to be confounded with that more dangerous form of hæmorrhage from the vessels of the portal system, characterised by its dark fluids, of the colour and consistence of pitch. These terminations—apoplexy, menorrhagia, hæmorrhoids, and melæna—are but varieties of the same affection. The seat is different, the disorder is the same. Hæmaturia is often mentioned as a con-

sequence of gout. It is rare even as a symptom. I never saw it terminate the disease. Hæmorrhoids, indeed, and menorrhagia, though they frequently put an end to gout, seldom do so after the manner of apoplexy and melæna, by putting an end to life, but by bringing on the next, the most common, and the most alarming occurrence in gout, viz., dropsy, which now claims our notice.

The most usual forms of dropsy in gouty subjects are hydrothorax and ascites, caused by the imperfect functions of the great excreting organs; the liver and the kidneys in this, and by the disturbance of the heart in that form of the disease. General dropsy, or anasarca, is much more rarely seen in gout. It cannot surely surprise any one that a disease, which has its principal seat for many years in the central organ of the circulation, should terminate at last in dropsy. The commencement of the dropsical affection is obscure, and the attack often evanescent. It is very common to observe a manifest fluctuation, which has disappeared the next day. A similar remark may be made regarding the water in the chest. It is not unusual to see a gouty patient oppressed with what he calls his asthma, and to receive plain indications through the stethoscope of the presence of liquid in the chest, and yet to find these symptoms disappear in a few hours. This is easily explained by relief given to the action of the heart.

The case of a lady, who was attended in her last illness by Dr. Bright and myself, will well illustrate these different positions. In spite of a life of very considerable mental distress and disturbance, she enjoyed robust health till she approached her fiftieth year. She then became subject to severe and frequent headaches. The stomach showed great signs of weakness. She became addicted to the use of antacids. The bowels refused their office except under the compulsion of medicine. The urine was loaded with urates. The catamenia had entirely ceased for six months, when she had a fit of gout. This was succeeded in the following spring by another, but gentler paroxysm. For several months after each attack she had much improved health. The next winter she was seized, while out of doors, with a menorrhagia, so sudden and profuse, that ere she could return home, the blood had penetrated all her clothes, and had even soaked through the cushion of the carriage. These floodings returned at distant intervals, but she had no more severe gout. Matters continued in this state for a whole year, during which she had four different attacks of flooding. Her headaches and her dyspeptic symptoms now left her, and she congratulated herself on having got over the critical period of a woman's life. She was plagued, however, with great tenderness of the feet, which, together with the

weakness induced by her long illness, made her give way to indolence and inaction. She often declared to me that she knew she had the gout in her system, struggling for issue. In this state I was summoned one day to see her; she had been struck down with apoplexy. It became necessary now to take away more blood. On her recovery she had symptoms of hemiplegia, which, however, entirely disappeared at the end of a week. She now again thought herself safe, and forgetting all rules of diet as before, relapsed into a similar illness, from which she recovered only to fall a victim to ascites, little more than three years from the beginning of her sufferings. This case, though crowded into so short a space, well illustrates the history and tendency to gout. Had there been more self-control, more wisdom and moderation in diet, this lady's malady might have been extended over many years, and would probably have taken quite a different course; but advice, though eagerly sought after and anxiously listened to, when danger and suffering were present, was soon forgotten when these disagreeable monitors were seen in the distance.

These are the terminations of gout, which are accompanied with alteration of structure and destruction of organs; but I fear I shall hardly obtain the assent of some of my readers, when I state my conviction that gout is sometimes the cause of death,

without any intervening processes, like those I have detailed above. Such are the cases of sudden death, so often heard of in gouty persons, and generally, but very arbitrarily, referred to gout in the brain, and gout in the heart. I believe that many of these cases are only syncope, too profound, and too long continued. The mechanism of the body has, in truth, stood still. Nor can this appear wonderful to those who reflect on the history of this disease, and on its great influence in harassing and destroying the functions of the most important organs of the body. The following cases will, I think, prove the truth of this opinion.

A soldier, aged 48, was brought into the hospital of Val de Grâce, and placed under the care of M. Broussais. He was in great pain from what was then deemed sciatica, but which, in the course of the following day, proved to be a severe fit of true and regular gout. He had suffered much from hard service, and more from hard drinking. The disease ran through its regular course ; but when the local malady was over, and he had recovered the use of his limb, the man remained in a state of great distress from pains in the abdomen. At that time Broussais' particular doctrines concerning inflammation of the bowels and mesentery were in their greatest favour, and though, to my eyes, it wore a very different aspect, yet this man's case was con-

sidered an instance of the disease then in fashion. He had a great many leeches applied to the stomach, and repeated again and again; whilst all solid food was strictly denied him, and even his liquid aliment was of the least nourishing kind possible. It was not surprising, certainly, that the man died; yet it would not be true to say that he died of inanition. Many other patients in the same hospital, at the same time, suffered greater extremities of hunger than he; nor did he show any unusual weakness. I saw him within an hour or two of his death, and found him cheerful, with a voice clear and sonorous, hinting his dislike of doctors and their ways, and his belief that '*une demi-heure du cabaret me remettrait mieux que les médecins.*' Poor fellow! I believe he was right. He was, however, under military discipline, and could only submit. But it then appeared to me certain, and does not appear to me more doubtful now, that he would have surmounted all the effects of starving and depletion, and probably have swelled the list of the cured, had not the blighting influences of gout been added to other causes of destruction. He was talking cheerfully to his companion in the next bed, when he felt a sudden faintness creep over him, laid his head on his pillow, and expired. His body was opened, and, after a most careful and minute investigation, no sufficient cause of death could be found. The left ventricle

of the heart was thought enlarged, and its walls somewhat attenuated. The case was made the subject of a few clinical observations by Broussais, and I never listened to that remarkable physician with greater pleasure and profit, nor felt, in a more striking manner, the effect of his clear and strong method of instruction, his seizure of practical points, his freedom from mannerism and the utterance of jargon without meaning, to fill up time, which is the ruin of much clinical teaching. Though he did not see that his peculiar practice had any share in the event, yet he at once perceived the great cause of it to be gout, and gave us, his pupils, some illustrations, which remain deeply graven on my memory, regarding the influence of the disease in perverting and masking the cause of other maladies.

But though I believe that some of these cases of sudden death are entirely owing to the influence exercised by the disease on the brain, and other portions of the nervous system, and through them on the heart, I still think, that, in many cases, the condition of this organ itself will best explain the event. We have too few opportunities of inquiry, and till of late years were probably not armed with the requisite instruments of minute anatomical analysis. One case has been sent to me by my brother, Dr. Gairdner, of Edinburgh, which I insert here, because it is an apt illustration of these ob-

servations, and because the dissection was skilfully conducted, and the changes of structure minutely observed and recorded.

“Mr. P—, aged 63, became subject, in 1841, to the class of symptoms which are referable to the cause of his death.

“I find that in July, 1842, he had an attack of vomiting, with pain and faintness, which was allayed by a draught of camphor with morphia and magnesia.

“On the 3d of September following, he had a sudden dyspnœa, with slow and feeble pulsation of the heart, from which he speedily recovered, under the influence of opium and of hot spirits and water.

“On the 9th of September, 1842, he had pain in the cardiac region, which was relieved by cupping.

“After this he had always some distress at the heart in walking rapidly up-hill, but in other respects was generally pretty well till June, 1846, when he had a smart attack of regular gout, which lasted nearly three weeks.

“Since then he has been occasionally troubled with giddiness and pains about his chest, especially in the cardiac region.

“Towards the end of August, 1847, these pains were more troublesome. He became uneasy lest he should not be able to attend the marriage of a near relative, in the beginning of September;

but he got through it better than either he or I expected, encountering the fatigue of a considerable journey to accomplish it. On his return, the symptoms recurred. He was occasionally giddy, and had pains in different parts of his chest; chiefly in the cardiac region. On the 13th he came home in a coach, having felt giddy in a shop where he called for a little spirits and water, in consequence of pain in his chest and dyspnœa. He was almost immediately better. I begged of him to avoid muscular efforts as much as possible, and ordered him a liniment containing tincture of aconite to be applied to the chest, which he afterwards thought had been very useful to him.

“His death happened in the most sudden manner early in the morning of 19th of September, 1847. He was in bed at the time, and appeared to have died in a sudden syncope.

“I had often examined the seat of the heart, but never could detect any abnormal sounds.

“Examination of the body forty-one hours after death.

“Body considerably loaded with fat in the abdominal region, and other usual situations.

“The morbid appearances were in the *heart*, *aorta*, *kidneys*, and *liver*. They were detected principally by microscopical examination.

“*Heart*. Size and thickness of its parietes na-

tural. Aortic valves *very nearly*, perhaps not *absolutely* healthy. Some points of ossification were observed about their roots, but not affecting their form. In the mitral valve some of the columnæ carneæ, at the points of insertion into the chordæ tendineæ, were changed into a whitish dense texture. The aortal segment of the valve was thickened in particular parts, which were of the density of cartilage. Dimensions of all the cardiac orifices normal; valves of the right side of the heart also normal. The muscular substance of the heart, and more especially of the ventricular septum, appeared, when closely examined, to have undergone a change; having become a lighter colour, with a tinge of yellow, and having lost a part of its natural fibrous appearance. It could be torn, however, into short fibres, which were easily lacerable.

“*Aorta.* The arch was very considerably dilated, but without any deposit in its tissue.

“*Kidneys.* Secerning portion of a light ochrey colour, more especially in the right kidney. Tubular part was of the proper proportion to the cortical.

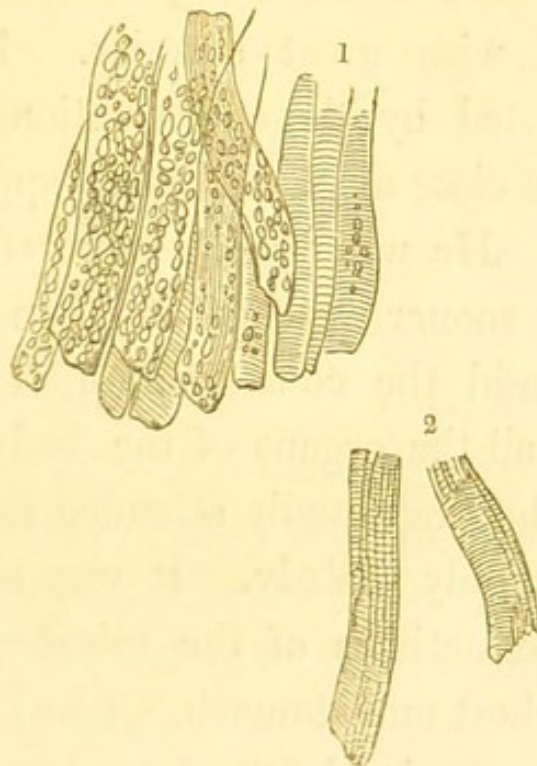
“*Liver.* Was paler than it ought to be, and unequally pale, particular parts being quite anæmic. It was also softer and more soapy to the touch than natural. Its size was normal.

“*Microscopic examination.* The ultimate texture of the heart had undergone the granular de-

generation; the fibrillæ were easily broken up, the striæ being everywhere in great part supplanted by irregular granules.

“The epithelium of the liver and kidneys, and the tubuli of the latter, were also filled with fatty granules and globules.”

The drawing, for which I am indebted to the kindness of my friend Mr. Dalrymple, whose skill and accuracy in microscopical research are well known, will show the state of disorganisation of the muscular fibre alluded to. It is not difficult to comprehend that with this fatty degeneration of its ultimate structure, muscular contractility



The first figure represents muscular fibres which have undergone the process of fatty degeneration, intermixed with more healthy structures. In the second figure, the normal structure of muscular fibre is seen. Both are taken from the columnæ carneæ.

should be overcome. I imagine this to be the source of future dilatation of the cavities of the heart, but more observation and longer inquiry are here required.

A gentleman, aged 63, complained of some disturbance of the stomach, with confined bowels, foul tongue, feverish condition, and dejection of spirits. He sent for a neighbouring surgeon, a young man, who had never had charge of his health before. A brisk cathartic of calomel and extract of colocynth was administered to him, which was followed by a dose of senna and salts. Not being relieved the next day, but, on the contrary, feeling somewhat worse, a similar dose was prescribed, which acted with great severity. He appeared much exhausted by these evacuations, and while sitting on the close stool, his looks appeared vacant and ghastly. He was quickly removed to his bed, and had no sooner reached it, than he swooned and died, amid the consternation of his friends. In this case, all the organs of the body were found healthy. I had repeatedly attended this gentleman for gout, his only malady. It was always of the atonic, and sometimes of the misplaced kind, attacking the chest and stomach. I had never known him have a very painful fit. His gout was attended by very slight, if any, discoloration of the part affected, but by diffuse, œdematous swelling; he

always suffered much from depression of spirits and dyspepsia. He did not, according to the usual rule, feel relieved in health by the occurrence of a fit. On the contrary, even after it was over, he required some weeks of nursing and care to restore him to his wonted spirits and vigour.

Those who have witnessed cases like the above, and have watched the waning strength of the frame under the pressure of gout, will easily understand the pernicious effect of any great and sudden calamity on a wasted constitution. The following case, related by Morgagni with all his fidelity and care, contains so good an illustration of many points related above, that it seems to find here a very suitable place. “George Corneli, Cardinal of the Holy Roman Church, and Bishop of Padua, having been for a long time past extremely subject not only to pains of the joints, but to pains of the kidneys also, and being now free from these pains, no calculi appearing any more, and the discharge of urine being greatly diminished, seemed to be falling into a dropsy, and perhaps was really so; but that a powerful diuretic given to him caused the discharge of a great quantity of urine.

“To these complaints were added a continual costiveness for a long time together, a heaviness of the head, and subsequently of hearing, together with a propensity to sleep; and, finally, frequent swoon-

ings. In this manner, having scarcely passed his sixty-fourth year, he at first lost his appetite for all kinds of food; and then was attacked with the arthritic paroxysm; and now his right hand and his left knee began to swell, when he received the melancholy news of the fatal disorder of his most serene brother, Giovanni, Doge of Venice, whom he sincerely loved.

“From this time he, though in other respects a man of great magnanimity, was seized with wonderful sorrow and pain. Soon after, the gouty matter was no longer carried to the articulations, and that which had been already deposited there was returned to the system. He was then seized with tightness and anxiety of the præcordia, which soon increased to faintness and lipothymia, in which the functions of both brain and heart failing, death seemed at hand.

“His pulse was extremely weak, and generally intermitted at every third pulsation, always, however, after a few beats. It was manifest that he could not be saved, unless the morbid matter was recalled to the joints. But it was equally evident that with such failure of power, the difficulty of accomplishing this would be very great, and particularly as he was firmly persuaded in his own mind that all our remedies were useless.

“The knee at one moment began to swell again, on

which we perceived signs of returning improvement in the pulse ; but nature soon after yielding, every bad symptom grew worse. His difficulty of breathing increased. His head was more and more oppressed. The torpor universal. Not only the limbs, but the internal parts were seized with convulsions ; and in this way died that most excellent cardinal, best of priests, and great encourager of learning.”

The body was opened by one of Morgagni's pupils, and the following changes of structure were observed : The viscera generally were much loaded with fat ; the stomach was large, with greatly attenuated coats ; the liver unaltered ; the kidneys larger than natural ; the right one, together with the fat covering it, had attained the size of a man's head. It contained eleven calculi, some of which were large and ramifying. The cartilages of the trachea were indurated. The same induration was remarked in the aorta, from the heart to the iliac arteries, and increasing in degree according to the distance from the heart. The aorta within the thorax was much enlarged. The heart contained little blood, which was generally deficient throughout the body ; but there was considerable accumulation in the brain, the vessels of which emptied themselves freely when cut into. The brain itself was soft and diffuent, with much serosity.

I have given this remarkable case at some length

because it illustrates many points concerning this disease, to which it is my wish to draw my readers' close attention, and because I think the effect of gout, in breaking down the solid structure, and destroying the functions of the body, is well exemplified by it. I shall now conclude the history of the regular disease by a short statement of a case which occurred to myself a few years ago. An officer in the army had retired from the service, with broken health and the gout. I did not then attend him, but was informed that he rarely escaped having a long fit in the spring, and sometimes suffered under two paroxysms in the year. There was great indigestion, with habitual costiveness. The urine was always loaded with urates. His pulse was irregular and feeble, and he had habitual cough, with expectoration of viscid mucus. He was suddenly afflicted by the misconduct of his daughter and only child, to whom he was much attached. This blow was too much for his enfeebled health. I was then called to visit him ; his painful gouty feelings in the feet had entirely disappeared, but his dyspeptic symptoms had greatly increased ; his appetite had vanished, and he had become subject to frequent faintings.

From day to day these symptoms increased ; and I was informed that he died with unequivocal signs of hydrothorax, at Brighton, whither he had resorted in the hope of improvement.

The experience of physicians in every age, indeed the common observation of all mankind, has sufficiently established the fact of the hereditary nature of gout. It does not always descend from father to son in uninterrupted succession, but often passes over a generation or two, though freely exposed to its exciting causes. It rarely, however, fails to resume its dominion, even in a third or fourth generation.

Women are certainly less obnoxious to it than men. Yet its paroxysmal form, under the age of puberty, is by no means unexampled, though it is rare. Many instances of it are related by our best authors, and most physicians have seen it. I have myself repeatedly observed it, and have even met with two instances of it in very young girls.

These examples of gout in children are interesting, because they point attention strongly to an opinion which I shall endeavour to establish, and impress on my readers in a future part of this work, that though the gout rarely breaks out in regular fits at a tender period of life, the gouty diathesis is often formed at that early age.

I have now given the history of regular gout, such as it has presented itself to my observation ; taking little account of, or omitting altogether, symptoms and appearances which are common to all great disturbances of the system, and which indicate little more than that the person suffers. The real character

of the disease has always appeared to me veiled by descriptions loaded with unmeaning symptoms. It may seem that I have presented it in darker colours than the truth will justify ; and this will particularly strike those who have been accustomed to consider the gout as only a relief to the system, and whom the accidents of practice have not brought acquainted with its heaviest calamities. But it was necessary that I should pursue the history of the disease through those cases in which its course was uninterruptedly and decidedly downwards. Let it not, however, be supposed that the gout always fills up such a history as that I have given, or even that such an array of symptoms is very usual. The cases, on the contrary, in which the constitution struggles well with the disease, are very numerous, and these do not occur, for the most part, in the strongest individuals. Very often they are found in persons of loose fibre, in whom the action of the heart is sound and unimpeded. Such persons generally have sharp and feverish attacks, attended with considerable temporary weakness. It is indeed not uncommon to see them pass through a long and self-indulgent life with regular annual or biennial attacks of gout, which seem to have no other effect than that of restoring the individual to the enjoyment of better health ; and even to observe the disease at the close of life, when all the vital and natural powers

have felt the influence of time and progress of decay, also abate in virulence, and actually cease to trouble. The reader who carefully considers all these things, and the fact that many deaths, which have their first cause in gout, are often set down to the account of other diseases, will now have no difficulty in explaining some apparent inconsistencies. The deaths from gout, enumerated by the Register-General, very little exceed 200 in about 350,000 annually, and the average of the week is generally set down at a small fraction of a unit. No one surely will believe this to be a correct representation of the mortality of the gout. That it is not so, we may convince ourselves by looking at the list of queries put by the companies who undertake insurances on life. Gout there figures in the first class, and probably takes precedence of every other disease. The directors of the companies in question take eager and anxious cognisance of the liability to gout, well knowing its great influence on the duration of life.

CHAPTER III.

VARIETIES OF GOUT—ATONIC GOUT—ITS HISTORY—METASTASIS.

HAVING now traced the history of gout, where it follows its usual, or, as it is technically called, its regular course, from its first faint beginnings to its conclusion, it remains that I should advert to those varieties of the disease in which it becomes irregular and devious. I have been censured by some of my friends for having, in a former edition of this book, treated this branch of my subject with too great brevity, and this reproach would have been merited had it not been my aim rather to present a picture of the regular form of the disease than a history of its varieties. But I propose now to give greater expansion to the details of atonic gout, and fill up the sketch sufficiently to give a more distinct conception of this form of the disease, such as it has appeared to me. When the minute features of gout are examined, they are found as various as the individuals whom it assails. As the constitution changes it receives a new inflection, departing more or less from its type according as its nidus is in a

young or old, a robust or weak individual; a sanguine or melancholic, plethoric or spare constitution. This may indeed be said of most, if not of all diseases; but of none is it true to the same extent as of gout. Patients themselves have made this discovery, in which, indeed, there is no great merit, for it lies on the surface; we thus hear them speak of "his" and "my gout," as if they were things of quite distinct creation.

Physicians have of late years recognised only three varieties of irregular gout; of these, I have already said, that I thought the atonic gout alone was entitled to a separate place. I am inclined to make a subsidiary distinction between that atonic gout which arises in a frame naturally feeble, and that which exhibits itself in persons weakened by debauchery and excess, or worn out by the cares, fatigues, and accidents of life. The latter form of atonic gout I have never witnessed under forty years of age; the former may, I think, be seen even in infancy: one is the result of external circumstances; the other springs from within, is sown with the seed, and ripens with the man.

The atonic gout rarely manifests itself in its incipient stage, like the regular disease, by disorder of the circulation. It first shows itself by affection of the stomach; every form of dyspepsia is present, but particularly gastrodynia and flatulency. The bowels

are confined ; and this state of constipation, if neglected, according to a doctrine now in fashion, is relieved by occasional disturbance and diarrhœa. The urine is sometimes loaded with urates, which appear and disappear with the greater or less pressure of the complaint.

But it is on the nervous system that the atonic gout makes its deepest impression. The patient is the victim of every kind of vague and inexplicable suffering ; pain is the least part of his distress ; there is a general sense of uneasiness, sometimes referred to one part, sometimes to another, without constancy, regularity, or rule, which keeps him in continual alarm. He takes the gravest view of his situation, and, when his physician can detect no sign indicating the least risk, he prepares himself for some sudden attack of dangerous disease, and talks to his friends of his approaching death. But though pain is a small part of his complaint, it is often considerable. Hemicrania or megrims beset him ; pains of the scalp and occiput torment him ; stitches in the side, and difficulty of breathing, simulating the distress of true asthma or bronchitis, with copious mucous expectoration, afflict him ; and these symptoms often go on for a great length of time without proceeding to any local indication of the disease which is really the cause of the disturbance, so as to leave it a mere matter of conjecture and probability

that the whole is to be referred to the influence of latent gout in the system.

When these symptoms have long distressed him, he is sometimes relieved by a regular fit of the gout. But the instances of atonic gout which never ripen into a fit, and from which patients suffer very miserably during a long life, are extremely numerous ; nor is the relief which follows a paroxysm at all commensurate with that obtained in the regular gout. Not unfrequently, indeed, the sufferings of the patient appear aggravated by the fit. This might have been expected from the form of the complaint, which manifestly owing to peculiarity of constitution is in no degree changed when the fit is over. The same habit which prevents the attack, makes a lingering paroxysm. The atonic gout, though less painful, is, for the most part, tedious, uncertain, abating its violence and resuming its hold, much subject to metastasis and displacement, in every way giving cause of disappointment, and difficult to treat.

In a subsequent part of this book I shall have to show in a more explicit manner the dependence of gout on the condition of the nervous system. At present let it be accepted as a fact to be afterwards demonstrated, that the atonic form of gout is mainly owing to an enfeebled nervous influence pervading the system and destroying the tone of all the func-

tions. When a vigorous action of the brain imparts power to the circulation, gout will always assume its regular and healthy type. These and other points are, however, best exhibited in examples to which I now proceed :

I was, some months ago, summoned to see a gentleman suffering under a severe attack of gout in both feet and one of his hands. As I entered his room, he saluted me with an apology for having some years before treated with disdain my opinion and that of several other physicians that he had the gout. He was then affected with the most miserable hypochondriacism. Dissatisfied with all regular physicians, he had for a long time betaken himself to quacks of every quality and of both sexes. But to such an extent had his wretchedness of feeling gone, that he was watched with great care by his friends, who had endeavoured, not without reason, to obtain his seclusion in a madhouse. His digestion was much disturbed. The bowels, indeed, acted regularly and largely, but he had every form of dyspepsia ; notwithstanding which, his appetite was a large one, and sometimes monstrously indulged, while at others he refused himself even necessary aliment. His urine was not more acid than is often seen in health, and perfectly clear of deposit ; but there were considerable gouty deposits on the joints of both hands. In the course of last

summer, he drank the waters of Recoaro, in the north of Italy, and recovered considerable strength. Soon afterwards I was called to see him in the state which I have described, and quite freed from all his misery and all mental illusions. I think he will now remain happy *with the gout*.

Another patient, who has now consulted me for many years, has not the good fortune of the person whose case I have just related. He has, indeed, long intervals of good health, and thus enjoys a relief unknown to many similarly afflicted, but he is from time to time the victim of the deepest gloom. When thus seized, he scarcely ever sleeps, loses all appetite, and bewails himself like a child. He has never had a regular fit of gout, but he has chalky swellings on his knuckles, every form of dyspepsia, an irregular pulse, and frequent and copious deposit of urates. Like the patient whose case is just narrated, he is a glutton in his diet; and it is observed by his children, that his attacks are preceded by corpulency, and that loss of substance and weight is the harbinger of his recovery.

These are two striking examples of the form of atonic gout when it afflicts the mind. But there is every degree of this affection, from the gentlest solicitude about health to the deepest despondency. Women are often, and particularly about the period when menstruation ceases, the victims of this form

of gout. It is in them accompanied by much hysteria. Unfortunately, it induces them to seclude themselves, and in retirement they grow worse. Their remedy is occupation, air, and exercise.

In the following case the influence of a congenital feeble organisation of the nervous system is shown. The subject of it was the son of a wild and eccentric father, who, after a brief and absurd career of profligacy, ended his life in extreme misery. My patient was born about the time of his father's greatest errors. I mention the fact because I believe the children of debauched parents singularly liable to this form of disease. In infancy he was subject to convulsions, and had several attacks of epilepsy at the period of puberty. He was tall and slender in person, but athletic, and considered himself superior to most men in muscular strength, though not remarkable for his capacity to endure long-continued fatigue. He early felt that slight errors in diet were attended with serious inconvenience, and, at the age of twenty-five years, had become a confirmed valedudinarian. His complaints were dyspeptic, and were attended with a very unusual degree of gastrodynia. I did not then know him; but, from the history he submitted to me, I believe that the first dawn of a gouty diathesis had already manifested itself. After trying many other plans, and, I believe, making great abuse of medicine according to methods then

in fashion, he consulted Dr. Lambe, and by him was submitted to a strict vegetable diet, with distilled water as his only drink. He was undoubtedly relieved of many urgent dyspeptic symptoms. His pain of præcordia left him. Headaches, to which he was much subject, also vanished. Pain of right hypochondrium and lumbago were mitigated. His urine, which had been constantly lateritious, became less turbid. In fine his condition was much less intolerable, though he was not well. In this state he remained many years with frequent fluctuations of health. But growing worse, and finding the system, which had hitherto served him, failing, he consulted me. He was now in his fifty-second year, and had acquired a considerable degree of corpulency, but it was very easy to perceive that no increase of muscular substance had taken place. There were great layers of subcutaneous fat; and, from his own account, it was very manifest that he had grown indolent and feeble. To this, no doubt, his vegetable diet had, in a considerable degree, contributed. But he still remained bigoted to that system under which he thought he had much profited. His consumption of food was very large, for his appetite was great. I endeavoured to limit his diet. To this he submitted for a time, but growing or fancying himself weaker, he broke loose from restraint, and I saw him no more till I was summoned some months

afterwards to visit him in a supposed apoplectic fit. While conversing with his banker, he suddenly became speechless, but there was no other sign either of apoplexy or paralysis. Before I saw him, he had lost in the space of a very few hours forty-five ounces of blood. The pulse was not full, and rather less frequent than natural. He gradually recovered speech and consciousness, but there remained a degree of hebetude which struck all his friends, and made them despair of his eventual recovery. At this time he was seized with gout in the hands and, less painfully, in the feet, which gradually increased, and never afterwards wholly deserted him. Like many others, he hailed this as a certain cure. On the subject of diet, he was now quite unmanageable. He ate, at all hours, vast quantities of thick pultaceous soups, made of peas, beans, lentils, and vetches of all sorts, seasoned with milk, eggs, butter; for all these were vegetables in the school to which he belonged. In truth, he had become an epicure in his own way, and a glutton too. Though crippled in all his limbs, and nearly confined to his chair, he constantly cried out for food, the only gratification left. He was a good example of the last condition of the gouty, manus habent et non palpabunt, pedes et non ambulabunt, clamabunt tamen in gutture. My remonstrances against this practice were not acceptable, and I was

dismissed for more complaisant advisers. He lived miserably five years longer ; sometimes obtaining a little transient relief, and dying at last of universal dropsy.

These cases of atonic gout exhibit the effect of an enfeebled nervous system in its production, and enable us to understand its association with exhaustion of all kinds, whether proceeding from great mental exertion and disturbance, bodily excesses, or congenital constitution. I might illustrate the subject further by an accumulation of instances ; but interspersed through this book will be found cases brought forward to prove other points which will afford abundant examples of the nature and course of the atonic form of gout.

The other supposed varieties of irregular gout are, for the most part, only forms of the atonic disease, and it is this which constitutes their great danger. When, owing to feebleness of constitution, the gout declares itself in one of the great viscera of the body, or is removed from the limbs to the stomach, heart, or other great central organ, in consequence of exhaustion, there can be little doubt of the serious risk of the patient. If the stomach be the part selected for attack, it commonly announces itself by sudden and violent spasm, or what is called cramp. This is accompanied by great sense of heat, sickness and vomiting, hiccup and faintness. The vomiting consists at first of mucous and serous matters, which

unless relief be given, become darker, till they assume the colour and consistence of the well-known coffee-ground discharge, which is not unfrequently mixed with copious ejections of blood.

This is the most urgent form of the disease; but displaced gout in the stomach often shows itself in a much more moderate manner, occasioning gastrodynia, of a dull and chronic kind, most intractable to remedies. Such affections, however mild may be their aspect, and however much the patient may be able to pursue his ordinary course of life, should never be treated slightly by a physician. Hiccup, of a very obstinate kind, is a frequent attendant of this form of gout. I have seen it distress patients by day and night, without any intermission, for a great length of time. It often comes on after a sudden suppression of the discharge of urea and urates by the kidneys, and I consider it an unequivocal sign of approaching danger.

When the gout is translated to the heart, the first symptom is often profound syncope: it is also sometimes the last. The patient expires, not after the manner of the sudden death related in the last chapter, but under a severe and griping spasm of the heart. If he survive, he is seized with violent palpitation and tumult on the left side of the chest, deep and dull, but yet great pain of the heart, short and laborious breathing, and orthopnœa. These

last symptoms generally continue days after the fainting and palpitation have been removed, and are, for the most part, attended by cough and copious expectoration. It is long before the patient feels anything like his former stability of health, and he frequently remains ever afterwards a shattered and enfeebled being.

But the translated gout to the heart has also its mitigated form; and this affection is exceedingly treacherous. Its only sign is often a slight irregularity of the heart's action, of which the patient's feelings give him no local warning whatever. If there be not joined to the affection of the heart disturbance of some neighbouring organ, it is not improbable that he will live in a false security. It is commonly, however, associated with affections of the lungs, of which the following case will afford a good example. On a journey, which I had occasion to undertake in a distant part of the kingdom, I called at the house of a friend, which happened to be in my way, and found him suffering from what was called a cold. He was at a distance from all medical advice, and having no alarm about himself, he was treated by his wife, after her manner, with calomel, black dose, and opiates. His cough had come on without any apparent invasion of fever, and was attended by an unusual depression of spirits and reluctance to exertion. I was struck with the

condition of his pulse, which was very feeble and intermittent. Knowing him to be a gouty person, I had little doubt of the cause. I ordered the medicines to be discontinued, and a couple of glasses of good wine to be given. This was reluctantly done; but his cough ceased nearly from that time. In the evening, he partook of some plain dinner, with good appetite, and was very cheerful. But that night he had a painful fit of gout in the ankle. He went through the ordinary stages of the disease, and was well.

These forms of atonic gout, which seize the stomach, diaphragm, heart, and organs of respiration, are often associated together. Indeed, where one is present, with any considerable degree of intensity, the others are seldom wholly absent.

If I may trust my own experience, the metastasis of gout more frequently takes place to the head than to any other part. It is usually stated that it shows itself in the common forms of apoplexy and paralysis. I have found these the rarest forms of the disease. I have more commonly seen a kind of stupor, in which the patient preserves his senses of hearing and sight, but loses his consciousness of persons and circumstances, place and time. He knows no one about him, not even his own family; his utterance is imperfect, or altogether lost; he seems like a person entranced; his eyes are vacant

and staring; his pulse is full and hard; he understands some of the things said to him, and will do as he is bid, if that which is demanded of him may be easily and quickly done. When asked to do so, he will hold out his hand or show his tongue, but is unable to comprehend any lengthened phrase. He probably hears only one word in a sentence, and does not know any thing or person around him, unless his attention be forcibly called and pointed to the object; yet he smiles stupidly on all, and seems conscious of his own infirmity. But matters do not arrive all at once at this degree of exasperation. Long before the healthy or physiological action of the brain is thus completely overcome, it has been obscured. The patient has suffered from violent and pertinacious headaches. He is observed to be somnolent, especially after repasts. He shows less alacrity of mind, and loses interest in things which formerly occupied him. He is himself conscious of less mental aptitude, and regrets the loss of former vivacity. Such is, according to my observation, the common form of metastasis of gout to the brain, in which it is not difficult to discern the first stage of oppression. If it proceed to complete apoplexy, the symptoms do not vary from those of its ordinary form. When cerebral disturbances occur, it will generally be found that the urinary and hepatic secretions are either totally or partially

suppressed. Matters which should be eliminated from the body, thus retained in the system, never fail, even in a more moderate degree, to excite great disturbance, of which we shall find ample evidence as we proceed with our inquiry.

Let no practitioner neglect the slightest warnings of these aberrations of gout. He who does so, however often he may escape without blame and without harm, will surely at last be caught in disgrace and calamity. His patient, lulled into a false and fatal security, will undertake duties, which he ought studiously to avoid, for which he is wholly unfit, and will break down at the moment when all his strength is most needed. The case of a late eminent German statesman, who sank under this form of gout amidst the most critical affairs of his country, is a striking illustration of the weakness and the risks which lurk under apparent strength in this deceitful condition.

CHAPTER IV.

THEORY OF A MORBIFIC MATTER—INDIGESTION—OPINION OF CULLEN
AND STAHL—URIC ACID DIATHESIS—ORIGIN OF URIC ACID—
ITS PRESENCE IN HEALTHY BLOOD—DR. HOLLAND'S OPINION—
DR. GARROD'S OPINION.

THERE is not any disease to which the old humoral pathology has left a richer legacy of error than this of gout. It pervades all the language we use, whether in speaking or in writing, and, as usually happens in such cases, through the terms we employ, confusion and mistake reach our thoughts. A late able writer on gout, indeed, openly avows his belief in the existence of a *materies morbi*, and he has since been followed by others not less eminent than himself.

In describing this disease, we are almost irresistibly led to employ a figurative and somewhat poetical language. Its phenomena readily adapt themselves to the metaphor of a surging mass, a coction, or a wandering vapour, and authors endow its assumed matter with a kind of separate existence, describing its wanderings to and fro, up and down in the body, till it chooses its local habitation,

there to mature its strength, exhaust its fire, and thence be eliminated from the system. These fanciful speculations no doubt afford a very ready solution of some appearances. They seem to account for the preceding discomfort and disturbed health of the patient, for his gradually increasing uneasiness, and for the sudden vanishing of many symptoms simultaneously with the explosion of the local disease. But it is surely a violation of all the best rules of philosophy to explain obscure phenomena by means of an assumed principle or fact of at least doubtful existence—notum per ignotum, obscurum per obscurius.

The notion of a morbid poison is not altogether without practical consequences. If it therefore be an error, it cannot be so immaterial to admit its existence, as the partisans of this opinion presume. We are much more frequently called to witness and prescribe for the atonic symptoms than for that form of gout, which has received the name, and is believed to be the type of the regular disease. In such cases it is a popular and favorite idea, which even receives countenance from men of science, that much relief is always obtained by bringing on an attack of the regular disorder, and that this may be laid down as a rule of practice. That such ideas are, for the most part, fallacious, and such hopes of benefit a miserable delusion,

multiplied experience amply convinces me. I do not deny that a paroxysm of gout is often accompanied by the relief of many symptoms which had previously distressed the patient. But, if its cause be viewed in the light in which I shall subsequently present it, a fit will by no means be always considered an advantage ; on the contrary, the first and most earnest endeavours of the physician to bring the disease in its active and regular form under his control, will often have the effect, and sometimes the salutary effect, of giving it the atonic aspect above alluded to.

This idea of eliminating some offensive poison from the system not only pervades all our best treatises on gout, but may truly be said to govern the minds of many of our best practitioners. I shall therefore be excused if I dwell with some pains on this part of my subject. If the idea be an error, it is of much consequence that it should be thoroughly expunged from the thoughts. I am convinced, too, that a careful analysis of the phenomena of gout will remove much of the obscurity which hangs over it, and satisfy all persons that there is no occasion to have recourse to analogical theories and metaphorical explanations of the fit, though that peculiarity of habit which makes this disease more incident to some individuals than to others, must still, and I fear ever will remain an

unravelling mystery in gout, as in most, if not all, other constitutional diseases.

It has always been reckoned a matter of much importance in the study of a disease, to discover its latent and proximate causes, its nature, and its seat. Many terms have been current among physicians to express the ideas here represented. But it is necessary I should define strictly in what sense I use the words cause and seat, because much misunderstanding may arise from the careless use of a term. By cause I would simply be understood to mean that state or disposition of a particular part, or of the whole fabric of the human body, which is necessary for the production of the phenomena of gout; and by seat of the disease I mean that particular part, if there be any, on which its symptoms, whether of pain, irritation, inflammation, or morbid change of structure, are particularly and exclusively demonstrated. In this view of our subject, though our success may be limited, we may yet, I trust, see some of that cloud removed which hangs over it. The intimate and essential nature of all diseases is obscure, but it is of the last importance that we should discern clearly where our knowledge ends, and where the region of conjecture begins. Too often the progress of science is synonymous with the demonstration of ignorance. Doubt is the parent of discovery. If we perceive distinctly what

points are yet subject to uncertainty and question, we shall best know whither to direct our inquiries, and shall avoid the snare of concealing real ignorance under a cloak of imaginary science.

Several eminent authors had already hinted their distrust of this morbid humour of gout before the time of Cullen, and had they not adopted theories still less tenable, it is probable that they would have seen more clearly how imperfect an explanation of the disease was afforded by the hypothesis in fashion. But Stahl and Cullen, I believe, first expressed plainly and boldly their utter disbelief of any morbid matter in gout. The reasons they assigned, indeed, for this opinion, were many of them weak enough, and they substituted theories of their own, resting on a very narrow basis of conjecture. Their great objection, therefore, that the hypothesis of morbid matter was unnecessary for the intelligence of facts, which could be better explained another way, necessarily fell to the ground, and the medical world reverted to the ancient popular belief in the poison of gout.

But though, as I have said, several eminent physicians of our own time have openly expressed their belief in a *materies morbi*, and though it dwells too much in the mind of many practitioners, it is undoubtedly true, that this easy and profitless explanation finds little countenance from physicians

in general. Another opinion, however, prevails, which, leading yet to a sounder mode of treatment, seems to me to involve hardly less of error. The very frequent accompaniment of symptoms of disturbed digestion has led to this theory by a natural and strong impulse. Patients, too, have aided in spreading the prevailing belief. It is flattering to their conceit and pride to attribute their sufferings rather to a constitutional peculiarity than to self-indulgence and ill-regulated appetite. This is not an opinion of modern origin. In all times, disorders of the stomach and bowels have necessarily drawn much of the notice of physicians. Scattered through their writings, the opinion may be found that this is the cause of all the phenomena of gout. “*Indigestio viscerum merito pro origine proxima hujus morbi habetur.*” Van Swieten, *Comm.* 1255. But if it be considered how often the disease exists in its severest forms, with little, if any, sign of dyspepsia, and that in its first invasion, when the real nature of the complaint may be supposed to be most clearly indicated, and its accidental complications to be least manifest, the signs of depraved digestion are nearly always absent, it must be admitted that some other cause should be sought for. It is indeed proverbial that the first attack of gout is attributed to a sprain, because it supervenes in the midst of the rudest and most

perfect health. To such a degree is this the case, that a physician seldom fails to get much credit for sagacity, who utters the word gout in these circumstances. A very old and experienced physician indeed, once told me that he was generally "taken in" by the first attacks of gout. He could not, even after long and multiplied experience, make up his mind to pronounce in favour of so formidable a disease on the evidence of one symptom in the midst of such perfect health. On the other hand, I have seen physicians so much struck by the sudden invasion of gout, and the absence of all other signs of disturbed health, that they were ready to suspect the presence of the disease in all circumstances. Gout was ever ready to solve for them any difficulty, and dissipate all doubts. They were like the celebrated surgeon, who discovered a syphilitic taint in every obscure case brought before him, and who would not admit in favour of his patient the fact that he had not been exposed to infection; "if it was not you, it was your father, and if he was not guilty, your grandfather was."

All that has yet been proved with regard to indigestion amounts to this, that it is the most constantly attending symptom of the gout. It is, however, so great a familiar as to be seldom absent, when the disease has made repeated visits, and has laid any considerable hold on the constitution. From

a consequence and a satellite, it may easily be erected into a cause. There is nothing more common than to meet with individuals in whom the least disturbance of the stomach and bowels excites an attack of gout. I have at this moment under my care a gentleman in whom any of the drastic purgatives, however small the dose, immediately stirs up an attack of gout. He dare not exceed a teaspoonful of castor oil at a time, and is obliged to be cautious not to employ even such an aperient too frequently. Such cases naturally lead men to believe indigestion to be the great and sole cause of gout. I am strongly of opinion that the real explanation is the irritation produced in a constitution where there is already extreme proneness to an attack, and where the digestive powers have been much injured, either by previous excess or previous disease.

One of the most remarkable results of arthritic indigestion is the presence of acid in nearly all the excretions of the body. This has of late years been called the uric acid diathesis. The adoption of such a term would imply a conclusion, to which I am by no means prepared to assent. By a diathesis, I understand a condition of the constitution, and not a simple affection of certain fluids of the body. Undoubtedly this acid condition is very general. Dr. Garrod has lately much extended our knowledge by a very interesting proof of the existence of uric acid

in the blood. Its presence in the joints had been previously made manifest by Wollaston ; Landerer found it in a concretion between the coats of the aorta ; it has been discovered in several fluids of the body in a state of disease. But, admitting that these accumulated facts are sufficient to justify us in the use of the expression to which I have adverted, it could not, by any means, be called the uric acid diathesis, for it appears that various acids make their appearance in the secretions. Berthollet supposed that the acid of the sweat was the phosphoric ; Berzelius and Anselmino showed it to be the lactic ; Thenard found acetic. No one, too, as far as I know, has ever found uric acid in the stomach, but there seems little doubt of the presence of the hydrochloric, and lactic, and the acetic in cases of dyspepsia. This idea of a uric acid diathesis as the cause of gout meets with another and a fatal difficulty from the fact that urates in the urine are common to gout with many other diseases. Ordinary indigestion, from whatever cause, or a slight and ephemeral fever, will cause this appearance. Dr. Prout has indeed here established a solid and useful distinction between that deposit of urates which is occasional and transient, and that which is more durable. "The lithate of ammonia in the urine is one of the most common attendants of slight dyspepsia from errors of diet." But the same substance makes its

appearance in the urine in a less transient manner, in the course of severe diseases not of a local nature, “when no food has been taken into the stomach, and when, therefore, its formation can only be attributed to secondary mal-assimilation of the albuminous contents of the blood, and albuminous tissues.”

I have seen, too, and I am sure Dr. Prout has seen, very durable deposits of the urate of ammonia in cases such as lepra or psoriasis, where no great constitutional disturbance existed, where no unusual disintegration of the tissues was going forward, and where no interruption to ordinary wholesome nourishment was suspected. But, in order to establish the presence of uric acid in the circulating fluids as the cause of gout, it would be necessary to prove that it is never absent. There is nothing, however, of which I am more perfectly satisfied than that I have often seen cases of true, regular gout, in which there was no evidence of excess of urates in the urine, and the cases are not rare in which deposits of earthy phosphates, and mixture of earthy phosphates with urates, are met with. This, indeed, might be expected in a disease occasioning so much oppression of the brain, and disturbance of the nervous system.

These are sufficient reasons for objecting to the use of so hypothetical an expression as the uric acid diathesis, and for believing that the expulsion of urates from the system through the urine, and of

other acid and earthy matters through this and other excretions, is to be looked upon only as one of the many consequences or symptoms of gout.

Few physicians now believe in the existence of free uric acid in the urine, but attribute the acid reaction to the presence of an acid salt. Dr. Bence Jones has, indeed, lately expressed doubts whether this condition be ever owing to uric acid. He even adds, "I am not certain that the acidity is always produced by acid phosphate of soda, though at present this is the most probable answer that is known," ('Animal Chem.,' p. 50.) That this opinion is untenable I cannot doubt, and Dr. Jones's own experiments will lead me to reject it. He clearly proved that the acidity of the urine is greatest immediately before food, least after a repast (p. 46); while the earthy phosphates at least seem always increased after eating (p. 82). It is probable enough that the acidity of the urine may sometimes be owing to the presence of an acid phosphate, and this may very frequently be the case in little disturbances of ordinary health, but that it is owing to anything else than acid urates in gout, I do certainly not believe.

The presence of uric acid in the blood is indeed a fact of the greatest importance, which may well arrest the attention of both physiologists and pathologists. It would be extremely interesting to ascertain its origin. It is strictly an animal product;

in what organs it is created, and through what means is yet undetermined. I have already quoted the opinion of Dr. Prout, that in some feverish disorders it arises from the destruction of the albuminous tissues; but he has assigned to it a double origin. He believes that the urates contained in too great abundance in the urine of persons suffering under casual and transitory dyspepsia, are owing to the "imperfect assimilation of alimentary matters by the stomach, and primary assimilating processes. On this account the chylous principles are not raised to that standard of perfection by which they are fitted to become component parts of the blood; we suppose that the healthy kidney possesses the power of selecting and disorganising such imperfectly developed chylous matters, and of converting them into the lithate of ammonia."

These opinions are conjectural, and cannot be raised into the rank of established truths on which any superstructure may be built. It happened to me lately to have occasion to order a boy four years of age, and with a fine healthy constitution, to be bled for an acute attack of bronchitis. As I have attended his family on both the father's and mother's side, I can state with certainty that the gout is unknown among them. I had the curiosity to submit the blood of this child to the same process described by Dr. Garrod, and found in it indubitable

traces of uric acid. The quantity of serum was so small, not much exceeding an ounce, that no crystals were obtained; but on exposing the residue to the vapours of ammonia, the red colour, indicating the presence of urates, was very plainly perceived.

It cannot, I think, be doubted that uric acid is a necessary and constant ingredient of pure and healthy blood.* This opinion, now founded on fact, best explains some of the phenomena of gout; it was so obviously pointed out by the facts which the close observation of modern physicians had brought to light, that before the actual discovery was made, it had almost been a settled idea in the minds of a few individuals who could anticipate the discoveries of science. The opinion that uric acid was present in the blood of the gouty had even been expressed. To this cause the phenomena of the disease were attributed; it was regarded either as the true *materies morbi*, or an expression and equivalent of it. Dr. Holland writes ('Medical Notes and Reflections,' 2d Edit., p. 142): "If we cannot affirm that urea, the lithic acid, or other animal compounds circulating in the blood, give cause to the phenomena of gout, neither can we, on any sufficient grounds, deny

* If any confirmation of the fact discovered by Garrod be required, it has recently been obtained by two German chemists, who have also found uric acid in the blood. Strahl u. Lieberkühn, *Harnsäure in Blut*.—Berlin, 1848.

the possibility of this. Under the most cautious reasoning, we are at least entitled to assume, with some confidence, that these matters, secreted from the kidneys, are the equivalents to gouty matter present in the system; that they have certain proportion of quantity to each other; and that upon this depend all the essential characters of the disease." This is a great conclusion. I am well convinced that I shall not offend that eminent physician by expressing my disbelief, and classing this with other changes brought about in the condition of the blood by the action of the disease. The inflammatory character of the blood, the buffy coat, is at least as constantly present. I have had frequent occasion to order the gouty to be bled; and in a regular paroxysm of the disease, or while it was impending, I never saw the above appearance wanting; but it would surely be an error to reckon this the cause and not a symptom of the disease.

I have dwelt longer on this subject of uric acid deposits because it is extremely interesting in itself; because it affords a sufficient and very probable solution of some phenomena of gout; but chiefly because it is the circumstance which has given most countenance to, and has, in my mind at least, most contributed to revive among us, of late years, a belief in a morbid principle of gout. Till modern chemists had discovered the urates in the urine, and

the same salts in the gouty articulations, this morbid principle was no better than a myth, in which some credulous people might have faith, but which had little weight with the greater number, and did not influence the practice of any. The opinions of physicians were admirably expressed in the following extract from Heberden, which, to my thinking, is as true now as when it was written: “ Si quis tamen contendat arthritidem esse conatum corporis, quo humores nescio quos corruptos expellat; ad experientiam provocandum est, quæ sola erit idonea hujusce litis judex et arbitra. Et fateor nonnullos reperiri, qui primo podagræ adventu gaudent, tanquam qui omnia fausta secum ferat; qui nihil jam nisi valetudinem integerrimam somniantes, facile credunt hanc primam accessionem mire profuisse; qui mos est hominum, quoties novos medicos, et novas medendi rationes experiuntur. Sed, his missis, illos consulamus, qui diu et sæpe ex artubus laborarunt, et intime norunt hunc affectum. Inter plurimos quos vidi, quorumque historias literis mandavi, ut minimum dicam, duplo plures sunt in quibus podagra aliis morbis supervenit sine minima eorum levatione, vel in quibus nova mala attulit prioribus; quam quibus profuisse visa est; et, meo quidem judicio, quæ mala podagræ imputata fuerunt, multo certius ab ea profluxerunt,

quam quæ bona." ('Commentarii de Morborum Historia et Curatione,' p. 36, Edit. 1802.)

Our practice would, however, receive a very important direction, could the fact be established that uric acid is the proximate cause of gout. To its elimination all our remedies should then be addressed. There seems to me a great risk that such an opinion may be adopted. The interest which the progress of chemical discovery creates, the real importance of this secretion of uric acid, and the light it sheds on many important symptoms of the disease, are all calculated to lead or mislead to the above conclusion. It would seem to have unconsciously influenced the mind of Dr. Garrod.* "Gout would thus appear," he writes, "partly to depend on a loss of power (temporary or permanent) of the 'uric-acid-secreting function' of the kidneys; the premonitory symptoms, and those also which constitute the paroxysm, arising from an excess of this acid in the blood, and from the effort to expel the 'materies morbi' from the system." In the postscript to his short paper, however, he repudiates the notion to which these words might seem to lead; namely, that gout is entirely dependent on a deficient power of the

* Medico-Chirurgical Transactions, 1848, pp. 93 and 95.

kidneys for the excretion of uric acid, and, he adds, "at present, I do not wish to advance any hypothesis as to the cause and nature of gout, considering that many further researches should be made on the subject before a theory of the disease could be advanced with safety." But even with this modification, Dr. Garrod's opinion seems to me a very questionable one.

The result of these considerations is, that I cannot look on the disappearance of urea and uric acid in the urine, and their accumulation in the blood, as anything else than a very frequent symptom and consequence of gout, itself again being the cause of other important phenomena. The kidneys are obviously the principal emunctories of these substances in the healthy state of the system. If their function be arrested, either the suppressed urea and urates must be eliminated through some vicarious channel, or be retained in the current of the blood, in which latter case we observe the most poisonous and even fatal results. This is indeed the frequent cause of that general cachectic condition so often seen in gout: hence arise distressing headaches, somnolence, and indifference. It is also, I believe, the origin of much of the dyspepsia with which the gouty are afflicted, and to this circumstance are to be traced those disastrous cases in which we see sudden death resulting from some

great emotion, or from some violence affecting any great function of the body. The sudden suppression of urea and urates in the urine, and the great increase of these matters in the blood, make a case tantamount to poisoning. It scarcely admits of a doubt that a great mental shock, a violent catharsis, or indeed any great cause of depression, has the effect of arresting for a time the function of the kidney. It is not the case in gout alone; it is even more remarkable in hysteria.

CHAPTER V.

ORGANISED PRINCIPLES—DEFINITION—DR. PROUT'S OPINION OF THE ORIGIN OF URIC ACID—UREA AND URIC ACID NOT FOUND IN ANIMAL SUBSTANCES—NOR IN THE STOMACH—INCONVERTIBILITY OF ORGANISED PRINCIPLES—HIPPURIC ACID IN THE URINE OF HERBIVOROUS ANIMALS—RELATIONS OF UREA AND URIC ACID—LIEBIG'S OPINION OF THE ORIGIN OF UREA—EFFECT OF RESPIRATION—OF SLEEP—OF EXERCISE—OF FOOD—URINE OF CARNIVOROUS AND HERBIVOROUS ANIMALS AND OF BIRDS.

It is not very easy to say what those substances are to which modern chemists have given the name of organised principles. It is a term used with little precision. At times I fancy that it is confined in its meaning to those principles employed in the construction of organised beings, such as albumen, fibrin, gelatin, &c. At other times it is used to include all products of organisation.

In this work I would strictly confine the meaning of the term to those products of organised beings which are never met with out of the body, and which are not to be imitated by any artificial process. Such are albumen, fibrin, gelatin, uric acid, and, notwithstanding the experiment of Wöhler,

which stands as a great exception, among them I reckon urea.

We cannot exaggerate to ourselves the importance of tracing the great organised principles, urea and uric acid, to their source. The opinion of Dr. Prout, that "lithic acid and its compounds are derived from the albuminous principles, not only of the chyle and blood, but also of the albuminous textures of the body; in the same sense and modes in which we suppose urea and lactic acid to be principally derived from the gelatinous textures;" and "that the healthy kidney possesses the power of selecting and disorganising such imperfectly-developed chylous matters, and of converting them into the lithate of ammonia," (p. 208, fifth edition), must now, I imagine, be abandoned. This opinion, indeed, would seem quite incompatible with the known fact, that both in the renal and hepatic veins, a considerable increase of albumen takes place over that which is found either in aortic or portal blood.

It does not appear that urea or uric acid, though floating freely in the mass of the blood, and found in the excreted fluids, is ever a constituent of the solid structure of animal bodies. Neither of these organized principles is to be found in any of the matters which animals devour. Extensive and accurate researches on this subject were made by Liebig

on a very large scale, but without any success. It must therefore be admitted that animals have a power of forming the substances in question.

Discovery has then proceeded thus far, that urea and uric acid have been traced from the urine to the blood. No one has ever seen either of these substances in the stomach, or even suspected their existence there, and, as the contents of the stomach have undergone searching and careful investigation, it may, I think, be safely concluded that whatever influence errors of digestion may exercise over the production of uric acid, it is at least not generated in the stomach. Between the process of digestion and the circulating arterial blood I can only see the great function of oxygenation, the office of respiration, during which and in which this important result may take place. Other considerations will tend to give probability to this opinion.

It is a matter of no small interest to determine how far organised principles are convertible. Some of them approach so near each other in chemical composition, that it is rather in their external appearance and their physical qualities, than in their elementary constitution, that we seek their distinction. Yet it is plain that nature has opposed strong barriers to that confusion, which would result from a ready transition of one principle into another. So much is

this the case, that the researches of organic chemistry seem to have been conducted almost with the assumed conviction that no such conversion ever does take place in the living frame. There is probably not more than a single known instance of the conversion of one organised principle into another out of the body. It is that of fibrin having become albumen under the ingenious proceeding of Denis. All the reflections I have made on this subject incline me strongly to the belief that, so far as secreting organs are concerned, organised principles are inconvertible, and that in the functions of assimilation, chiefly if not alone, the great changes of elementary composition and organic constitution take place.

There is certainly much similarity of constitution and origin in several of the substances we are now considering. It was once supposed that uric acid was the exclusive product of the carnivorous tribe of animals, while hippuric acid was thrown off by the organs of the graminivora alone; but this appears to be a mistake; each acid being found in both classes of animals.* Yet the old opinion is so far correct, that uric acid abounds in the urine of the carnivora, with but slight traces of hippuric acid, while this relation is exactly reversed in the herbivora. This,

* Fownes, 'London and Edinburgh Philos. Mag.,' xxi, p. 139.

indeed, might have been expected from the difference of food of these animals, hippuric acid containing a greater amount of carbon, and uric acid a larger proportion of nitrogen. This consideration again leads to the rejection of the idea that these substances are formed in the kidneys, and strengthens the conclusion to which modern discovery points, that they are the products of the earlier processes of assimilation derived from the blood, and much influenced by the food and the organised structure of the secreting animal.

These facts may then, I think, be assumed to be established, that the three substances we are considering, viz., urea, uric acid, and hippuric acid, though derived from the food, are not imbibed with it, but are formed within the body, and enter the blood in the earlier stages of assimilation; that they are constant and necessary ingredients of that fluid; and that we are yet ignorant of any useful purposes they serve, and can only consider them in the light of refuse or effete matters, which if not duly eliminated, are productive of much disturbance to health.

I have long had a strong conviction that, in the altered relation of these substances to each other, would be found the explanation of many morbid phenomena. We have been too much in the habit of separating them in our minds, of viewing them

as distinct and quite independent essences, instead of considering them as cognate and related things. Rejecting all consideration regarding hippuric acid, which chiefly concerns the lower animals, let us fix our attention on the two great secretions of man, urea and uric acid. When I say that they are related substances, I do not mean that, when once called into separate existence, they may, by any process of decomposition and recombination, be made to pass into each other, but that, in certain morbid states of the system, the nascent urea becomes uric acid during the assimilation of the food. This opinion is at variance with the idea expressed by Liebig and Wöhler, who consider the uric acid as the parent of the urea; but I receive this opinion with great difficulty, because it implies the admission of the convertibility of organised principles, to which I have already pointed out the great objection; because urea is a voluminous and constant product of health in all animals except birds and serpents, while uric acid seems to be wholly absent in some, and very scanty in most; and because the experiments related by Liebig and Wöhler, in which the uric acid is subjected to chemical decomposition out of the body, urea being one of the results, do not in my mind warrant the conclusion that any analogous operation takes place in the living system. The passage in Liebig is the

following :—“ When uric acid is subjected to the action of oxygen, it is resolved into alloxan and urea ; a new supply of oxygen acting on the alloxan, causes it to resolve itself either into oxalic acid and urea, or into oxaluric and parabanic acids, or into carbonic acid and urea.”* It cannot be denied that there is here cited the direct testimony of a fact. Urea has undoubtedly been obtained by chemical processes, from uric acid ; but urea has also been obtained by Wöhler through other chemical processes, in which no uric acid, and indeed no animal organised principles were employed.

The difficulties which the facts of clinical medicine oppose to the reception of Liebig's theory, have been felt by all practitioners to be insuperable. These objections have been stated with great fairness by Dr. Golding Bird. There are some of the diseases, however, which are cited as instances of hyper-oxygenation, which I should feel little inclined to admit into such a class. Liebig himself has, I imagine, been induced so to consider them from overstrained hypothetical reasoning ; but whatever may be our opinion of the nature of fever or phthisis, I imagine it will be universally allowed that there is nothing in the mere paroxysm of gout which tends to any modification of the process of respiration.

Influenced by these views, I made the following

* *Op. cit.*, p. 137, 2d Edition.

case the subject of a series of observations. A gentleman, 55 years of age, but yet in unbroken health, was visited by some painful gouty feelings. He had previously felt the influence of the disease, though he had not yet experienced a regular fit of it. There were no signs of dyspepsia, but he suffered from aching of the toe and heel, the pain flying from one foot to the other, and thence to the shoulders, occiput, and head. As each part was attacked, the others were relieved. His urine was loaded with urates, which fell in a copious deposit on cooling. This fluid was subjected to analysis,* and yielded,

* As the mode in which this and every subsequent analysis of urine was performed differs somewhat from that which is usually employed (at least on the Continent), it may be here proper to describe it briefly.

The intention with which the analyses were made being merely to observe the varying relations of the uric acid to the urea, all other constituents of the urine were neglected, with the exception of those whose occasional presence might interfere with the processes by which these two were determined. The analyses were all performed in the *same* manner, in order that the difficulties which beset this branch of analytical chemistry might not prevent the results from being strictly accurate for the purposes of *comparison*, although, like those obtained by every other known process, not *absolutely* accurate.

1. The *urea* was determined by evaporating (at 212°) quantities of urine, varying from 1500 to 2000 grains, to such a consistence that, when quite cold, the residue was syrupy. Pure nitric acid was then added in slight excess, and the vessel immersed in cold water for several hours. The nearly solid mass thus formed was thrown on a filter, and water of the ordinary temperature (small in quantity, but sufficient, joined to the excess of nitric acid, to dissolve the earthy and alkaline salts and extractive matter,) was allowed to trickle slowly

in 1000 parts, 25 parts of urea. He then lost five ounces of blood by cupping, with speedy relief of all

through. Some nitrate of urea was also, of course, dissolved, the amount of which was calculated from its known rate of solubility. The nitrate which remained on the filter was dried at 212° . It had usually a very light brownish colour; the proportion of urea in it was calculated in English equivalents, from the formula usually accepted—that of Regnault.

2. For the determination of the *uric acid*, from 3000 to 4000 grs. of urine were generally taken, and evaporated at 212° , as far as could be done without producing a deposit; excess of muriatic acid was then added, and the vessel left in cold water for some hours. The precipitated uric acid was collected, well washed, dried at 212° , and always tested in the usual way. It had generally a pale reddish colour.

The tendency of this method of proceeding would obviously be slightly to increase the apparent quantity of urea, as that of other processes would be to diminish it; but it is clear that the comparative results would be not at all affected, and even the positive ones very little.

It will be observed that the amount of urea in 1000 parts of urine is, in almost all the analyses here published, much higher than the average drawn from the researches of Becquerel, Simon, Day, and others. This variation can be only to a very slight extent, owing to different modes of proceeding: it would evidently be expected from the much higher sp. gr. of the specimens of urine above quoted, and still more perhaps from the very different circumstances of the persons from whom they were taken. One cannot, however, forbear suspecting that, in the course of the operose process followed by these distinguished authorities, a portion of such a delicate and changeable principle as urea must have been occasionally decomposed and lost. This substance is one of the animal products, the least stable under the operations of a chemical analyst.

It may be added, that the proportion of urea quoted in most of the original analyses given in the text is less than that obtained by Berzelius, Marchand, or Lehmann.

his symptoms. The blood had a slight film of buffy coat. After twenty-four hours had elapsed, his urine was again examined. There was a very feeble acid reaction, and the uric acid sediment had entirely disappeared; even after cooling and standing many hours there was none. But the remarkable fact, to which I would draw attention, is this, that while the urates had disappeared, the proportion of urea had risen from 25 to 29 in 1000 parts.

I was lately called to see a man, 40 years of age, strong, corpulent, and of very self-indulgent habits, with manifest signs of an approaching fit of the gout. He had had two previous attacks, and now suffered from great tenderness of both feet, wandering pains of head and chest, and every symptom of dyspepsia. His urine was very acid and turbid, of sp. gr. 1·014, and yielded—

Uric acid . . . 0·7 in 1000 parts

Urea . . . 14·5 in 1000 „

Ratio of uric acid to urea, 1 to 18·6.

Two days afterwards he had a sharp fit of the gout in the great toe, which was moderated by a bleeding of 4 oz., and at the end of a week further checked by colchicum and lenitives. The urine was still acid, though much less so: it was also much less turbid; of sp. gr. 1·013, and yielded—

Uric acid . . . 0·52 in 1000 parts

Urea . . . 14·5 in 1000 „

Ratio of uric acid to urea, 1 to 28.

If these results be confirmed by future observations on similar cases, it will, I think, place on an irrefragable basis the opinion that the uric acid, though not derived from the urea, at least owns the same origin, and that these substances are vicarious of each other. In a state of health, the elements necessary for the composition of urea are separated from the blood; but, under the influence of the gouty diathesis, the secretion of uric acid takes place with greater abundance.

If we cast our eye over the following table, we may see the great probability that this change is connected with the process of respiration. The table is founded on analyses given in Turner's 'Chemistry,' and assumes two atoms of nitrogen as a common point of comparison in each of the following substances, in order to exhibit with sufficient accuracy for my purpose, their relative composition :

	N.	H.	O.	C.
Urea	2	4	2	2
Uric acid . . .	2	2	3	5
Hippuric acid . .	2	16	10	36
Fibrin	2	12	5	16
Albumen				
Casein				

A simple inspection of these figures is suggestive of much important reflection, having a direct application to the facts of this disease, and shedding light on the function of respiration itself. If indeed

a less perfect consumption of carbon, or elimination of carbonic acid, by the lungs, would give us uric acid in the blood, we may divine not only the origin of the urates in the gouty, but see in what way repose and indolence aid in the production of this symptom of the disease, and how exercise and air contribute to its removal. We may also readily enough understand the vicarious origin of urea and uric acid during the process of respiration, without having recourse to the improbable idea of their transition into one another at a future stage.*

When we consider the atomic composition of urea and uric acid, we can easily understand the experiment of Liebig; but, more than this, we can see its great importance, and its direct bearing on the subject we are now considering. If, by decomposition, we can obtain such changed relations in the elements of uric acid as to yield us urea and carbonic

* Though I have not had these laborious chemical analyses repeated, yet I have frequently satisfied myself, by more easy processes, that the principle holds good; and that as the acid reaction of the urine diminishes, the amount of urea increases. But my attention has been called, by the kindness of Professor Day of St. Andrews, to a very important confirmation of it in the new edition of Lehmann's 'Chemistry:' "Although we have no numerical proof that, in human urine, the urea stands in an inverse ratio to the uric acid, yet the numerical results of Becquerel and others show that there is at least an approximate ratio. The recent experiments of Wöhler and Frorichs (Liebig's 'Annalen,' vol. lxxv), in which the introduction of uric acid into the organism by the *primæ viæ*, or by the veins, was

acid, we can have little difficulty in perceiving that the imperfect arterialization of the blood may exactly reverse this process in the living body. To constitute uric acid the chief change required is the addition of carbon to urea. We have already proved that these substances are sometimes correlative and vicarious; we have made it probable that, as they are found in the blood, so also there they take their origin. The subject seems now so much narrowed, that we may pronounce with greater confidence that, in the chemical changes which take place during the process of respiration, the two substances, urea and uric acid, are generated, and if we scrutinise these changes closely, we may easily perceive circumstances which favour the production of one or other compound, according to the condition of the patient.

That this is so, will appear more probable when we meditate on the changes which the blood under-

followed by an augmentation of the urea and oxalate of lime in the urine, affords tolerably strong evidence that the uric acid in the animal organism undergoes a change into urea and oxalic acid, precisely similar to that which can be artificially produced by peroxide of lead. Now, if the urea be produced from the uric acid by the partial oxidation of the latter, anything impeding this process must cause less urea and more uric acid to be secreted." (Lehmann's 'Physiological Chemistry,' p. 225.) The last clause of the last sentence contains a very exact expression of the principle for which I have contended, and it is to me gratifying to find so eminent a chemist, operating at a distance, arrive at the same conclusion to which pathological observation and chemical analysis had led me.

goes. If I mistake not, we shall here obtain a great insight into the pathology of gout. Physiologists are now agreed that, though the breathing be carried on in the lungs, and the changes of the blood, most obvious to the eye, take place there also, yet the arterialization is completed in the systemic circulation. The oxygen, which is absorbed into the blood in respiration, is slowly and gradually combined with it, effecting those changes necessary to its uses in, and diffusing warmth to, the whole of the body. During the progress of the blood to the veins, it receives the carbon thrown out of the system, and becomes venous, in which state it is carried forward to the heart to undergo the process of renewal, and be fitted again for the purposes of life.

But if, during respiration, the above changes be imperfect, all the living process I have described is disturbed. In the history of gout I have pointed out many signs indicating that the decarbonization of the blood is deficient. The blue lips, the swollen veins, the bloated complexion, the skin diseases, and general cachectic condition, sufficiently mark this. It is indeed evident in the whole natural history of the disease.

When the blood is perfectly oxygenated, the heart and vessels are roused to energetic contraction ; but it is quite certain that, when the expiration of car-

bonic acid has been less copious, the absorption of oxygen diminished, and a portion of venous blood carried forward into the arterial system, the circulation is slackened, a depressing influence is exercised on the brain and nervous system, congestion takes place in the vessels, and that state of things which I have pointed out as favorable to the creation of a gouty diathesis is speedily brought about.

The effect of this condition on health must be obvious to every one; but its relation to the habits of a gouty patient is not so apparent. To this I wish pointedly and earnestly to call attention. In it there is much matter of interest, and matter directly applicable to the treatment of gout.

The quantity of carbonic acid exhaled from the lungs is subject to great variation. By exertion it is much increased; in repose, its amount is comparatively small. In sleep it is yet further diminished; and during the long torpor of hybernating animals, it is diminished to such an amount, as under muscular exertion would be incompatible with life.

We shall find a condition in some degree analogous in the heavy breathing of sleep and in the retarded and less deep inspirations which take place at seasons of repose, or in a life of sluggishness and bodily rest. In asphyxia, whether arising from drowning, strangulation, or the inhalation of mephitic air, a

struggle is immediately caused on the part of the heart and arteries to drive forward the interrupted current of blood; but the irremovable impediment in the lungs causes stagnation in the veins, and congestion of all the capillaries. This is quickly followed by prostration of muscular power. It seems quite certain that muscular activity is incompatible with interrupted respiration; and indeed there is much reason to believe that not only muscular activity, but muscular power and a well-nourished muscular frame, bear a direct ratio to the capacity of the chest, and the perfection of the function of respiration. The observations, indeed, of modern physiologists have proved that the contractile muscular power is not entirely dependent on the influence of the brain, and have revived the doctrine of Haller of a *vis insita*. But though the contractile power rests, in some degree, on influences resident in the muscle itself, all observations prove its great dependence on the function of respiration.

Not only is the expulsion of carbonic acid favoured by exercise and pure air, but it is much affected by the condition of the patient's mind. Vacuity of thought and cheerfulness of spirits aid its elimination; when combined with exercise and air, they lead to deep and powerful inspirations, and to great improvement of health. On the contrary, intense and long-continued employment of the mind, espe-

cially if combined with anxiety and apprehension, and a stimulating diet, are always attended with imperfect oxygenation of the blood, and deficient elimination of its carbonaceous matters.

But it has already appeared to us probable that the urea and uric acid, which are constant and healthy ingredients of the blood, take their origin at this particular place and time, viz. in the lungs, during the process of respiration. It appears also certain, that, in some conditions of the body, and with some habits of the patient, the carbonaceous matters, which should be cast out of the system, are retained in the blood. Can it then be wonderful that, of two ingredients, the one which is most abundant in carbon should now be formed at the expense of that which contains less; that the urates, in fact, should be found in excess in the blood and in the urine, and the urea should suffer a very material diminution? I have measured the quantity of urine made by the patient whose case is mentioned at p. 88. It amounted to 36 ounces in twenty-four hours; and as 4 parts of urea in 1000 of urine had disappeared, it follows that 68 grains of urea were suppressed in the urine, to reappear in the system in some noxious form or other. This appears to me certainly the real origin of the urates. The injurious effect of so great a change in the secretions of the body, of the suppression of a healthy

evacuation, its reappearance under a more noxious form, and of the retention in the blood of a poisonous ingredient, must be obvious to all practitioners.

Guided by these ideas, I thought that I might obtain a further illustration of them by instituting a comparison of the urine secreted during sleep with that passed in the day. I imagined that the oxygenation of the blood might be found less perfect during the heavy breathing of sleep than while the lungs are expanded in exercise. The result corresponded with my anticipations.

The urine of young and healthy persons was first subjected to investigation, but the quantity of urates given by them is so small, and the apparatus at my disposal for measuring minute amounts was so defective, that, though I received the conviction that I had here hit on a valuable truth, the result of the experiments need not be placed before my readers, especially as I have others of an exact and decided kind to relate.

The urine voided in the morning by a gentleman, who had experienced repeated assaults of gout, was subjected to analysis. He was at that moment free from any painful symptom of the disease, but had a very decided arthritic diathesis, and rarely passed through twelve months without a fit. The following results were obtained :

1. Morning urine, sp. gr. 1·023
 Uric acid . 0·92 in 1000 parts
 Urea . 24·00 in 1000 „
 Ratio of uric acid to urea, 1 to 25.
2. Afternoon urine, sp. gr. 1·018
 Uric acid . 0·4 in 1000 parts
 Urea . 18·2 in 1000 „
 Ratio of uric acid to urea, 1 to 45.

In other words, the morning urine not only contains much more solid matter than that made during the day, but the relation of the uric acid and urea is so much changed, that the relative amount of the former separated from the blood during sleep is nearly twice as great as during the day.

Another experiment of the same nature gave a similar though less striking result—

1. Urine passed at bedtime, sp. gr. 1·024
 It contained—Uric acid . . . 0·75 in 1000 parts
 Urea . . . 30·7 in 1000 „
 Ratio of uric acid to urea, 1 to 41.
2. Urine passed the following morning, sp. gr. 1·021
 It contained—Uric acid . . . ·94 in 1000 parts
 Urea . . . 28·6 in 1000 „
 Ratio of uric acid to urea, 1 to 30·5.*

To these very conclusive experiments may be added another, in which the urine of an asthmatic patient,

* There is another remarkable passage in Lehmann's 'Physiological Chemistry,' pp. 248, 249, in confirmation of these views. "There are, however, other conditions which give rise to both an absolute and a relative augmentation of the uric acid to the urea, and in the

breathing with difficulty, was examined. Its specific gravity was 1.018, and the ratio of uric acid to urea was as high as 1 to 12.

I may here mention a confirmation of these ideas, contained in the observation of a very intelligent woman, who told me that she always knew when her husband was about to have the gout, by his snoring in his sleep. I have, since this remark was made me, asked what was the experience of other wives, and have generally found their testimony on the same side.

Another remarkable symptom is here also worthy of a place. It is the extraordinary intolerance of their urine, which often afflicts gouty people. I am, occasionally, consulted by a lady in whom the gouty

first place, among them, we must notice disturbed or imperfect digestion. Thus I have observed, both in myself and others, that if indigestible food, or spirituous liquors, be taken shortly before bedtime, the morning urine always deposits a considerable sediment. While in the normal state, the ratio of the uric acid to the urea is 1 in 28 to 30; but I found that, in the urine passed after indigestion, the ratio was sunk to 1 in 23 to 26, and that the ratio of the uric acid to the other solid constituents, which is usually as 1 to 60, was now as low as 1 in 41 to 52; so that the amount of the uric acid is here not only increased at the expense of the urea, but also at that of the other constituents. In the most marked case, I found in 100 parts of solid residue 2.4 of uric acid, 35.2 of urea, and 62.4 of other solid constituents. Hence the latter were absolutely increased in the urine; hence it is easy to understand why there is an augmentation of the quantity of the uric acid in the urine in many of those cases which the elder physicians regarded as stasis of the portal circulation, hæmorrhoids and arthritis."

diathesis is well marked, and who at times cannot obtain an hour's sleep together, though she is able to hold her water for the ordinary period during the day. Her urine is heavily laden with urates, whose acrimony, no doubt, irritates the mucous membrane of the bladder. Such cases are very common, and are generally accompanied by catarrh of the bladder. The case of the lady above mentioned, is in some degree accounted for by the state of her chest, which gives an additional illustration of the nature of the disease. On exposing it, I found one side much diminished in size. Her ribs had fallen in, and respiration had ceased on the whole of the right side. It was the result of inflammation at an early period of life. In this case, it sometimes requires two and even three grains of carbonate of soda to neutralise one ounce of morning urine, while half a grain added to the urine made in the day, will restore the colour of the test paper.

But if the effect of repose be to increase the quantity of urates and diminish the amount of urea, the influence of exercise in restoring the one and suppressing the other is hardly less striking. Lehmann has given us the result of active exercise on himself, while living on a mixed diet of animal and vegetable food; by which it appears that while the proportion of uric acid to urea, in a state of rest, was 1 to 38, it fell, after exertion, to 1 in 77.

A similar result was obtained by Dr. Percy, and is recorded in a note in Dr. Day's translation of Simon's 'Chemistry,' vol. ii, p. 169. The urine of a man, in training to run a race, was examined before and after running, with the following result. Before running, the uric acid bore to the urea the ratio of 1 to 9·3; after running, it had fallen to 1 in 34.

The influence of the respiratory process on the ratio of uric acid to urea, is also well shown in the proportion of these substances in the urine of men and women. Becquerel, as the result of many analyses, gives us—

Urea in men . .	13·838 in 1000 parts;
in women .	10·366;
Uric acid in men	·391;
in women	·406;

From which numbers the ratio of uric acid to urea appears to be—

in men	1 to 35·4,
while in women it is as high as	1 to 25·5.
(‘Seméiotique des Urines,’ pp. 34, 48.)	

If, likewise, the mean quantity of uric acid expelled from the body in twenty-four hours by men, be taken as 100, that expelled on an average by women in the same time will be 112·5. This is also deduced

from the analyses of Becquerel. ('*Seméiotique des Urines*,' pp. 34, 38.)

The greater bodily exertion of men, the superior capacity of their chests, and probably also a more animal diet, will give a sufficient explanation of these facts.

The experiments of Lehmann, on the effects of different kinds of food, afford some corroboration of these views. He first established in his own person, by a series of experiments, the standard ratio of urea to uric acid, under a mixed and healthy diet, which he ascertained to be 27 to 1. He then successively restricted himself to a purely animal diet, a purely vegetable diet, and a strictly non-nitrogenous diet. The result was that, while the amount of uric acid remained nearly uniform, that of urea underwent very extraordinary changes. The following table will show the variations which took place :

	Urea.	Uric Acid.
Mixed diet . . .	27	to 1
Purely animal diet . . .	32·7	„ 1
Vegetable diet . . .	22	„ 1
Non-nitrogenous diet . . .	20	„ 1

It would be difficult to account for the facts observed in animals, without admitting that the urinary evacuation is much influenced by the food they eat. In the carnivora, we find larger quantities of urea with smaller amounts of uric acid. In the

herbivora, the urea exists in diminished quantity, and the uric is replaced by hippuric acid, which undergoes a great increase. The carbonaceous food exercises its full influence. Much undoubtedly is due to the organism of the creature itself. But Chevreul has proved that, by great perseverance in non-nitrogenous food, dogs may be swayed from their nature, and made to secrete urine similar to that of the herbivora, though their health is destroyed.

The effect of the oxygenation of the blood is strongly demonstrated in the urinary secretion of the carnivora. The mammalia of that class,—lions, tigers, hyenas, with large and powerful respiratory apparatus,—produce considerable quantities of urea, and traces of uric acid. Serpents and lizards, with dormant habits and diminished breathing power, secrete uric acid only. The evacuations of birds, seemed to me a great exception and contradiction of a universal law. This difficulty has been felt by all physiologists, and seems to have strongly influenced the mind of Dr. Golding Bird. But I think the explanation is found in the peculiarity of their organs. The kidneys in birds have a great development as compared with other parts, and with the bulk of the whole animal, and their function receives an adequate development. The urinary secretion, as it leaves the kidney, is a viscous fluid, which speedily becomes solid, and forms a

large amount of the contents of the cloaca. There is no doubt that matters, which in other animals are ejected from the system by the emunctories of the skin and bowels, are eliminated through the kidneys of birds. This function, therefore, cannot with any propriety be compared in these different classes of animals. But even in birds we receive a great confirmation of the influence which the respiration and the food exercise over the secretion of the urine. Coindet found that the urine of graminivorous birds was entirely composed of uric acid, while urea appears in considerable quantities in that of the carnivora, which soar high in the air, and sustain a long and fatiguing flight.

It is a remarkable circumstance, in connection with this subject, that, in all times, birds have been thought to be affected by gout, and their articulations are certainly very often incrustated with tophaceous deposits, having a great resemblance to the chalk-stones of gout. (Heusinger, 'Pathologie Comparée,' p. 119.)

The conclusion, then, at which I arrive is, that both the urea and uric acid are formed from the blood during the processes of assimilation and oxygenation. When this latter process is perfect the uric acid nearly disappears; but if circumstances occur which interfere with the due arterialisation of the blood, the immediate consequence is the appear-

ance of uric acid in the urine. Müller appears to have felt the truth of this doctrine in the following passage: "All the foregoing circumstances render it very probable that the source of the uric acid lies much deeper than the point of its excretion, and that its production is intimately connected with the nature of the food, and with the process of sanguification." ('Elements of Physiology,' translated by Dr. Baly, vol. i, p. 587.) It is possible that the elements of the urea and uric acid may be partly derived from the disintegration of the tissues; but it would be difficult to account for the great variations which occur in man in health and disease, and in all animals in the normal state, without admitting that the food much influences their urinary secretions, and that the elements of these secretions, whether derived from the food or from the waste of the animal itself, undergo different degrees of elaboration in respiration according to the activity of that function.

Simon saw this even more clearly than Müller: "In all probability, urea, uric acid, and bilin, are formed as a consequence of this consumption of blood-corpuscles. For these substances must necessarily be formed as products of the changes which the constituents of the blood undergo in the circulation, and are not (as observations on starved and emaciated animals show us) a consequence of the changes which the circulating fluid undergoes

during the nutrition of the tissues, but are dependent on the metamorphic action that is produced by the respiratory process." ('Animal Chem.,' p. 219.)

I have no doubt that many physicians will think these ideas are pursued too far in a work on practical medicine, and that chemistry can hardly yet be called on to solve questions so intricate. They cannot require more prudence in the application of chemistry to the uses of medical science than I am disposed to inculcate, and I should place little reliance on these results did they not meet with confirmation from the other facts of the disease; but when I find a concurrence in the chemical history and pathology of gout, both affording the same illustration of its phenomena, and the same explanation of what would otherwise be doubtful, I am encouraged to adopt them without hesitation. I trust I have convinced my readers, as well as satisfied myself, that, in gout we have not merely an increase of urates in the excretions, but an altered relation of the urea and uric acid, and that this change takes place in the early assimilation of the food during the process of respiration. These facts throw much light on the pathology of the disease; and they are so distinctly applicable to treatment that I trust even those physicians who deprecate the great freedom with which speculations in chemistry have sometimes been used to bolster up fancies in physic, will excuse the length and minuteness of the details into which I have entered.

CHAPTER VI.

INFLAMMATION NOT ESSENTIAL TO GOUT—LANGUID CIRCULATION IN
GOUT—ATTACKS THE AGED—SPARES WOMEN AND ROBUST PEOPLE
—THE MOXA—ALLIED DISEASES.

IN all times, and by all authors, inflammation has been assumed to be not only an invariable concomitant of gout, but an essential part of the disease. Cullen places it among the phlegmasiæ. His predecessor, Sauvages, indeed, while admitting fever to be a necessary symptom of the disease, thought that gout might be separated from the class of pyrexiaë. He gave it no distinct place in a nosological system, by sending it among the *dolores vagi*; but all authors, systematic and practical, write of this disease as if inflammation were its constant attendant, and necessary to complete its history. Amid such consent it may seem presumptuous to question this position; yet frequent observation of, and much meditation on, the phenomena of gout, make it, in my mind, by no means an unquestionable matter of fact. In the study of the disease, it is of much consequence to make this point clear, and indeed to remove out of our way all errors obstructing a sound and true

view of those principles which are not only to explain its ever-varying phenomena, but to regulate all reasonable and successful attempts for its relief and cure.

I shall best introduce what I have to say on this subject by relating a case which occurred to me now some years ago. One evening, when dining at the house of a friend, I observed a gentleman, who, an instant before, had been in the most cheerful spirits, suddenly turn lividly pale, and complain bitterly of a pain which had at that moment seized him in the ball of the great toe. As we were all familiar friends, the part was immediately stripped and exposed. The limb shook with agony; but there was not the slightest discoloration, swelling, heat, or local change of any kind in the part to which the pain was limited. Had it not been for the manner in which the colour forsook his cheeks and lips, and the other traces of exquisite suffering in his countenance, his friends might have suspected him of shamming. This pain continued for half an hour, and then quitted him as suddenly as it had seized him, leaving no trace of its past existence. I questioned him closely, and assured myself that he had had no warning whatever of the invasion of this pain in any disturbance of his health, either local or general; in fact, he considered himself at that moment unusually well, and was not less surprised

than we at this sudden assault of an unknown and hidden enemy. But it was not difficult for me to see in this symptom an attack of gout. My opinion was received with derision, as medical opinions sometimes are by thoughtless people. That the pain had completely left the part may be believed when I state that this man went to a ball in the course of the evening, and danced several times. The next morning I was summoned to visit him, because he had had another attack of pain like to the former in all its circumstances, except that this time it had seized the toe of the other foot. It had attacked him in bed, and indeed awakened him from his sleep. Having a perfect conviction of the nature of his pain, I did not think it necessary to postpone other pressing occupations in order to attend to his hasty summons, and did not visit him much before my usual time of leaving home ; I found him, therefore, dressed and equipped to go out. He was now again delivered from his pain, and was not to be persuaded into the use of any measure, whether of caution or cure. I heard nothing more of him for three weeks, when the disease caught him in the heel, and he went through a severe fit of the disorder, in which no symptom was wanting.

But this is by no means an unexampled case. Van Swieten, in his 'Commentaries,' relates that of a gentleman, who, on alighting from his carriage,

was suddenly seized with such intense pain of the great toe, that he firmly believed it was occasioned by luxation. The event, however, showed it was true gout; for though it soon disappeared at the time, it returned in an unequivocal form in twelve months afterwards. Experienced physicians will readily attest to similar circumstances. But I ask, does any one doubt that the first two attacks of pain, in the case I have related above, were true symptoms of gout? and does any one believe that inflammation then existed? The conditions necessary to constitute inflammation could assuredly neither be so rapidly created, nor so speedily dispersed. It would be easy to accumulate proofs drawn from cases less clearly defined than the one I have given, but on a point of this kind a single example is an *instantia crucis*. Inflammation is not an essential condition of gout, if absent in one well-established and well-marked case.

The position, however, which I seek to establish, does not rest on grounds so partial. If we permit ourselves to take a comprehensive view of what I have already called the natural history of this disease, the conviction will be forced upon the mind that its nature is the very reverse of inflammatory, however frequently a peculiar inflammation may attend the accidents to which it gives birth. In fact, to admit inflammation as a necessary condition of gout would

be to allow the exception fully as prevalent as the rule. Not only is it often found wanting in the assault of the regular disease, but its irregular, misplaced, and atonic forms are for the most part wholly free from it.

The gouty have always a languid circulation ; they complain much of coldness of extremities, of creeping and rigor of surface ; they are much subject to those sudden convulsive shivers, called by ancient physicians *horripilatio* ; they suffer much in winter, and always enjoy comparative ease, in this country at least, on the return of the summer heat. I believe that where the gout diathesis is well established, these symptoms are never absent ; they may well be considered its most characteristic signs. This condition of the circulation is certainly by no means incompatible with inflammation, but it is surely not favorable to it. If it be a necessary and universal attendant on gout, as I think will appear, it surely follows as a strong presumption that the very opposite state of the system can only be looked on as accidental and superinduced.

The gout, too, seldom declares itself at that period of life when men are most prone to inflammation, but infests them in their decline, when the system assumes the congested, more asthenic, and lingering forms of disease ; when the blood and other fluids, impelled with less vigour, and stagnating in the

vessels, oftentimes cannot feed a well-marked inflammation, even under the excitement of a smart and painful injury. At this time of life men are less given to exertion, which impels the fluids in their course, and more willingly seek for repose, which permits them to linger in their channels. The solid structure of the body would not even endure the strain put on it easily and with advantage at the more youthful period of life.

The gout does not spare the young alone. Those who have had opportunity of making extensive observation agree that it abstains from attacking persons of robust constitution. This, though true as a rule, is subject to vast exceptions. But the heavy and corpulent, those who have loaded viscera and languid circulation—persons of inactive temperament and lazy habits—those in whom other diseases assume indolent and cachectic forms, are its choicest victims. It shuns the stout and healthy labourer; it seizes the fat and dull farmer; it seldom visits the active and athletic sportsman; it revels in the blood and joints of the exhausted debauchee; its whole history marks it as a complaint of an asthenic character. Cullen would assuredly have done wisely had he placed it among the cachexiæ instead of the phlegmasiæ.

It may, however, be doubted that the strong are less obnoxious to its attacks. It is certainly neces-

sary to define in what sense we receive the term vigour of constitution, and also to take into consideration the accidents of life to which the robust are particularly exposed, in order fully to appreciate this truth. Constitutional strength does not consist in powerful muscles, huge bones, and great stature. Such gigantic forms are, for the most part, accompanied with a corresponding power, but they are perfectly compatible with great constitutional weakness. Nothing is more common than to observe these great monsters of flesh sink on the earliest touch of serious malady. It may be alleged, too, that the comparative immunity of women from gout is a proof that the opinion I have enounced is erroneous. But women who cannot bear excessive fatigue, and exhibit many other signs of muscular feebleness, do, notwithstanding, very generally bring an amount of constitutional resistance to the undermining influence of disease, which we do not always meet with in men. As far as my observation extends, and my attention has been bestowed in a very special manner on this point, people of a vigorous constitution are little liable to gout, and only become so when repeated and long-continued excess has enfeebled their frame and wasted their energy.

Were gout essentially inflammatory, it might be presumed that inflammation would be its primordial local symptom, and in this case we should surely

expect that it would sometimes run the ordinary course of phlegmonous disease. Not only is this not the case, but there seems something in the nature of the disease which prevents the inflammation that supervenes in gout ever running into the suppurative process. I never saw but one instance of phlegmon in gout, and I never saw a more ill-conditioned and offensive discharge.

The local phenomena of gout sometimes throw great light on the nature of the complaint. Sir William Temple has left us a singular account of an Indian cure, which was brought from the island of Java by the Dutch, and given to him when ambassador from the court of England to the Hague.* It consisted of the application of the moxa to the pained part. It succeeds best when applied before the swelling has begun, but answers even after local inflammation has been added to the pain of gout, which was notably the case with Temple himself. The moxa is burned down to the part affected, indeed, till the skin and immediately subjacent textures have become charred and destroyed. The relief afforded is immediate, and the fit is cut short. The Indian explanation of the action of the remedy

* This practice seems to have been very popular over Europe at the time. It is mentioned favorably by Sydenham, and later by Morgagni; but it did not originate in that age. Very similar remedies are recommended by Hippocrates and Celsus.

is absurd enough ; but on what principle could the great benefit that results from its employment be accounted for, if gout be a disease of which inflammation forms a very prominent and essential part ? Yet Temple assures us that, being at the time of the application of the moxa in such pain that he could not suffer the smallest touch or pressure on the foot, he was, in the course of a few minutes, so much relieved, that he could walk with ease through the room. A fact related on the authority of Sir W. Temple, may be readily credited. But I have also witnessed the administration of this remedy in a less severe form, in various parts of France and Belgium, where the tradition is preserved, and sometimes with the same, though not with a uniform good result. Rejecting the idea of inflammation, and admitting an opposite condition of things, there seems less difficulty in explaining the result. The violent action of the moxa excites the benumbed nervous system, and rouses the over-loaded vessels to the expulsion of their contents, and to free the part from the gripe of the disease.

On the same idea I account for the fact well known to physicians, that the gout is often got rid of by those who treat it with contempt and use it rudely. In Sir W. Temple's essay on the Cure of Gout, to which I have just referred, the case of the Rhynggrave, who was killed before Maestricht, in the

year 1676, is stated. "He used no other method or remedy than, upon the first fit he felt, to go out immediately and walk, whatever the weather was, and as long as he was able to stand, and pressing still most on the foot that threatened him; when he came home, he went to a warm bed, and was rubbed very well, and chiefly on the part where the pain began." Temple also records the case of "old Prince Maurice of Nassau, who laughed at the gout; though he had been several times attacked, it never gave him care nor trouble."* Whether these were wise proceedings or not, is not to the point; they seem at least to prove that something else than inflammation is busy with the part. I have more than once had occasion to see a gentleman, now in his 85th year, but who has much of the vivacity and cheerfulness of youth, with painful gout in the foot. It is vain to recommend to him care or remedies. His answer to his physician and his family is the same—"I'll walk it off." And truly he does walk it off. He often quaintly remarks to his friends, "go to bed with the gout, and it will surely go to

* Lieutaud bears his testimony to the same effect: "*Si demum morbus parti cuidam infigatur nullum forte præsentius remedium novi quam motum voluntarium partis affectæ; quo sane quidem exasperantur dolores: sed contractione musculari attritus latex morbosus brevi ut plurimum diffilatur; dummodo non adoleverit morbus.*"—('Synopsis praxios Medicæ,' Amst., 1765, p. 89.)

bed with you, and be mighty bad company." Such cases are worthy of much study. I do not doubt that in some forms of the disease and in some constitutions too much warmth, too much repose, too great tenderness of treatment, greatly aggravate and much lengthen the sufferings of the patient.

The terminations of gout, and its vicarious and cognate diseases, also mark its nature. They are suppression of the natural evacuations, spasm, cramp, dyspepsia, melancholy, apoplexy, and dropsy. This view of the course and tendency of the disease, leaves on my mind no doubt that another explanation of its phenomena must be sought than that which inflammation would afford; that this state is neither the immediate antecedent nor constant attendant of gout; that it is not its proximate cause; that by it we shall obtain no good rationale of the symptoms; that through it we shall neither succeed in explaining the nature of the disease, nor in establishing the true principles which should preside over all our remedies for its relief. It is, in fact, the very difficulty of understanding the phenomena of gout, by classing it with the more usual and familiar forms of disorganising disease, that suggests with great force the idea of a poison or morbid matter operating in a way peculiar to itself.

CHAPTER VII.

TRUE NATURE OF GOUT—VISCERAL CONGESTION—SUPPOSED CONNECTION OF TUBERCLE AND GOUT—DISORDER OF THE HEART—CAUSE OF ŒDEMATOUS SWELLINGS, AND OF THE LOCAL DISEASE—SUPPRESSED SECRETIONS.

HAVING now, I trust, not at too great length nor altogether unsuccessfully, discussed the question of what gout is not, we are prepared for the much more difficult and subtle inquiry of what it is. In a former part of this treatise, while considering the deposits of uric acid, and other matters thrown off with the urine, I had occasion to call attention very emphatically to the highly vascular condition of the kidneys in gout. This is so remarkable as to have drawn to it the attention of physicians in all times. The same state of venous congestion, however, exists in the liver, and each of these organs has at various times, and by different authors been assumed to be the seat of the disease. Even the accurate and cautious Morgagni seems to lean, in his fifty-seventh letter, to the idea that, in the condition of the kidneys will be found the solution of our doubts concerning the nature of gout. To these speculations there is

a simple answer, that the very same degree of vascularity is discovered in all the abdominal viscera, stomach, small and large intestines, and the organs of the pelvis. Even the omentum is loaded with venous blood, and this state extends to the hæmorrhoidal veins, as I have observed in the history of the disease. It is rare that gouty subjects escape altogether the affliction of piles, and, for the most part, they suffer from them severely.

The abdominal organs, except in the advanced stages of the disease, rarely suffer much disorganisation. I cannot agree with Dr. Prout in considering the tuberculous and arthritic diatheses frequently associated. That they may and do sometimes co-exist I am quite aware; but that this is to the extent to lead to the conclusion that they are vicarious affections and outward expressions of the same disease, I cannot admit. I believe, on the contrary, that in the great majority of cases of gout, the principal abdominal organs are singularly healthy in structure, and resist for a long time the disorganising influence of the disease. The reverse of this is true of tubercle, whose insidious beginnings are little felt in disorders of the system. I have ever observed the gouty to have a singular immunity from other constitutional diseases, (such as tubercle, cancer, and scrofula,) and to such a degree as to justify the vulgar observation, that the gout prevents

them. We have not frequent opportunities of investigating the condition of the great organs of the body in the beginning of gout, but I have been struck with their singularly healthy appearance, even at rather advanced periods of the disease.

It is very common, indeed, to feel the right hypochondrium turgid, protuberant and solid at the beginning of the gouty paroxysm, which appearance gives way to the usual soft and elastic condition of the abdomen, as the fit wears off. This is, no doubt, owing to a plethoric condition of the liver, which yields to the effect of the paroxysm and its remedies. This state is well described by Dr. Budd in his accurate and instructive book, on 'Diseases of the Liver,' and is well traced by him to the impediment to a free passage of blood from the liver to the heart. "The most frequent opportunities we have of observing the effects of simple congestion of the liver, are in persons labouring under organic disease of the heart. It often happens, that in such persons, when the circulation is more than commonly impeded, the liver grows larger. Its edge can be felt two or three inches below the false ribs. If the circulation be relieved by bleeding, or by diuretics, or by rest, the liver returns to its former volume. This enlargement of the liver from congestion often takes place, and again subsides very rapidly, according to the varying conditions of the general circulation."

(‘Diseases of the Liver,’ p. 41.) The frequent repetition of such a state, may no doubt occasion permanent congestion of the organ, with enlargement of its solid structure, destruction of its cells, accumulation of blood in the capillaries, and bile in the ducts.

There is no doubt that a general state of vascular plethora of the great chylopoietic organs is always met with in gout. I believe this to be quite without exception. I have already, in the history of the disease, pointed out the very constant presence of a varicose state of the veins of the lower extremities during an impending fit. It is plain, therefore, that the heart is oppressed with a flood of returning venous blood, and this, I think, associated also with the impure condition of this fluid, from the non-elimination of urea and urates, and probably of the biliary constituents, is the cause of those symptoms of disordered function of this organ, which I have pointed out as the earliest indication of the disease.

In the former part of this treatise I have observed that the first sign of disturbed health which has attracted my attention, and announced to me a tendency to gout, has been disorder of the heart’s action. When I have had an opportunity of observing the health of any one, previously to a first attack of gout, or have had a patient who could make an observation on himself, I have rarely,

if ever, found this disorder wanting. Its most common form is that of palpitation, fluttering, pause in the heart's action, intermission, or some indication of diminished tone and energy,—in a word, impaired power of the organ. These symptoms are often experienced in so slight a manner, that they escape the patient's notice, who, though oppressed by a congested venous circulation, considers himself in perfect health. Were I to name the symptom which, in my mind, first declares the advent of gout, it would be this little embarrassment at the centre of the sanguiferous system. But though often slight, it also not unfrequently occurs to a very painful and serious extent, so as to give rise to a great apprehension of fixed and organic disease of the heart. Some years ago I attended, in common with the late Dr. Abercrombie, of Edinburgh, a gentleman about 50 years of age, who after a severe attack of influenza, was affected with irregularity of circulation and faintness to such an extent, as to give rise to the most anxious apprehensions. Without any communication from me, Dr. Abercrombie wrote to me his opinion that the case was one of suppressed gout. Though this gentleman could hardly rise from his seat without a feeling of pause and failure at the heart, and never had his bowels relieved without suffering for the space of an hour from the same symptoms, yet he could take great

exercise in shooting and hunting, and indeed always had a steady, regular pulse, and was free from every kind of faintness or other emotion when perspiring under exertion. By the steady use of quinine and gentle purgatives, with a moderate diet, he perfectly recovered his health; but many months' employment of these remedies was required to obliterate all vestiges of his illness. That this was a case of gout is indeed rather matter of opinion than of certainty, for he has had only the faintest possible local indications of the disease; yet I entertain little, if any, doubt on the subject.

Venous congestion, then, I consider the first condition essential to the formation of the gouty diathesis. It is no new observation: it may be found interspersed through the writings of all former authors. Even those who adopt explanations inconsistent with such a state of things notwithstanding admit it. This state of the blood was first clearly enounced as the great cause of gout by Galen, whose opinions have continued to influence the minds of succeeding physicians, in a greater or less degree, to the present day. The truth of the fact being, I imagine, unquestionable, it will always continue to embarrass the doctrines of those who advocate opinions with which it is incompatible.

But the great venous canals of the body, as well as the larger arterial vessels, are endowed with a

resiliency, which enables them to struggle well against the flood of returning blood. This fluid, then, is compressed between two opposing forces, that, namely, which is derived from the heart and arterial system, urging it forward on its course, and on the other hand the antagonistic resistance of the great veins leading to the right auricle. Under this compression I believe that the vessels give way, and a true hæmorrhage is occasioned in the part affected. If the rupture take place in a minute capillary carrying the serous portion of the blood only,* œdema is the consequence; but if the burst vessel be one carrying red blood, a true ecchymosis is formed.

This view of a fit of gout may startle, from its

* I am well aware that some physiologists deny the existence of such vessels, on the ground that "they have not been demonstrated." (Müller, p. 214.) It is argued that they have not been demonstrated, because they have not been injected, and have not been seen with the aid of the highest power which the microscope has yet attained; but surely the absence of such proofs is not enough to set aside the equally important, in my opinion the far more important, facts both of physiology and pathology. There are textures which no red blood ever reaches in a state of health, yet they are nourished, they decay, they ulcerate, they are repaired and healed,—they undergo all those processes, of which no explanation can be given, without the assumption of the existence of vessels. Mr. Toynbee's recent researches have added strength, indeed, to these new physiological views; but whether the serous portion of the blood escapes from the capillaries by rupture, or traverses their coats by exosmosis, does not affect my argument.

novelty ; but I am thoroughly convinced, from long observation of the disease, that I have given the true rationale. All its symptoms may be readily arranged under this explanation. Any other that I have ever heard of leads us into such difficulties, as to leave us only in greater doubt than before. It will surely be admitted that the capillary and nutrient vessels, distributed on the extreme and sentient fibrillæ of the nerves, are affected in the same manner as the larger venous trunks. I believe these distended capillary vessels are the real seat and cause of the painful phenomena of gout. Is it not credible that such vessels, dilated so as to admit fluids, for which they were not intended, and bound down by the firm fasciæ, in which gout has its usual seat, may give rise to much suffering ?

The case of a gentleman, for whom I have frequently had occasion to prescribe, though probably not one of gout, will illustrate some of the above positions. During a residence in India he suffered much and repeatedly from hepatic disease, and still more from the heavy mercurial treatment prevalent in that country for the diseases of the liver. He is now subject to an occasional severe and prolonged pain of the heel, which has been pronounced neuralgic, bilious, and gouty, by different physicians. Such is his faith in large doses of calomel, or so speedy is the relief he obtains from them, that it is

no easy matter to stay his hand, when only threatened with a visit of his inveterate enemy. This pain, however long its duration, is never accompanied with any degree of heat, swelling, or suffusion of the part. Handling it even does not increase the pain, and though always accompanied with some abdominal disturbance, it is rarely attended by the train of dyspeptic symptoms which characterise gout. But it has one appearance which readily enough explains the sudden and mysterious twinges of pain that announce and attend them both. I have never failed to observe great fulness and swelling of the veins leading from the heel and foot. As the pain increases in severity the veins swell more. They sometimes become so turgid that the office of their valves is destroyed, as may be ascertained by pressing the blood backwards with the finger, when we find that it passes downwards beyond the point where a valve is situated. The same thing takes place in the veins of a gouty limb. But there is another symptom in this case which disclosed itself to me by accident, while observing this turgid state of the veins in my patient. On pressing the blood backwards in the manner described—that is, in a direction from the heart and vena cava towards the capillaries—I seldom failed, at the distance of a few minutes of time, to excite some sharp twinges of pain; and so well aware is my patient of this fact,

CHAPTER VIII.

CONSTITUTION OF THE BLOOD—OXYGENATION—FIBRIN AND GELATIN
—ASSIMILATION—COMPOSITION OF ALBUMEN AND FIBRIN—PATHO-
LOGICAL OBSERVATIONS—ORIGIN OF FIBRIN—GELATIN—ITS PRO-
PERTIES—ITS ORIGIN—SANGUIFICATION—RECAPITULATION.

INTIMATELY connected with these pathological researches, and deeply interesting in the history of gout, is a study of the physical and chemical constitution of the blood. From all that has been written in preceding chapters, it must be apparent, that the influence exercised by the oxygenation of blood over the stable and well-balanced phenomena of health, is hardly more striking than the same process in the fluctuating symptoms of disease. It becomes, then, of vast importance to the pathologist, as well as the physiologist, to determine with clearness and accuracy, in what this process consists. Unfortunately practising physicians, qualified in my mind more than all other men for the investigation, have too much retreated before the great difficulties of the subject, and indulged in a general scepticism as

to the truth of most of the theories proposed to them. The subject, however, is far too extensive to find a place here in all its parts. Rejecting, therefore, all that is of the domain of speculative physiology, I shall confine myself to that which has an immediate bearing on practice, and on the particular subject of this book.

The experiments of Magnus have satisfactorily established the facts, that oxygen, carbonic acid, and nitrogen do all exist in both arterial and venous blood; that oxygen is found in much larger proportion in arterial than in venous blood, and that a great increase of carbonic acid takes place in venous blood. It is certain, therefore, that the oxygen must in the capillaries deprive either the tissues themselves, or the mass of circulating blood, of a portion of their carbon, to form the new compound. But this is not enough to account for the oxygen, which disappears in the process of respiration. The concurring testimony of nearly all chemists proves that a larger amount of oxygen is absorbed by, than what again issues from, the lungs in respiration, in the form of carbonic acid gas.

To account for the disappearance of oxygen has exercised the ingenuity of philosophers, and various theories have been promulgated for this purpose. The most recent is that of Liebig, who supposes that the oxygen enters into union with the iron of

the blood, raising it to the state of peroxide. This peroxide of iron becomes a carrier of oxygen to the remotest tissues, parting with it in its progress through the capillaries, and returning to the condition of protoxide on the right side of the heart.

But this ingenious theory finds little credit with physicians. It is laid down, indeed, by systematic authors as the last promulgated doctrine of the hour. Grave physicians view it as they do many matters of teaching, to which there are serious and unanswered objections, well knowing that, if unsupported by any thing better than ingenuity of speculation, it will pass away like other short-lived theories. It seems to rest chiefly on the large amount of oxygen contained in the peroxide of iron, and the facility with which this substance undergoes decomposition. But it would seem to have been necessary for the establishment of an opinion so novel and so hardy, to begin by some proof that the iron in the blood does actually exist in the two states indicated above. No such proof is given us by Liebig. At page 273 of the first English translation of Liebig's work on 'Animal Chemistry,' 1842, it is stated, that "according to the researches of Denis, Richardson, and Nasse, ten thousand parts of blood contain eight parts of peroxide of iron." Surely such a statement as this is not enough to serve as the basis of such a

superstructure. I have not been able to obtain access to Professor Nasse's work, but I have had the curiosity to consult Denis, and have been much surprised to meet with the following account of his investigation. "As for the iron, I hold the question of its condition in the blood to be undecided ; till further inquiry, I shall consider it in the state of peroxide." p. 114.* ('*Applicat. de la Chimie à l'étude du Sang*;' Paris, 1838.) If Denis has published any further researches, I am not aware of them, but I quote from his latest separate work.

Certain facts are readily enough explained by this hypothesis of Liebig. Of others it affords a very inadequate solution, while there are many which, under such a supposition, would seem quite unaccountable. Admitting that the colour of the blood is owing to the presence of iron, and that the condition of this substance in arterial and venous blood is materially different, which seem hardly sufficiently proved, the assertion of Liebig that it is raised, in respiration, to the condition of peroxide, in order to fall in the course of the systemic circulation to the carbonate of the protoxide, would account for the change of colour that takes place. But when we are told that the supply of oxygen to the system is

* "Quant au fer, je tiens pour indéciise la question de son état dans le sang ; jusqu'à nouvelles preuves, je le considererai provisoirement comme y etant à l'état de peroxide."

thus maintained and regulated, the mind reverts at once to the many occasions and vast requirements of this substance, in the constant changes of solids and fluids taking place in animal bodies. No where is this better stated than in nearly every page of Liebig's own work, in which chiefly this ingenious explanation appears both faulty and inadequate. The refutation of it, afforded by Müllder, seems to me quite unanswerable. "It has been assumed that this iron is very loosely combined with the colouring matter, so that it can be oxydised and deoxydised in respiration, the real organic matters not being comprehended in this action. As, however, the quantity of hæmatin existing in blood is very far from sufficient to combine with all the oxygen taken up in respiration, it is undeniable, that it is not the iron which takes and carries throughout the body the quantity of oxygen, which is converted into carbonic acid by respiration.

"Moreover, the iron is very intimately combined with the four organic elements of the hæmatin; so much so that, if duly prepared, it may be digested with dilute hydrochloric or sulphuric acid for many days, without the least diminution of the quantity of iron. From hæmatin, treated in this manner, I obtained, after combustion, 9·49 per cent. of oxyde of iron, which is the quantity always left after combustion, by properly prepared hæmatin.

“The idea, therefore, that the iron can be separated from the blood without producing a complete change in the nature of the colouring matter, may justly be termed inaccurate.” (‘Chemistry of Vegetable and Animal Physiology,’ pp. 336, 337.)

“There is another reason, besides, which incontestibly proves, that the iron does not exist in the state of peroxide in the colouring matter, prepared in contact with the air, that is, such as it is present in arterial blood. For, in the first place, this colouring matter can be freed from iron, by strong sulphuric acid with disengagement of hydrogen, which could not happen if peroxide of iron ($\text{Fe}^2 \text{O}^3$) were present in it;—in the second place, after separation of the iron $\text{C}^{44} \text{H}^{22} \text{N}^3 \text{O}^6 \text{Fe}$, have $\text{C}^{44} \text{H}^{22} \text{N}^3 \text{O}^6$, while the remaining substance should contain $\text{O}^{4\frac{1}{2}}$, since if $\text{Fe}^2 \text{O}^3$ were really present, it must be in combination with a substance represented by 2 ($\text{C}^{44} \text{H}^{22} \text{N}^3 \text{O}^{4\frac{1}{2}}$).” (Op. citat. 337.)

These reasons seem to me unanswerable; but at all events, while the chemical condition in which the iron of the blood exists is matter of so great doubt, it is surely unphilosophical and rash to adopt a theory, however ingenious, based upon the assumption, that this substance is resident in the blood in a state in which there are such grave reasons for believing that it does not exist. I am also disposed to attach more value to the opinions of Mulder

than to those of Liebig on a point of this kind, because the former is a practising physician, and because, throughout his writings, I find a staid and sober judgment, and in his conclusions a close adhesion to observation and fact.

The researches of modern chemistry have disclosed a great variety of organised animal substances. So numerous indeed are they, that their very nomenclature is fatiguing to the memory; but few of them present much interest to the physician. It is indeed certain, that they are, for the most part, created in the torturing processes to which experimental chemists submit animal products, and cannot, with any propriety, be assumed to have a separate existence of their own. Yet of the number there are undoubtedly some which demand a distinct consideration, not only as endowed with important attributes of their own, but as the sources whence further changes in the system and greater products are derived. Müllder has admirably expressed this:—"Latterly scientific men have been much more occupied in exposing organic substances to various influences, and producing from them derived bodies, than investigating what combinations exist." "Since chemistry is a science of such an amazing extent, they who study it will certainly not be exclusively directed by a strife for utility; but yet a choice must be made, and, when forced to do so, they ought to prefer to

all other substances, those which can contribute to explain the operations of nature, for nature ranks above art." (Op. citat., p. 826.) Following this excellent advice, I perceive two widely distributed substances, Fibrin and Gelatin, which stand out distinguished by their striking chemical properties, their not less conspicuous physical qualities, and the manifest important purposes they serve. Unlike the derived and recondite bodies above alluded to, there is no difficulty in their extraction. They either separate spontaneously, or are disclosed by very easy means. Neither are they to be found lurking only in this or that secretion, or in any particular structure, but generally diffused through animal bodies, forming, as it were, their framework and chemical anatomy. A study of these substances will throw much light on the nutrition of the body, and on those morbid processes in which nourishment is either carried to excess or vitiated in kind. It will enable us better to understand the disease I have undertaken to describe and illustrate.

Dr. Prout has assumed, without any methodised proof, but on strong and reasonable grounds, that animals and men especially possess a power of converting the food they eat, of changing its organised principles, by means of which, though consuming only one kind of food, they become possessed of all the different substances necessary for the wants of

their economy. This opinion is indeed rather shadowed forth than plainly expressed. Other physiologists utterly disbelieve the existence of such a faculty. They cannot find any proof of such *chemical transubstantiation*. I fear that the absolute proofs we possess in organic chemistry are not many, but probabilities, so strong as to become a just basis, both of reasoning and practice, are not wanting, that this transubstantiating power is common to all organised beings. It appears to me that not a single step in physiology or pathology can be taken without frankly admitting it.

Dr. Prout, likewise, proposed another theory, which appears at first sight not in very strict accordance with that just enunciated. He supposed that vegetables alone possessed the power of extracting from the inanimate creation the elementary principles of their constitution, the carbon, nitrogen, hydrogen, oxygen, sulphur and phosphorus, &c., and building up organised principles from their unlimited changes and various combinations. He supposed, also, that to animals is assigned the more restricted but higher office of constructing tissues and organs out of the materials furnished by the vegetable world. A chain of existences is thus exhibited from the lowest forms of vegetable life up to the highest animal organisations, with mutual dependence, and characterised by the nature and extent of their nutrient

powers. The vegetable world devoured by the graminivora and inferior animal races again serves as food to the carnivora and man.

No doubt this theory expresses a great general truth, and when limited to an explanation of the ordinary and most accustomed course of nature in the nourishment and growth of her creatures, must meet with universal assent. But the dogmatical excess to which it has been lately driven by others, less cautious than its propounder, constrains us to remember, that animals do appropriate the air they breathe, the water they drink, with the various salts it contains, and thus probably the earth also on which they live ; and that the sphere of a vegetable, greatly limited by the soil to which the plant is attached, is probably also an indication of its dependence on some matters of higher elimination than the elements of the earth and atmosphere. I do not believe that plants can live when wholly deprived of food which has undergone some process of organisation, and the most superficial observers will admit, that thus situated, their existence becomes a very frail and feeble one. It is equally certain that while the poorest soils, poorest in organic remains, produce only plants of the slowest growth, the richer the stratum is the more rank and luxuriant the vegetable form. It seems to be an universal law of living beings, to which plants like animals are sub-

ject, that whatever power they may have of appropriating to their own substance the unorganised matters of the earth and atmosphere, they must have for their sustenance some portion of the principles already organised by previous existing creatures. The great truth, however, I believe to be clear and certain, that while both the great living kingdoms of nature are continually employed in appropriating the lifeless matter around them, this is more remarkable the lower we descend in the scale of existences, while the higher we rise the more obviously necessary it is that animated creatures should prey on the genera beneath them. Thus man conquers the earth, and subjects it to his own dominion and use. Nor is the truth, when even thus limited and generalized, to be received without exception, since man himself becomes food for the reptiles.

Liebig has proposed the startling doctrine that, before entering the organism of plants, the nutrient matters of the soil are resolved into their original elements, and that the office of the humus is only to supply the great demand for carbon which growing vegetables absolutely require. Such an opinion, it is manifest, can rest only on conjecture. It is contradicted by the thousand facts which our daily experience furnishes of the growth of plants, not in any way proportioned to the abundance of the

humus, but altogether dependent on the amount of organised remains in the soil. The late discovery by M. Soubeiran, of the solvent effects exercised by the ammonia disengaged in the decay of animal and vegetable matter over the humus and humate of lime, has removed the chief ground on which Liebig's theory rested. The French chemist has indeed proved, by well-devised experiments, that not only is the humus thus rendered apt to the nourishment of vegetable life, but that it does thus actually penetrate the organism of the plant without either change or decomposition. ('Journal de Pharmacie,' vols. xvii, xviii.)

In confirmation of the same theoretic views, Liebig and the disciples of the German school of chemistry affirm, that they have discovered in plants, albumen, fibrin, and fatty matters perfectly identical with the same substances as seen in animal bodies; and to make a congruous and perfect doctrine, the additional rule is laid down, that these principles originate in plants, are there elaborated, and, after due preparation, are thence transferred by absorption into the constitution of animals.

There is here so much speculation, and such a concatenation of supposed facts, as is well calculated to stagger the faith of the least cautious physicians. Were there no dissentients from, and no obvious objections to these doctrines, we should still feel

justified, on the ground of a general unbelief, and the yet great imperfection of organic chemistry, in withholding our assent from inferences of so extensive a kind, and in repudiating the conclusion that differences of physical properties can ever be unattended with changes of chemical constitution. But we are not unsupported in our scepticism.

Our assent is more easily obtained to ideas by which some of the most important phenomena of life are brought within the domain of chemical action, by the complete system they present. The cohesion of parts is very seductive, and has, without doubt, begot in favour of this novel doctrine a fervour of feeling which lulls to sleep the reason even of grave and considerate philosophers. The very justifiable admiration, too, entertained for the great labours and most useful discoveries of the Giessen school, has probably induced us more readily to adopt their errors.

But the German chemists have not merely represented animal and vegetable albumen as identical; animal albumen and fibrin, though widely different in appearance and physical qualities, are also said to be quite alike in chemical constitution. The ease with which the scientific world has acquiesced in these opinions does, indeed, appear still more surprising, when they are not found supported by facts as distinct and positive as the dogmatical language in

which they are announced. In scrutinising the analytical tables of Liebig's work, I am surprised to find figures set down on the trustworthy authority of Scherer, Jones, and of Liebig himself, establishing such differences of composition between animal and vegetable albumen, and animal albumen and fibrin, as not to justify language so emphatic, and certainly to make us pause ere we draw great conclusions from facts so uncertain. These differences may be within the limits of what analytic chemists allow for the usual errors of experiments; but I at least can readily conceive that variations of such amount may make great distinctions in qualities; and it strikes me as singular, that these variations point chiefly in one direction, to which I shall afterwards more particularly call attention. When it is considered, moreover, that these quantitative analyses are accomplished by operating on very small amounts of matter, and that the results thus obtained are multiplied so as to arrive at the formulæ given, it may easily be conceived how a small error in the original experiment, unworthy even of being recorded, might appear a huge difficulty if worked out into the published tables, or might remove one which should have appeared. Let it not be supposed that in what I have written I would be presumptuous enough to question the great comparative exactitude of Professor Liebig's analyses. But the

conclusions from them seem to me swayed by a preconceived opinion,—a theory to be made good. For this reason it is necessary, not only to examine the reasoning, but to scrutinise the facts on which it rests with the minutest care. The doctrines sought to be established are of great practical importance, and should not be admitted without the most cogent proof. The following observations on this subject will, I think, command universal assent :

“It is of great importance to keep this in view, because nature, by adding a little to, or taking a little from, the same primary material, produces several bodies apparently very dissimilar. In this we behold a simplicity which is highly remarkable ; but small as these quantities are, we find in the chemical difference of the substances added, the cause of the differences which exist in the nature and quality of the products. Thus the differences among the protein compounds above mentioned are by no means owing to polymorphism, but to a real chemical difference in their constitution. (Müllder’s ‘Chemistry of Veget. and Animal Physiology,’ p. 304.)

In a former edition of this book, I stated my conviction that the great organic principles of which animal bodies are composed are disclosed, elaborated, and brought to perfection in the circulation. Additional and careful reflection only adds strength to this belief. The circulation, indeed, pulmonic and

systemic, appears to be the great workshop of the body. Here, controlled and directed by the vital forces, great chemical changes are accomplished with ease, to which no parallel can be found in the laboratory, though the attention of men of science has of late years been earnestly turned in this direction.

The near approach to each other in chemical composition, which the laborious and careful analysis of albumen and fibrin presents, has naturally attracted much observation. For some years physicians have endeavoured, without much success, to convert, by chemical processes, these substances into each other. The nearest approach to a satisfactory result was made by Denis. The strange mutations, indeed, which he describes are most interesting. He has certainly proved that by treating albumen with neutral salts, particularly the chloride of sodium and azotate of potass (nitrate of potass), a substance possessing many of the properties of fibrin, such as spontaneous coagulability and solution in hot water, may be obtained. But all such experiments are of little use till it is proved that nature herself follows the same road to arrive at a like end.

Remembering the advice given by Mulder, already quoted, it appeared to me far more hopeful to make a study of the process which nature herself employs in accomplishing her own ends. I did so un-

doubtedly with a preconceived notion of what I should find. I looked, as I have already said, to the circulation as the field in which to expect results. I remembered that both the great ingredients of the atmosphere disappeared during respiration in a manner yet unaccounted for. I remembered also the experiment of Mylne Edwards, on the disappearance of nitrogen, now strangely neglected. I felt assured that here I should find a solution of all my difficulties.

It was natural to expect, that if the albumen of the blood did, during respiration, pass into fibrin, a difference in the amount of fibrin in arterial and venous blood would be found. This had already been satisfactorily proved by Berthold Mayer, Denis, and Müller, but none of them seem to have arrived at the right conclusion. They attributed, as was very natural, the greater amount of fibrin in arterial blood, to the fact that it had received the contents of the thoracic duct from the food ; while the venous blood had already parted with its fibrin in the course of the systemic circulation. The multiplied testimony, however, of all these authors, as to the different condition of the fibrin in arterial and venous blood, convinced me that there was another explanation to be given than this. The doubt I entertained was of being able to perform such an experiment as would force out the truth.

The fibrin of arterial blood is described by all observers as constituting thick, solid, shining bundles, while that of venous blood is soft and dilute. This difference is ascribed by them to the fibrin in venous blood being in a state of greater division, and not to that of arterial blood having been more highly elaborated in respiration.

Had I confined myself to a consideration of the facts presented by physiology, it is probable I should have rested in the conclusion which satisfied previous inquirers, but the phenomena of pathology, and particularly of the disease which is the subject of this work, pointed another way with a clearness which permitted me neither rest nor hesitation.

The buffy coat of inflammatory blood is universally allowed to be fibrinous, and it is certain that it always indicates a considerable increase of fibrin in the blood. Though both respiration and circulation are hurried in inflammatory fevers, yet it is quite conceivable that the phenomenon we are considering, as well as the firm coriaceous coagulum always met with in such cases, might not be owing to increased generation, but to arrested deposit of fibrin caused by great disturbance of the system. This explanation, however, must necessarily be abandoned, since the discovery by Andral and Gavarret, that in adynamic and putrid fevers the very opposite state of things takes place. The soft pultaceous extended

coagulum presented in these cases, is indeed familiar to all physicians. The results obtained by Andral are so great, as somewhat to stagger our faith in the perfect accuracy of his observations or the correctness of the method employed. Of the 88 cases of anæmia related, some were so impoverished in health as to have the globulin of their blood reduced in the proportion of 127 to 21. We have difficulty in conceiving the endurance of life under such extremes, and are astonished to find that such patients should have been bled at all. The fact must be accepted on the unattested evidence of its relator, for no opportunity will occur to an English physician of verifying it. Happily, however, the investigation has been resumed by the careful and accurate Simon, who has confirmed, in the main, the statements of Andral with regard to fibrin.

The phenomena of ordinary local inflammation also crowded on my mind to convince me that, during and by means of respiration, the amorphous albumen of the blood is raised into the plastic fibrin, and fitted for the formative uses of the body. The commencing inflammatory fever, occasioning an increased production of fibrin; the tumefaction and insulation of the disease, by the pouring out of lymph (fibrinous fluid?); the subsequent stage of exhaustion, attended by effusion of pus, (albuminous and oily product?) seemed all easily understood.

The facts of a common incised wound are strikingly illustrative of the same general principles. The first febrile movement being of a sthenic or inflammatory kind, is attended by the formation of coagulable lymph (fibrin?), and here, in a healthy and vigorous person, the process ends. But weaker individuals, and those placed either in ill-ventilated hospitals or foul rooms, have a less-sustained and less-decided primary fever, followed by an asthenic condition and suppurative process.

The origin of fibrin has not escaped the penetration of Mulder. In the following quotation his opinion is very clearly expressed, bound up with some other views of his own. "Two other very important protein compounds occur in the bodies of animals, namely, the bioxide and trioxide of protein. They both exist to a large extent in inflamed blood. They are produced during respiration, and are ordinary constituents of blood. Both, as I have said, are found in the blood, being constituents of the healthy organism. In it, upon every respiration, a small quantity of them is produced, and they probably form round the globules a thin layer which has the same composition as the inflammatory crust. They are produced by the oxydation of the substance which, during the coagulation of the blood, is changed into fibrin. This protein compound absorbs oxygen in the lungs, and circulates through the arteries in

the state of the two oxides of protein. They are decomposed in the capillary system, and are employed in effecting the necessary changes in the substance of the body." (Op. cit., pp. 314-15-16.)

Simon also expresses very clearly the opinion that fibrin takes its origin during respiration. "Fibrin is therefore obviously formed in the active metamorphosis of the blood; and that portion which pre-exists in the chyle is modified and rendered more plastic. It is a well known fact that the respiratory process not only increases the plasticity of fibrin in the blood, but also its quantity, and that, on the other hand, the amount of fibrin diminishes in blood which is not brought into contact with oxygen." ('Animal Chemistry,' p. 157.) But neither of these authors has pursued this important subject, and taken it out of the field of conjecture. It became therefore a matter of much interest and considerable thought to contrive an experiment which should make evident the truth I desired to elicit. At first it appeared to me probable, if albumen passed into fibrin by the aid of, and during the process of, respiration, that blood abstracted before and after sharp exercise would give traces of the fact. This experiment proved to be a total failure for the proposed object, yet was not unproductive of interesting results. At first it seemed that the desired truth was disclosed, for the bulk of the fibrin was very

remarkably increased after exercise. The blood was drawn from the jugular vein of a horse, which was afterwards smartly galloped for an hour, and again bled from the same incision while still reeking with exercise. But the fibrin, which during the agitation of the animal had undergone a remarkable increase of bulk, proved on drying not to have acquired any addition of weight. It had not suffered any change.

On pondering over the results of this experiment, it was plain to me, that it ought not to have succeeded. It is quite evident that whatever increase of fibrin may take place on the arterial side of the heart, the blood must in a state of health return to its ordinary standard in the veins: otherwise, the balance of the system would soon be overturned and fever be engendered. In my conception of the experiment also, I did not advert to one of its necessary and most important conditions. The same exercise which roused the circulation and respiration into unusual activity, called into play also the other energies of the animal. The friction of the muscles was attended with ruin of their substance and loss of weight. The fibrin created was instantly wanted to replace that which was lost. The experiment served, however, to show that which is too little known or adverted to, the very short space of time required for the completion of these organic operations.

To avoid these sources of error, it seemed to me sufficient to keep an animal at rest, and make him breathe an atmosphere of oxygen, or, at least, one very highly oxygenated. An inspection of the elementary composition of the organised principles of the blood, satisfied me that oxygen, if not the sole, was, at least, the principal agent in the creation of fibrin. This experiment answered my expectation. Blood was taken from two rabbits, one only of which was exposed to the oxygenating influence with the following result:— 'The blood of the rabbit in the natural state contained 1·55 of fibrin, while that which had breathed oxygen for half an hour, contained 2·9 of fibrin in 1000 parts.

Two sources of possible error, and probable cavil and objection, presented themselves in these experiments. They were performed on different animals, which, though apparently in perfect health, could not be considered so exactly alike in all points of constitutional condition, as to remove doubts from the case. In the second place, the blood was taken from arteries and veins alike, from every vessel, in fact, in the neck that would bleed. The small quantity of blood yielded by a rabbit rendered this necessary.

To obviate these objections, I sought to obtain the blood of my experiments from the arteries of a horse. The difficulty of placing a large animal in

a stream of oxygen so effectually as to make any notable change in the great volume of its blood, is so great, that, though assisted by Mr. Mavor, one of our best veterinary surgeons, I was obliged to desist.

The resource which remained for me, was to take the blood immediately from the left ventricle of the heart or the aorta of the rabbit, and to multiply experiments, so as to get rid of the fallacy which various constitutions and varying health imposed. This was accordingly done.

My first care was to establish a standard of health in the animal selected. None was so convenient as the rabbit; six males, in apparent perfect health, were selected, and the blood, taken as above stated, examined with a view to establish the quantitative proportion of the different organised principles, with the following result:—

The following analyses were made to determine the relative proportion of the organic constituents in 1000 parts of the Blood in the Rabbit:

	Fibrin.	Globules.	Albumen.
1	1.8	88.	40.6
2	1.45	77.14	37.2
3	1.45	95.5	40.
4	1.5	70.	52.
5	2.	92.	50.
6	1.73	71.5	58.
Average	1.65	82.35	46.3

I next sought to determine the changes which oxygenation of the same quantity of blood would induce, with the following result :*

	Albumen.	Globules.	Fibrin.
1	40	75	2.5
2	45.7	73.2	2.4
3	35.	60.5	2.3
Average	40.23	69.56	2.4

An inspection of these tables is sufficient, I

* The following is the process by which the analyses of blood given in the text were performed. It was that which was found, after many trials, to be best suited to the quantity of fluid operated on, which in almost all cases was comparatively small.

1. The fibrin was separated (as Simon recommends) by agitating the blood with a few shot, to which it readily adheres: it may be separated and weighed with far more accuracy than any other constituent of blood.

2. The albumen and globules were separated from each other by a saturated solution of sulphate of soda, in which the latter are insoluble. If the mixed fluids be left at rest for eighteen or twenty-four hours, and then passed through a good double filter, the albuminous portion will come through only very faintly tinged, and the globules on the filter may be washed with small portions of the solution of sulphate of soda. The filtered fluid is then boiled to coagulate the albumen, which is washed and dried at 212°.

3. The globules on the filter are to be dissolved in a considerable quantity of cold water, the solution boiled, and the coagulum washed and dried at 212°.

None of the other constituents of the blood were taken into account in these experiments, partly as not affecting the comparative results, but chiefly because of the small quantities accessible for examination.

think, to establish, as a principle, that oxygenation and fibrination are identical.* If this be received as a rule, its influence on hygienic considerations must be very considerable. It accounts to me for many striking incidents of my professional life, which seemed to me, more like the unexplained and mysterious influences of the nervous system, than changes brought about by the operation of chemical and physical laws. It is not long since I ordered the removal of a young gentleman from a lodging in one of the close lanes in the neighbourhood of the Strand, to a comfortable room at Bayswater. The

* These results exhibit, in a strong light, the absurdity of the extreme length to which the stall-feeding of cattle is now carried, unless, indeed, the only object be to produce fat and manure. The former may profit the butcher, and the latter be of great use to the farmer, but the interest of the consumer seems little consulted in this practice. I have no doubt that, by a much shorter period of confinement and feeding, while the health of the animal can yet be well maintained, a great addition to its flesh, and a softening of its fibre, may be procured; but if there be any truth in what I have related, this will be much promoted by moderate air and exercise. When stall-feeding is carried to excess, as it commonly is, so that the animals grow dull, fat, and apoplectic, it is at variance with reason, and is real waste. The public opinion seems now in a state of revolt against the offensive exhibitions of our cattle shows, where prizes are given to faults and not to excellencies. It is said in their defence, that the amount of fatness is commensurate with the perfection of the breed. I am a bad judge of such things; but I have been struck, in walking through our annual exhibition of fat cattle, with the great number of brutes having, to my eye, all the external marks of coarseness, yet in a very shocking state of repletion.

effect was nearly immediate. The same evening he expressed himself better, and the next day an erysipelatous rash, which covered his face and neck, was arrested, and the discharge from an abscess became healthy. Here, let me say, that we commit a great mistake, when, in sanitary matters, we confine our attention to mephitic exhalations which engender fever, diarrhoea, and epidemic diseases: fetid air alone is most injurious to health. It induces a low state of breathing. The sensitive apertures of the lungs are closed against the intrusion of the offensive fume and the organic processes of health are interrupted. I believe the saying of that eminent physician was not so paradoxical as it seemed, who declared that "he had rather undertake the practice of physic with pure air, pure water, and good food alone, than with all the drugs of the Pharmacopœia without them."

Any difficulty we may have met with in accounting for the origin of fibrin is exceedingly enhanced when we seek to trace gelatin to its source. This substance is indeed the most perplexing of all animal products. It is not to be found in the blood; and, suddenly, without any apparent stage of transition, it makes its appearance in certain tissues, the skin, cellular membrane, tendons, cartilaginous structures,

and bones. It is very extensively diffused through the body ; seems, indeed, to form a large part of its skeleton and framework, and yet is not found in its nutrient fluids. I long thought, that with greater care of investigation, it would surely be found lurking in some of the component parts of the blood, and the globulin seemed to me its most probable hiding place. Unfortunately, we have no distinct and delicate reagent for gelatin ; but the accurate and continued researches I have caused to be made, convince me now that it is not to be found either in globulin or in any other principle of blood.

The systematic chemists have solved this difficulty in a very easy and expeditious manner, by denying the existence of gelatin altogether as a part of the animal body, and assuring us that we form it in the act of ebullition. They do not, indeed, explain to us the process of extraction ; they do not tell us what molecular changes are accomplished, what elements are set loose or enter into new combinations, in order to furnish us with this educt of gelatin, which now, for the first time, exhibits itself. This axiomatic opinion was first, if I mistake not, emitted by Berzelius, and is now laid down in works on Chemistry with a gravity and comfort that are very surprising. It would, indeed, be presumptuous in me to oppose myself, on a question purely chemical, to great authorities in this branch of science, had

the decision been acquiesced in by physicians ; but they continue to think about and talk of gelatin as a substance having a real place in, and forming a distinct and essential part of, animal bodies, hardly conscious, or not choosing to recollect, that chemists have decided anything in the matter. Indeed, the chemical dictum sounds to me not a little paradoxical, and very much as if we were to say, *We believe it is not there, because we find it there, and because we do not find it somewhere else.* As long as there are tissues yielding gelatin readily to the simple process of exposure to water of not greatly elevated temperature, so long will the belief be strong and ineradicable, that these gelatinous tissues contain, as an essential part of their constitution and in the form in which we find them, the substances they yield. But it must appear strange, and, perhaps, prove somewhat consolatory, to the followers of practical medicine, to perceive that dogmatism is not confined to their own art, and that it shows itself even among the students of purely experimental science, where there is less excuse for it.

It would, indeed, very materially abridge my labour, and aid me in my inquiry, could I admit this position of the chemists. Were there no necessity of accounting for the presence of gelatin in the tissues, I should find no contradiction, seeming or real, of the doctrine I have adopted, that all the

great organised principles which serve the purpose of building up the animal frame, take their origin in the blood, and that they are there from absolute necessity. The question now becomes an important one, and not less curious than important. Is gelatin an exception to all other organised substances? Does it not arise in the process of sanguification?

Before giving an answer to this question, it is worth while to review some of the properties, chemical and physical, of this substance, and its relation to other organic principles of animal bodies. The first circumstance which presents itself worthy of observation, is the remarkable behaviour of gelatin under the influence of heat, as contradistinguished from that of albumen. This latter substance undergoes a total change, when exposed to heat of a very moderate degree. What the nature of that change is, is not yet known, except by its result, insolubility. But all the changes which gelatin undergoes are in striking contrast. It only becomes soluble at an elevated temperature, and then, too, requires a large proportion of fluid for its perfect solution, while soluble albumen seems diffusible through the smallest quantity of water. In contrast with albumen, too, which once coagulated cannot be led back to the fluid condition, some solutions of gelatin seem to have a difficulty in returning to a state of cohesion. If a portion of gelatinous tissue be treated with acetic

acid, and a jelly obtained, it will readily liquefy on exposure to a very moderate degree of heat, but it does not return to its gelatinous condition on cooling; yet it seems to exist united to the acetic acid, so far unaltered that, on the addition of an alkali, it reappears with properties unchanged. This phenomenon never exhibits itself in aqueous solutions of gelatin, and, indeed, the more durable quality of this substance may be looked upon as one of its marked characteristics, of which, probably, the retention of its properties in the experiment related may be considered a striking illustration.

In remarkable coincidence with the more fixed quality of gelatin, is the fact that it enters into the construction of the most durable textures of the body, the cartilaginous, tendinous, and chondrinous structures, which are least liable to change or decay. In this, too, we can see the explanation of one of the great difficulties of the systematic chemists, that this substance cannot be obtained from the gelatinous tissues without decoction. Such firm textures cannot indeed be broken down without a considerable disturbing force, and that this is the true reason, is proved by the fact that gelatinous tissue, when in a state of subdivision, is by no means so rebellious to the action of hot water.

But gelatin in the tissues is undoubtedly in a state of very great condensation. If 25 grains of

the aponeurotic expansion of a sheep's foot be exposed to the action of acetic acid, it becomes transparent, swells to many hundred times its original bulk, and yields a jelly which does not arrive at a fluid state till it has penetrated, or been penetrated, by an almost incredible amount of fluid. It is really difficult to say whether the gelatin absorbs the liquid, or is absorbed by it, so strange is the manner of its solution. But this remarkable property of swelling and absorbing liquids, and the great amount of fluid required to overcome its cohesion, and give it perfect mobility of parts, afford, in my mind, the explanation of many of its phenomena, and remove the veil of mystery, which shrouds its condition in the living body.

Let me now call my reader's attention to the elemental constitution of gelatin; and with a view to its more perfect understanding, I will place it in conjunction with albumen, fibrin, and chondrin. I wish that the following analyses had been made, I will not say with greater care, for I doubt not they were made with that exactitude which characterises the eminent individuals to whom we owe them. But I wish they had been made with a knowledge, on the part of their authors, of the important deductions likely to be made from them. They are, however, at least free from any suspicion of a bias to suit a preconceived purpose.

	Carbon.	Hydro- gen.	Nitro- gen.	Oxygen.	Sulphur.	Phos- phorus.
Albumen, by Mulder	54.086	7.100	15.650	22.157	0.677	0.330
Do. „ Scheerer	55.097	6.880	15.681	22.342		
Fibrin „ Mulder	53.810	6.910	15.539	23.052	0.359	0.330
Do. „ Scheerer	54.454	7.069	15.762	22.715		
Gelatin „ Mulder	50.050	6.480	18.350	25.120	...	
Do. „ Scheerer	50.557	6.903	18.790	23.750		No Ph.
Chondrin „ Mulder	49.960	6.630	14.440	28.590	0.380	
Do. „ Scheerer	49.496	7.133	14.908	28.463	...	

Whatever doubt may reasonably be entertained of the perfect accuracy of such minute operations, and their authors assume limits within which errors of observation are not only possible but probable, still the same process of analysis being followed, they are relatively correct, and form a very sure basis of general deduction. An inspection of the table seems to me replete with interest, and pregnant with useful suggestions. The coetaneous disappearance or diminution of all the combustible matters, except hydrogen, with the increase of oxygen, is very striking. The proportion of carbon gradually diminishes as we rise through albumen and fibrin to the higher organisations of gelatin and chondrin. Phosphorus altogether disappears in gelatin, and there are but traces of sulphur either in this sub-

stance or chondrin. Whilst these changes are going on, a great addition of azote takes place as fibrin passes into gelatin, which is again dropped as the last substance is raised into chondrin.

To my mind all these changes are most striking. How is it, and for what reason is it, that amid a general consumption of these combustible elements hydrogen alone is spared and maintained in its primitive amount? Nature is said to do nothing in vain. Yet here is the most inflammable of all these elements preserved amidst a general waste. Can any one who observes this, doubt the controlling power of the nervous or vital force?

It is a dangerous thing to yield ourselves up to speculation, and follow the current of the imagination. But the danger is in great measure removed when we know what we are about, and do not put objects, dimly observed in the distance, in the place of things well understood and clearly seen. I cannot help connecting the remarkable characteristics of the tissues we have been considering, with the known qualities of the elements which enter into their composition. All these ligamentous or gelatinous tissues have, and absolutely require for the uses they serve, a great degree of elasticity, durability, and ductility. Their combustible and perishable elements are removed, while they receive a great addition of the least destructible of all the productions of nature.

The cartilaginous or chondrinous tissues, on the contrary, require no ductility and tenacity, but even augmented elasticity, the heavier ingredient, nitrogen, is withdrawn, and the expansive hydrogen is maintained. These are not phantoms of the imagination. They appear to me indications of important truths, and to point in the direction of a sound philosophy.

It may, indeed, be objected that I have assumed, without proof, these successive stages in the erection of the above organised principles, and this is, without doubt, a perfectly valid objection. The explanation is theoretic. Except in the case of fibrin from albumen, I have not adduced any direct or conclusive fact on which to build these opinions. But I think I am justified in saying, that other opinions are even more destitute of support. It appears to me, that the account I have given affords a far more ready and more probable account of the facts, both of physiology and pathology, while it is free from any striking difficulty. On this I rest it; and venture to think that future facts, as they are discovered, will tend to its confirmation. It would, however, but little affect my argument, were it proved that all these organised products were, according to the prevalent opinion, directly created from albumen.

The experiments of Mylne Edwards on the absorption of nitrogen have fallen into unmerited neglect. Though never disproved, they have been dropped.

The disappearance in the blood of an element, so little prone to unite itself to other substances, has been an insurmountable difficulty to men of science. But it is chiefly an obstacle to those whose pursuits are too exclusively chemical. I fear I shall weary with my iteration of the necessity of looking on animals, as organised beings, not surrendered to the laws of matter, in whom, indeed, these laws are entirely subordinate to vital actions and vital necessities. The success which has of late years attended the researches of chemistry into the physiology of organised beings, has too strong a tendency to make us forget the much greater forces which control and bind the palpable and visible phenomena. I have, indeed, been lately much surprised to read the expression of open incredulity and something like derision of vital actions. It would seem enough to observe a creature instinct with life, and the same being in death and corruption subject to the uninfluenced operation of chemical and mechanical agents, to put an end, at once and for ever, to such overweening philosophy. I have not a doubt, that the atmosphere is the real source of the azote required for the constitution of gelatin, and that this is another proof of the controlling force of these vital functions, which accomplish with ease changes impossible by the unaided agency of any known scientific power. Edwards has proved the disappear-

ance of nitrogen in respiration ; Magnus has clearly shown its presence in the blood ; chemical analysis yields it in the organic principles of this fluid ; it seems to me that demonstration could hardly be closer and more complete.

We are now prepared to understand the origin of gelatin, without supposing it to contradict the general law, that the great organised principles which serve for the construction and nourishment of the frame are eliminated in the blood. If the gelatin be raised from the fibrin, as I think will appear at least probable, this change must take place in the course of the circulation. But when the requisite addition of oxygen and nitrogen has been made to fibrin, the result will not be a jelly, which alone we are accustomed to consider gelatin, but which is really a hydrate of gelatin ; the result will rather be, that radicle which we have seen swell into many times its original bulk, when exposed to the action of solvent fluids and heat. Not finding, however, within the current of the circulation, that great amount of moisture essential to its disintegration, it is necessarily and immediately dropped on the tissues where it is required.

A very interesting question remains here for discussion, but of which I do not mean to treat at any length, because the subject to which I allude does not, in truth, concern so much the history of gout, as

those which have already occupied me at such length. Yet it is of importance that a reply should be given to the query, whether fibrin penetrates the human system only in the way I have described. Whether, in fact, the fibrinous tissues of the inferior races of animals may not be taken as food, and pass unchanged into the organism of man. There is one change which we know these fibrinous matters must undergo before entering the blood. They must be dissolved. The philosophers, who found no difficulty in supposing that the albumen of grass could, without modification, become the albumen of the ox, will readily enough admit that the muscle of a sheep may, without any additional organisation, furnish forth the limbs of human beings. But such a doctrine cannot be established on assertion. I have great difficulty in believing that the organised principles which served the purpose of building up the carcase of a quadruped of very dissimilar wants and habits can, without considerable change, and something more than molecular change, minister to the construction of a man. It is not any notion of superior human dignity which actuates me here, but a feeling of the incongruity of the matter. Yet I do not think that the fibrin should return to the state of albumen to be worked up again. This would be to suppose labour in vain. It seems to me both probable and certain that fibrin, in common with all other alimen-

tary matters submitted to the assimilating functions, must undergo a process of organisation fitting it for the uses of the new individual of whom it is to form a component part, nor could any apparent homogeneity of chemical constitution, in the present state of science, induce me to renounce so plain a dictate of reason.

Before leaving the subject, let me recapitulate, in a few words, the leading facts and positions I have sought to establish. It has been proved, I think, beyond the possibility of cavil or doubt, that, in the act of respiration, and by a process of oxygenation, the amorphous albumen is converted into the plastic fibrin, adapted to the uses of the system and the formation of the softer muscular tissues. The fibrin is again, I imagine, by the removal of a portion of its carbon, by a further process of oxygenation, and by the addition of some atoms of nitrogen, raised to the condition of gelatin, which is instantly carried to the organs for whose nutrition it is destined. The fibrin supplies the softer and more perishable muscular substance. The highly organised gelatin nourishes the organs and containing vessels where elasticity and ductility must be united to great resistance and strength. By a still greater development of the same processes, the more elastic chondrin is educed to constitute the cartilages of the body. These functions of decarbonisation and

oxygenation best account, in my mind, for the appearance of carbonic acid, and disappearance of oxygen in respiration, the points I proposed to illustrate at the beginning of this chapter.

CHAPTER IX.

RESPIRATION A PROCESS OF NUTRITION—ITS IMPORTANCE TO HEALTH
—THE RED GLOBULES—THEIR OFFICE—PATHOLOGICAL OBSERVA-
TIONS—REMORA IN GLOBULES—STEADINESS OF ALBUMEN—ORIGIN
OF CONSTITUTIONAL DISEASE.

My principal object in the last chapter was to prove that the great office of respiration was not a process of mere defecation, in which light it is too much regarded, but a very important function of nutrition. More than one physiologist has already pronounced the lungs to be a great gland, but they differ from all other conglobate glands in this, that the organised principles they create are retained in the system, and the effete matter they eject is a simple chemical product. We think we understand all the importance of the office of respiration when we pronounce it to be vital, but its alliance with the natural functions is hardly of less value in the system. It is really as important to health as it is necessary to life.

This is no new thing. The importance of air and exercise to health has always been duly appreciated. But it is of no little consequence that we should well

understand why young women, who loll on sofas and live in over-heated rooms, should grow wan and emaciated, why the slaves of the law and the desk should lose their looks and their health. The observations of the preceding chapter will, I trust, place in a clear and unmistakeable light, that breathing is as necessary to strength as eating, and that the first office is but the essential complement of the second occupation.

But the least careful thinker will perceive what serious consequences must ensue if these healthful processes be not completed; if men maintain an opulent diet, and deliver themselves up to a life of indolence and inaction; if, in fact, the albuminous portions of the blood be not raised into their higher representatives, which alone are fit for the organic uses of the system.

It is of some interest to follow this process a little closer than we have hitherto done. We have already seen what reason there is for believing that by the agency of oxygen the albumen is converted into fibrin. It is certain, however, as I have already stated, that there is something here beyond a mere chemical operation. We cannot by exposing albumen to the action of oxygen obtain fibrin. I have kept them in contact and agitated them together for very many days without any success. In considering this subject, our attention is naturally drawn to the most striking

and most abundant organic principle of the blood, of which I have as yet made but little mention, the red globules. Everything in these remarkable bodies points out their great importance. Great accordingly has been the attention they have received; and though much has been discovered, yet it has neither been commensurate with the labour bestowed, nor with the importance of the subject. We cannot certainly yet say that we know the use of the globules. We know even nearly as little of their chemical condition as of their physiological office. Such, indeed, is the obscurity in which they are still involved, that Mulder, a practising physician as well as a profound chemist, has written the following blighting sentence concerning them:—"What I have stated as to the colouring matter of the blood, has been mentioned only for the purpose of modifying the prevailing ideas as to its functions. It is not, I think, one of those substances which perform a principal part in the organism, and it ought not, properly speaking, to have been treated of here. It is generally considered of importance, in a chemico-physiological point of view, an opinion in which I do not concur." ('Ch. of Veg. and An. Phys.,' p. 345.) This seems to me only one of those sentences of despair which fruitless research of his own, and groundless speculations of others, is apt to dictate to the wisest of men. These blood-corpuscles full surely hold a

secret which the progress of science will disclose. They have been considered by nearly all physiologists by Henle, Wagner, Wharton Jones, &c., as floating cells, whose office is to elaborate the fibrin from the plasma of the blood. Simon supposed that the nucleus of the cell was the part chiefly instrumental in this conversion, an opinion which has fallen to the ground since more accurate observations have established the truth that the red-corpuscles are not nucleated. Others think that the envelopes of the globules are the principal agents of the change, and seeing that they are most exposed to the action of oxygen, there seems great probability in this opinion. Mr. Wharton Jones, however, believes that the inclosed hæmatin is the source of fibrination. Whatever truth there may be in these conjectures, there is a remarkable concurrence of testimony, that in the constitution of the blood the red corpuscles hold a conspicuous place, that they stand between the albumen and the fibrin, that the former must pass through the globules during its transition into the latter. Though the labours of all preceding physiologists tended to the same conclusion, this opinion was first laid down as a great general truth by Mr. Wharton Jones. "The red corpuscles draw, from the raw materials of the liquor sanguinis, a matter, elaborate it, and when elaboration is perfected give back the matter, becoming at the same time melted

down in the liquor sanguinis." (Wharton Jones on the Blood, p. 597, xxviii; 'Brit. and For. Med. Review.')

In opposition to this doctrine, Dr. Carpenter has proposed another explanation of the origin of fibrin, founded certainly on strong and striking facts. He states that the animals whose blood does not contain any red particles, have, notwithstanding, fibrinous tissues, and that fibrin is found in the lacteal and lymphatic vessels, in which its presence cannot be accounted for by the agency of red globules, though white globules are there met with abundantly. Founded on these facts, Dr. Carpenter has advanced the opinion that the white globules are the source of the fibrin.

The fact of fibrination in white-blooded animals does not present, to my mind, a great difficulty. Where there is a great difference of organisation, there may be a difference of office, without impugning that uniformity of the functions of nature which is so general a law. White-blooded animals may receive their white fibrous textures from white globules, while the red muscles of the vertebrata may proceed from red corpuscles. The presence of fibrin in the lymphatics and thoracic duct, is a greater difficulty. But when I consider the condition of the fibrin in these vessels, its soft and undeveloped form, and when I reflect on the very

certain connection which seems now established between the function of respiration and the origin of fibrin, I feel compelled to admit, that it finds its way into these absorbent vessels by direct absorption from the food, and not by excretion from the white globules.

But the determination of this question seems to me to be, at present, at least, more within the domain of pathology than of physiology. The great changes which take place in disease are accompanied by fluctuations in organised principles which afford very striking indications of the bonds by which they are united to each other. Le Canu showed that a great increase of globules took place in plethoric diseases. Andral and Gavarret proved that in inflammatory diseases, a great addition was made to the fibrin of the blood. Simon following, carried these discoveries out into much detail in a great variety of diseases ; but he took an additional step, by proving that the increase of fibrin was invariably attended by a diminution of the amount of the globules, and that this process of fibrination was, in fact, carried on at the expense of these latter bodies. This fact is surely a great proof of the correctness of Mr. Wharton Jones's opinion of the origin of the fibrin. It is also much confirmed by what was observed in the experiments related in a former chapter. The discs of the globules had undergone a considerable process

of destruction under the action of the oxygen; their even and clear outline had become ragged and irregular, and they were entangled with shreds of fibrinous matter, from which it was not easy to separate them. These shreds I suppose to be the remaining envelopes of globules which have been totally disorganised, and I think their presence a proof that the fibrin has its source in the envelopes, and not in the hæmatin. This is proved by another circumstance observed in these cases of oxygenised blood. A certain amount of hæmatin is found effused in the plasma, and it becomes a matter of great difficulty and trouble to separate it, so as to ascertain its amount in establishing a just analysis.

Reverting to the pathology of the blood, let us see how far the facts brought to light by Le Canu, Andral, and Simon, coincide with and illustrate the views of the constitution of the blood exposed above. Did the stomach lose its office and the appetite for food disappear, when the respiratory and assimilating functions are less active, weakness and faintness might result, but the balance of the organised constituents of the blood, would still be preserved. Our daily experience, however, proves to us, that not only may a good appetite be preserved, but great gluttonous powers remain in spite of the almost total ruin of healthy assimilation. Though the nutrition of the body be thus, as it were, cut off in

the middle, the stomach and bowels may still retain their office unimpaired, and the nourishing fluids be yet poured into the blood, there either to oppress the system, or run into the most painful forms of disease.

The observations of Le Canu have established the fact, that the point at which the assimilating function stops, when the system is oppressed, is the globulation of the blood. To use the language of the older physicians, remora takes place in the globules. Indeed, nothing can be more striking than the remarkable steadiness of the albumen, both in health and disease. Le Canu found the proportion of albumen to vary extremely little in men and women, and individuals of a sanguine and lymphatic constitution; but he found the mean ratio of the globules in women 99, while in men it rose to 132. In men of sanguine habit, he found the proportion of globules rise to 136, and in women to 126, while in men of lymphatic constitution, the same proportion reached only 116·6, but in women it was as much as 117·3. (*Le Canu 'Etudes Chimiques'*, p. 83.) In scrutinising the various analyses of the blood in disease made by Le Canu, Denis, Andral, and Simon, the same great steadiness of the albumen is observed. In one disease only, albuminuria, does it undergo a great change, and then it sustains a diminution. The rule, too, is nearly in-

variably followed, that wherever a small addition is found to the nominal proportion of albumen, there is an adequate loss in the globules. Thus in typhus, Le Canu found, in one case, globules 115, albumen 71 ; in another, globules 105, albumen 90, (p. 109.) In five cases of heart affection, he found the mean of globules as low as 50, and the mean of the albumen as high as 80, (p. 110.) In chlorosis, he found the proportion of globules as low as 55, and the albumen at 73 ; and in the same disease two analyses, made by Allié de Nancy, are quoted by Le Canu, in which the proportion of globules was found 91 and 85, while that of albumen was as high as 86 and 85. These results are fully confirmed by the researches of Andral and Gavarret. They found, in a case of cachexia after ague, the globules 68·8, the albumen 72, (p. 75.) In a case of diabetes mellitus, the globules 86, the albumen 80 ; in a case of dropsy from dilatation of the heart, the globules 68, albumen 85 ; in a case of cachexia following colica pictonum, globules 84, albumen 78 ; in nine cases of chlorosis, the average of globules 59·6, of albumen 79·5. But Andral and Gavarret, have proved the same tendency of the albumen to maintain its ordinary standard in diseases of a plethoric character. They have recorded one case of apoplexy in which the proportion of globules reached the very considerable amount of 175, and in which, notwithstanding the

albumen was still only 73 ; and in eight cases of the same disease, the average of the albumen was 74.

It may then, I think, be considered as proved, that though the albumen does undoubtedly alternate with the globules tending to increase, when they fall off in amount, and to diminish when they abound, yet a much greater degree of stability characterises it than the other organic constituents of the blood. These last oscillate in a very wide manner, increasing and diminishing with the condition of the system and the health of the individual ; when a stasis occurs in the blood, as in plethora, the arrest is in the globules.

In order to carry out the proof of this point, I desired some rabbits to be fattened for a great many days, and their blood to be examined. The following result affords a sufficient confirmation of the opinions of Le Canu and Andral :—

	Albumen.	Globules.	Fibrin.	In 1000 parts.
1	50·20	97·40	2·10	
2	49	80·50	1·75	
3	48·20	75·43	1·96	

The first of these rabbits was allowed its liberty in a room, and was somewhat different in conformation from the others. The last two resembled each other generally in colour, form, bulk, and were closely confined in a box. The influence of this on

their fibrin is manifest, and the relation of this circumstance to the observations made in note p. 155 is sufficiently striking.

These organic changes are of much importance in the history of constitutional disease. If the nutrient matters of the food be carried forward to this point, and here, instead of further elimination, be deflected to form lower products than the fibrin and gelatin, which would serve the healthy purposes of the body, we must look here both for our explanation of disease and our guide in the choice of a remedy. We may now well understand the quotation I have made from Dr. Prout, at page 6. Though I do not believe that scrofula takes its origin in a gouty state of habit, but that, like gout, it is to be referred to an original congenital constitution, an idiosyncrasy of the individual, yet its outward manifestations, its allied disease, tubercle, and many other tumours, may be traced to this source. All these growths abound in albuminous principles. Their progress is favoured by that which lowers the health and disturbs nutrition. The food, which ought to proceed to the nourishment of the great organs and moving powers of the body, is interrupted in its course, and diverted to engender morbid processes or add to mal-organisations already begun. In some individuals, extraordinary obesity is the result, and where

subcutaneous fat only is created, it often serves as a relief to a plethoric habit. In others, low hydrocarbonaceous products show themselves in the urine in the form of sugar or urates. We can thus readily enough account for the most striking phenomena of scrofula, phthisis, diabetes, gout, etc., according to the proclivity of the individual to one or other form of disease; nor will it appear wonderful to the philosophic physician, that maladies of aspect so strikingly different, should yet own an origin in some respects common.

These are not creations of the fancy. They are exemplified in the daily experience of every physician. What observation so common as the origin of scrofula in an impoverished condition of health? Is it not observed, that a low quality of food tends to its increase, and a generous diet to its extinction? Does it not infest the close and pestilential manufactory, all low, marshy and mephitic places? Is it not cured by pure good air, as well as by good food? Do we not turn our scrofulous patients out of hospitals, for fear of the consequence to their health? In a pure and wholesome atmosphere the chest is thoroughly expanded, and the necessary changes in the blood well effected.

In gout the very same influences prevail. Only the tendencies of the constitution being different, the plethoric or superfluous albuminous matters show

themselves in different local manifestations. The treatment, too, has various points of resemblance. Both are aided by whatever promotes the real nutrition of the body, and obviates stagnation and load in the vessels.

The opinions I have expressed above seemed to me to receive considerable confirmation from the fact discovered by Le Canu, that the placental blood contains a great increase of globules; and that the blood of animals of powerful organisation and active habits also abounds in them. Seeing these things, and seeing that arterial blood contains more globules than venous, the blood of men than that of women, boys, and old people, the blood of persons of a sanguine than that of those of a phlegmatic temperament, the blood of persons well-fed than that of persons badly nourished, the blood of the plethoric than that of the anæmic, I could not doubt that the opinion of Wharton Jones and Carpenter (for in this at least they concur) is correct, and that within the globules the great development of organic principles and their adaptation to the uses of the body is effected.

But while revolving these things in my mind, it seemed to me certain, that the globulation of the blood was more a vital or organic than a chemical process, and that I should probably obtain an augmentation of globules by stimulating the nervous system, and an electro-magnetic influence occurred

to me as the most likely means of accomplishing my object. A rabbit was accordingly thus treated ; but I was completely disappointed. No matter how moderate the influence used, the breathing of the animal was excited in the highest degree, which prevented all arrest and accumulation in the globules. I obtained, however, a very important confirmation of the former experiments on the effect of oxygenation. A stream of galvanic magnetism was carried from chest to spine for half an hour, at the end of which time the blood yielded 51·2 albumen, 70·4 globules, 2·9 fibrin.

I have now gone through the whole of this subject of the chemical and physical constitution of the blood, with a view to prove that rest and repletion lead necessarily to accumulation of globules; that aeration is the source of the fibrin; that by exercise the fibrin is carried forward to the tissues; that by exercise, air, and moderation in diet conjoined, constitutional disease, and particularly gout, may be avoided and cured; that without them it is vain to hope for anything more than a respite from suffering for a greater or shorter period, or even only a suspension of the most acute symptoms of disease. These observations are so consonant with the observation of all men, learned and unlearned, of every age and every country, that they will, I feel persuaded, meet with ready belief.

CHAPTER X.

EXCITING CAUSES—SENSUALITY—MODERATE INDULGENCE—WOMEN NOT SUBJECT TO GOUT—MEN OF BUSINESS MUCH LIABLE—CAUSE OF THIS—CULLEN'S OPINION—NERVOUS INFLUENCE—MORTALITY OF DIFFERENT CLASSES—CARDINAL CORNELI'S CASE—CASE OF A MAN OF BUSINESS—THE ARGUMENT CONDENSED.

THE exciting and occasional causes of gout are equally valuable with its proximate causes in elucidating the nature of this disease. The gouty have in all times been willing to refer the origin of their sufferings rather to hereditary descent than to any errors of their own. But the experience of physicians, in every age and in every country of the world, cannot deceive us. They all pronounce with one voice that gout and full diet are united by a sure and indissoluble bond. If the opinions of physicians be set at nought, surely the universal experience of mankind may teach this important lesson. It is the malady of the sedentary, the supine, the luxurious liver, and too frequently of the student and overtaxed man of business. It is unknown among the laborious

peasantry, and even among the hard-working artisans of towns. Linnæus found the Laplanders unacquainted with its existence. Many years ago, I made inquiry in some of the remote valleys of Switzerland, and there, too, I was informed that the inhabitants had scarcely any acquaintance with gout, and looked upon it as a disgraceful disease. Sir Gilbert Blane did not find a single instance of it among 3800 patients in St. Thomas's Hospital. The same thing cannot assuredly be said of the sick who crowd the hospitals at the west end of the town. There can be no question that it spares the poor and the laborious.*

During the season of youth, the wealthy victims of gout give a loose rein to their appetite for pleasure. Indulgence is yet new, and presents itself to the

* A writer in the 'Edinburgh Monthly Journal of Medicine' has the following passage: "In Dr. Forbes's 'Bibliography,' we reckon more than 200 works on gout, not one of which has issued from the Scottish press, while London teems with them. This produces a great peculiarity in the views and practice of our southern brethren. They trace gout in almost every complaint to which the human frame is liable, not only in its congeners of biliary and urinary complaints, but in a great number of others—diseases of the heart, liver, hydrothorax, dropsies, &c.; while we, in our northern clime, meeting with the same diseases unconnected with gout, which is extremely rare, consider them as separate entities, however allied." (*Jan.* 1850, p. 42.) In the large hospital at Edinburgh (one of the largest in the kingdom), I understand that gout is nearly unknown.

senses in the most attractive forms. The maxims of the wise are unheeded. The future is unseen, and little apprehended. This sensual enjoyment goes on unchecked, till the shadows of age, cast perhaps before their time, begin to make themselves known in benumbed feelings and easily sated appetite, with a still unbridled desire; the lazy stomach is then roused to unwilling exertion by every ingenious device. But the heart has no longer the energy of its youth; its flagging currents are circulated with less freedom, and driven forward with less force; natural strength of constitution may, for a while, conceal the mischief, but if there be any hereditary tendency in the constitution, the gouty diathesis is formed.

Nothing would be more easy than at this stage of the disorder to rectify it. But self-restraint and abandonment of habitual indulgences are necessary. The patient is not yet disposed to adopt such an extremity. Though I have described a somewhat serious state of disease, it produces in him neither pain nor any great amount of distress. The ancient pleasures still possess their baneful attraction. He only regrets his inability to carry excess as far as before, and return to it as often. He deplores, also, the state of the benumbed nerves, which do not return the same relished enjoyments, the same exquisite sensations as before. If he consult his

physician, it is probably on account of this last calamity.

Indeed, at a much more advanced period of disease, if the constitutional power be in some degree sound, and the long habit of self-indulgence have left to the individual any virtue of resolution, it is wonderful from what a state of suffering he may be rescued. This is at once the privilege and the snare of the gouty. A certain consciousness they have of the soundness of the principal organs of the body, and the knowledge of the great relief they obtain after a sharp attack of disease, betrays them. They seek the palliatives of physic, and reject the great remedy in their own hands. Day follows day, and month, month; and the revolving year finds them with their sloth and superfluity of enjoyment, till at last they realize the picture of Hogarth's voluptuary, dying with an oyster on his fork.

I have given the history of unrestrained, unlimited, sensual corruption. It is not common, but the effects of a passion are best portrayed in an extreme case. Yet a more limited indulgence, where the individual is stamped with great proneness to the disease, will ensure a similar fate. We all consume much more food than is necessary for the sustenance of the body in health and strength. There is no necessity that persons, without any proclivity to disease, should confine themselves within the strict limits of the

absolutely essential; for the human body has a great power of adaptation, and a range is permitted, within which the pleasures of the table may be enjoyed without injury. To the gouty, however, no such licence can be given. If they desire to escape the penalties of this sad disease, they must eat only for the purposes of life, and with a view to health.

It has been argued that gout does not depend on a plethora of diet, because women, who do not commit excesses, are yet subject to it. This assertion is, indeed, not correct, for women, though not wholly exempted from attacks of gout, do, notwithstanding, enjoy a great comparative immunity. This they owe partly to the greater purity and propriety of their lives; but in a great measure, also, to some circumstance of physical constitution, of which no good account can be rendered. But women are not always so well ordered in their diet, and it is by no means unusual to see them suffer when they deviate from that course of life prescribed to them by their condition in this world. I do not think that this was ever, in the history of the human race, proved on a large scale but once. In the corrupt times which followed the Roman republic, such was the fearful degeneracy of private morals, that women had cast away the modesty of their nature, and publicly practised all the worst corruptions of men. Seneca

writes of them : “ Is it then surprising to catch the greatest and most skilful physician in error,* when we find so many women gouty and bald-headed? They have lost the benefit of their sex. They have cast off the woman, and are doomed to the diseases of men.” But when we read Seneca’s account of their morals and habits, a little further on in the same epistle, we can feel little surprise that they should have gout or any other disease proceeding from a disordered life. “ They are as late sitters, as deep drinkers, as men. They solicit men with oil and wine, and like them render up, by vomiting, the load put on their unwilling stomachs, to be again replenished by renewed cramming.”

The distinguishing peculiarity of the organism of women has not wholly escaped the researches of modern physiology. I have, at p. 177, pointed out the great disproportion of the blood globules in men and women. Le Canu proved, likewise, the much more watery constitution of the blood in women, an observation confirmed by Denis. The following tables, extracted from the last author, will make this clear :—

* The allusion is to the aphorism of Hippocrates, *Γυνή οὐ ποδαγριᾷ, ἢν μὴ τὰ καταμήνια αὐτῇ ἐκλίπῃ*

Table showing the relative amount of Water and Solid Constituents in 1000 parts of Male and Female Blood.

MEN.			WOMEN.		
Age.	Solids.	Water.	Age.	Solids.	Water.
14	249·6	750·4	4	167·	833·
23	267·	733·	6	180·	820·
25	268·	732·	12	213·	787·
31	234·	766·	15	226·	774·
33	217·	783·	20	228·	772·
40	250·	750·	22	220·	780·
46	231·	769·	32	250·	750·
50	252·	748·	38	226·	774·
53	210·	790·	48	214·	786·
54	202·	798·	52	180·	820·
65	200·	800·	74	255·	745·
70	210·	790·			
80	219·	781·			

The constitution of the blood of boys, who, under puberty, have so many points of resemblance with women, bears out this argument. Their blood abounds in water. According to Denis, the water of the blood of boys, under ten years of age, bears the very high proportion to the solid constituents of

830 to 170, and, between ten and twenty years of age, of 800 to 200. But, at puberty, a remarkable change begins to manifest itself; and, between the ages of twenty and forty, Denis obtained a mean of 760 to 240. ('Recherches Experimentales,' pp. 254, 255 and 257.) These results are confirmed by Le Canu. ('Etudes Chémiques,' p. 67.)

It has been proved, likewise, by Andral and Gavarret, that women, when they begin to menstruate, give off less carbonic acid in respiration than before; and, when this function ceases, they effuse carbon, in breathing, like the other sex. ('Annales de Chémie,' vol. viii, p. 129.) In connection with this subject, a remarkable observation was made to me by the superintendent of the gymnastic establishment at Passy. He assured me, that during the calisthenic and masculine exercises of his female pupils the menstrual flux is altogether suspended, and that it is invariably renewed soon after their return to their families. I have been informed, too, that the women, who, till lately, were yoked to coal waggons in our mines, lost sight of this evacuation. I believe it is also certain, that though very abandoned in their lives, they were very rarely known to become pregnant; but that, since they have been liberated from their slavery, they threaten to become a great burden on their parishes; a very just retribution on the society which tolerated and en-

couraged so monstrous an infraction of the law of nature.

I have said that a very moderate degree of indulgence will suffice to inflict all the penalties of gout on those who are hereditarily predisposed to the disease. But this is not the only remote cause which, conspiring with a small excess of food, will bring on gout. There is a very large and interesting class of beings, in whom small deviations from rule are the cause of a life of suffering. The literary labourers, the eminent statesmen, the men whose hours are consumed in the heavy labour of the desk and the counting-house,—whose feelings are depressed by frequent anxiety and gnawing care, are singularly liable to the assaults of this terrible disease. Sydenham, in the midst of the pains of gout, derived comfort from the reflection that he suffered in common with kings, men of illustrious rank, and philosophers; that it had killed more rich men than poor, more wise men than fools. This is indeed a poor consolation, especially when coupled with the fact, that he also shared his misfortune with some of the basest and most abject of his fellow-creatures. It is certainly very true that the sensual are not alone subject to gout, and that the most useful and virtuous of mankind are singularly obnoxious to its attacks. It would be easy to name a crowd of instances of men who, by the quality of

their understanding, and the lives we know they led, could not have earned the misery they endured by any considerable excess, had not the depressing effects of anxiety and toil been added to the more immediate causes of the disease. Atticus, in ancient times, put an end to his life, that he might put an end to his gout. Leibnitz and John Milton died of it. The great Harvey and Lord Chatham were its victims. We are often assured, and I believe it to be true, that a great occasional debauch does not so much disturb the constitution as the daily habit of more moderate indulgence. But I do not in the least doubt that these little excesses, added to a sedentary life, much care, and intense employment of the mind, are the circumstances most calculated to sow the seeds of gout in the constitution. There are some individuals who can undergo the great trials of life on a very frugal diet; but there are others who cannot meet anxiety, agitation, and toil without adequate sustenance. I have daily occasion to witness the fact, as the patient has often to deplore it.

There is no doubt that the men on whom devolve the great cares of state and the anxieties of professional and commercial undertakings, do frequently and bitterly suffer from attacks of gout. The disease is sometimes a matter of national and imperial interest. The public service depends much on the

health of those who are at the head of it. Sir William Temple assures us that he had seen the councils of France grow bold or wax tame, according to the fits of his Majesty's gout; and two fortified cities lost, contrary to all forms, from the same cause. Few subjects, then, I apprehend, can more worthily occupy the time and thoughts of a physician than this. So far as the community is concerned, to save life is, comparatively speaking, a secondary service. Plenty of candidates will be found to supply the vacant places of those who perish. But to maintain in health of body and aptitude of mind the men to whom the great cares of business (public and private) are allotted, is a task of the greatest importance.

The fate of these eminent persons would be more tolerable if the gout generally attacked them in its regular form, giving them a few weeks' painful illness, and then leaving them in improved health: but this is not the case. The gout of the sedentary man of business generally shows itself in the lingering, metastatic, and atonic form, leaving few intervals of perfect repose. This has so much struck some inquirers, as to lead them to consider its phenomena as chiefly due to a disturbance of the nervous system; and although this idea be inadequate to account for the appearance of gout, it still contains a great truth, which demands our serious attention.

Cullen's opinion had this foundation. Observing that gout was not a disease of any particular part, but one of universal seat, and that the moving powers were chiefly affected by it; knowing, likewise, "that their power was derived from the nervous system, and believing that the occasional or exciting causes were almost all such as act directly on the nerves and nervous system," he sought for "an explanation of the whole of the disease in the laws of the nervous system;" and he arrived at the following conclusion: "Pyrexia and neuroses are necessarily and unavoidably mixed more or less with one another. Of those which are mixed, gout is a principal instance; in so far as it is an inflammatory disease, like rheumatism, it is placed among the pyrexiaë; but it is among the limits between pyrexia and neuroses, and shows more than any other pyrexia does of an affection of the nervous system." The local manifestations of the disease he explained by supposing that, "at a certain period of life, there is a certain vigorous and plethoric state of the system, which is liable to a loss of tone in the extremities. When this loss of tone occurs while the energy of the brain still retains its vigour, the *vis medicatrix naturæ* is excited to restore the tone of the parts, and accomplishes it by exciting an inflammatory affection in some part of the extremities." (Cullen's Works, vol. ii, pp. 122, 123. 1827.) These opi-

nions embody so much close observation of facts, that I extract them in order to introduce the important subject of the influence of the nervous system in gout, and I prefer doing so in the words of the author himself, on account of the fanciful hypotheses with which they are associated.

If I mistake not, this nervous influence in gout will give the explanation of the proneness to the disease in persons who lead a laborious and sedentary life, and at the same time shed a very interesting light on its nature. It may be supposed that their sedentary occupation is the sole cause of their suffering; and that it contributes its share—that, too, a considerable one—I do not doubt; but that it is even the chief cause of gout in these persons I do not at all believe. This indeed, will, I think, appear proved to any one who casts his eyes around him, and takes an account of the numbers whose lives are quite sedentary, and yet are not embittered by this disease. The weaver at his loom is not gouty; he indeed may be saved by the penury of his diet. But the cobbler at his stall, the tailor on his board—merry, chirruping, licentious creatures—are not gouty. To these might be added many others.

The brain, like the heart, feels the influence of time and the effects of labour. Unlike the heart, it has its seasons of repose; but these intervals of rest

are often brief and imperfect to the industrious and thoughtful. It is surely not wonderful that, when they have been overtaxed with anxiety and toil for many years, and when the chills of age make themselves felt, the long exertion should become apparent in the functions of the brain. The nervous influence is now transmitted with less energy to the body, the heart (the central organ of nourishment) is not roused to its wonted action, and a somewhat similar condition, though from so different a cause, is produced, to that which is the merited fate of the sensual and voluptuous. The man now feels his strength waning. The want of innervation makes tasks, formerly easy and light, difficult to be borne: yet he is, for the most part, called on to carry a heavier load, and, weary and faint, he seeks in artificial means (to him a real poison) that support which he does not find within himself. I doubt not that my readers can realize a part of this picture either in their own persons or in the example of their friends. The great Mr. Pitt, who surely was not a self-indulgent man, had yielded to the seduction of wine and opium. Is it wonderful that the statesman, on whose clearness of thought and energy of mind the presumed safety of the world depended, should have felt human strength unequal to a heavier load than ever before was laid on the shoulders of man? It were easy to accumulate examples, but of what

use to overprove that which is evident to the daily experience of every observant person. Man's strength is not unlimited. It is the part of wisdom to proportion exertion to power, to be warned betimes of the approach of weakness and age, and to throw labour to the hands of those who can yet meet it with undiminished vigour and uninjured health. Unhappily, this is too often not possible, and we seek, by artificial means, to prolong that strength and that youth to which the great God of Nature has set a term.

It is not possible to exhibit so clearly the means by which the disintegration of the nervous system is accomplished as in the former case, in which the health is broken down by over indulgence. The peculiar nature of the nervous influence, by which life is maintained and regulated, is not laid bare to the senses; yet no one doubts its existence. The veil, indeed, which concealed the laws that govern it, has, of late years, been partially withdrawn; but still, though the great office of the brain is manifest to all men, much obscurity hangs over its functions. We are too apt to think that they are not liable to augmentation and diminution by the condition of the organ through which they are manifested; and some there are among us who, despite of both reason and experience, would charge such an opinion with the heresy of materialism. Nothing, surely,

can be more certain than that the nervous influence emanating from the brain is diminished and weakened by the effect of time, and that the organ itself is worn and exhausted by long labour of thought.

A great proof of this has been afforded by the statistics of various countries. They concur in the account they give of the mortality of different classes at different ages. At the period of youth and manhood, when the body is yet increasing in bulk and strength, the deficient nourishment and greater exposure of the lower classes turn the scale of mortality sadly against them. At a later period of life, however, when the use and abuse of the system are made to tell in the feebleness of age, the above rule is altogether reversed. Then the hardy and well-knit frame of the workman and the peasant strives well against the weakness, hereditary and acquired, which infests the upper classes of society, and against the exhaustion which attends the care and anxiety given by the preservation of property and public duties.

Before I conclude this part of my subject, I wish to revert to the case of Cardinal Corneli, related at p. 41, because it is given on such high authority, and illustrates in a very remarkable manner many things advanced by me, which may carry less conviction than I desire. The whole account of the illness and dissection of that case, as given by

Morgagni, with a degree of detail prompted as much by his love of his patient as by his love of science, merits careful perusal. The admission, indeed, is very remarkable, that this great physician, so familiar with post-mortem examinations, "could not bear to be present" at the opening of the body of a man for whom he had so tender a regard; but this is a guarantee to us of the minuteness and fidelity of the account he has transmitted.

Let me, then, first point attention to the suppression of the natural evacuations, urinary and fæcal, accompanied by deafness, drowsiness, and swoonings, marking the advanced stage of the complaint. The heavy calamity which befel him hurried on the crisis; no remedies sufficed to restore the nearly extinguished action of the heart; the slight attempts at rallying soon proved hopeless. On dissection, to great visceral disorganization were added earthy deposits in the larger arterial vessels, and much dilatation of the thoracic aorta. This last mark of organic disease, the state of the great artery, is matter of much interest. I believe that it will seldom be found wanting in inveterate cases of gout, and that it is often associated with valvular disease. Its connection with venous congestion, loaded capillaries, organic disease of viscera, and obstructed circulation must be manifest to every reader.

A case which occurred to me, in the year 1834,

will serve to illustrate the same facts, though I am not able to give any account of appearances after death. A gentleman, 32 years of age, who led an easy and agreeable life, with much indulgence in the pleasures of the table, was seized with gout. His system had been well prepared for the paroxysm of the disease, which was long and painful, but was at length to all appearance, completely surmounted, and, as usually happens, quite forgotten. The common fate attended him. Two years afterwards he had another fit less painful, but quite as long; and from this time he certainly never afterwards had as good health as before. Slighter irregularities of diet were attended with more suffering; the bowels required the constant aid of medicine; and the urine was, from the most trifling causes, loaded with sediments, both of phosphates and urates. At this time he was called on to bear much anxiety, and to undergo heavy labour in his business. These he neither could nor would endure, without the aid of food and stimulants. His gout now assumed the atonic form; it seldom made its appearance in the feet, and the visits of the regular disease were always short-lived. Strange to say, he looked on them with alarm, and reckoned their absence an evidence of improving health; yet his sufferings were so constant and so great, that, after a long struggle, he abandoned his occupations at the age of forty years,

and went abroad in pursuit of health. He was now subject to every form of dyspepsia; the bowels were habitually constipated; their evacuations were nearly colourless, yet fetid in the highest degree; the deposit of uric acid in the urine invariable, and sometimes very copious. He was much subject to palpitation and faintness, and could not mount a stair, or ascend an easy acclivity, without breathlessness and suffering. Abroad, his diet was improved, and his mind was free from care. He gained much in health, and was recovering flesh and strength, when he was seized in the north of Italy with the prevailing influenza, under which he sank, exactly ten years from his first attack of gout.

Chronic diseases may, in one sense of the word, be considered as mere modes of decay of the system. This is true, whether they be the result of original construction, the offspring of our own follies, or the effect of time; but there is no chronic disease which, in my mind, so remarkably exemplifies the progress of decay as gout. When we consider its hereditary descent, we can hardly withhold our belief that, though its great symptoms are exhibited at the decline of life, yet it must lie concealed in the constitution of the young. Physicians who observe carefully the ailments of infants and growing youths cannot fail to be struck with the frequent indications they give of arthritic disease. From these faint

beginnings, to the final destruction of health and life, the course of the disease is gradual, sometimes almost imperceptible, but steady and certain, if its great causes be uniformly maintained. Indeed, I do not know a better measure of decay of the system than is afforded by gout.

The real pathology of gout appears then to me to be comprised under these heads—an increased pressure of the blood from its accumulation in the great veins, and an altered state of that fluid of which an increase of globulin and diminution of fibrin are the most remarkable circumstances leading to the perversion of the nutrient principles of the blood, and the formation of uric acid instead of urea. All these results depend on too copious an absorption of nourishment, on defective respiration, on deficient innervation, and on more or less suppression of the healthy evacuations from the liver, the kidneys, and the skin. The plethoric state thus engendered, causes in strong constitutions painful manifestations of the regular disease; in feebler habits, its irregular and atonic forms. But this plethoric condition has its cause, which I have as plainly pointed out as my desire not to assume, in a medical treatise, the censorial privilege of a moralist, would permit. We must still pause for a reply to the dark and intricate question why some constitutions, when thus affected, generate gout,

while others show no tendency whatever to the disease. The progress of science will prove whether that unknown something in the system which we express by the term hereditary and constitutional tendency, can be laid bare to the senses, or whether it must be for ever veiled from our eyes; but at present it is undoubtedly one of those mysteries of science requiring implicit belief, on which our keenest study has not yet shed one ray of light.

It is, notwithstanding, very certain that the blood of those persons who fare too sumptuously, and lead indolent lives, is in a less healthy condition than that of those whose indulgence is moderate, and whose occupations are active and salutary. So far, indeed, am I of a humoralist as to believe that chemical researches will lay before us more morbid changes in the fluids than the increase and diminution of urea and urates, of albumen and fibrin, according to the varying condition of the system. These changes will, no doubt, prove explanatory of phenomena which yet perplex us, and they may also become concurrent causes with plethora of the fluids and rupture of vessels, in explaining the paroxysm of gout; but even so, I should not depart from the opinion I have expressed that they are all of them only signs of that state of the system indispensable for the production of the local phenomena which distinctly characterise the disease. It is unques-

tionable that, though revealing itself by the outward manifestations I have described, gout is due to a particular tendency of the constitution, of which no explanation can yet be given, which may never disclose itself, and whose nature and essence will, in all probability, remain for ever shrouded in that deep obscurity in which organized and formative structure takes its vital impulse and individual existence.

CHAPTER XI.

CURABILITY OF GOUT—ITS ORIGIN IN INFANCY—DIET OF INFANTS—OF YOUTHS—OF ADOLESCENTS—NUTRITION NECESSARY TO GOUT—SUBSIDIARY FORCES OF CIRCULATION—EXHALATION OF PLANTS AND ANIMALS—SIR D. BARRY'S OPINION OF RESPIRATION—EFFECT OF MUSCULAR EXERTION—USE OF EXERCISE—SYDENHAM'S OPINION OF MORBID MATTER—LOW DIET INADMISSIBLE—MILK DIET—VEGETABLE DIET—CURE DES RAISINS—DRINK OF THE GOUTY—BEER—WINE—SPIRITS—MEAT—IDIOSYNCRASIES—DELIRIUM TREMENS.

THE curability of gout has been subject of dispute. Some physicians, following the example of Sydenham, have nearly abstained from remedies; contented with palliating a few symptoms and obviating some inconveniences, they have left the disease to follow an uninterrupted course, while others, relying on some of the strongest drugs in the armoury of physic, have sought not only to put an end to the paroxysm, but to extirpate the disease. Such errors as the last will rarely be found among old practitioners. Gout certainly has been, and ever will be, the opprobrium medicorum, if extirpation of the malady by means of the medicines of the pharmacopœia be aimed at. The fit may be mitigated, shortened, often cut asunder by drugs, but nothing

beyond temporary relief, can from this source, be looked for. Hence the triumph of the quack, who always steps in to take the place vacated by the honest physician. Our admitted inability is his opportunity. He points to the errors of physicians, and the uselessness of medicine, and, at the same time, to his own great secret. This has been the case in all ages, and ever will be. But the professional impostors are not the only or the worst offenders in gout. There is hardly a family in the kingdom, afflicted with the disease, which has not its favorite remedy, with which even the ladies practise on all comers, to their very serious injury.

I have not a doubt of the perfect curability of gout in its earlier stages, though not through what is vulgarly called physic, yet through the physician. If the argument I have used in the preceding pages has any force of conviction, it must be seen that a simple process of starving, instead of curing, will aggravate some of the worst forms of gout. It is, notwithstanding, by dietetic and hygienic means that much is to be accomplished. More, however, is necessary, as will presently appear.

Van Swieten mentions the case of "a priest, who, in the enjoyment of a fat benefice, and, suffering from inveterate gout, was captured by pirates, and compelled to work hard at the oar for the space of two years, with this good effect, that, when re-

deemed from captivity, he was freed from his cumbersome and superfluous bulk, nor was he ever afterwards affected by gout, though he survived several years."

Musgrave has the following case :—A gentleman, who had spent his youth in gluttony and wantonness, was seized, "at middle age, with an attack of gout, whose violence was proportioned to his previous excesses." He underwent severe and frequent attacks, by which his health was destroyed. "His joints were covered with many and large chalk-stones. But this vile glutton, in process of time, ruined his fortune, and reduced himself to poverty : he then betook himself to the laborious occupation of brick-making, and led a life of much fatigue. He greatly profited thereby. His appetite returned while his scanty means denied him all indulgence : he got rid of his superfluous flesh ; his body became athletic ; his chalk-stones all disappeared, and he lived many years thereafter with great labour and moderate fare." This was a very advanced case. Such rude treatment applied to the majority of gouty subjects would, probably, be attended by very pernicious consequences. But these instances serve the more effectually to prove how much may be done if the vital functions of the body are not too seriously injured.

These cases illustrate another point of the greatest

importance. Nothing is more common than to see men, under a conviction of its necessity, impose on themselves a frugal diet, and not only miss all the expected benefit, but even bring on worse sufferings in the shape of atonic gout. I have already given various instances of this, and need not repeat them here. Such men have continued to lead a life of indolence; they have yielded themselves up to studious occupations, or their hard fate has compelled them to anxious and incessant labour of a sedentary kind. They must be told, that more than observance of diet is required of them. Had V. Swieten's monk, been imprisoned in his cell, and put on low diet, it is not probable that his health would have been improved; or had Musgrave's patient prescribed to himself the same abstinence, he would have received small benefit. The laborious exertion was the necessary complement of the cure. We have already seen how a plethora of blood is accomplished by a life of repletion and inaction, and how this is obviated by increased activity of respiration, and by muscular exertion. It is necessary not only that the flowing stream of nourishment should be restrained, but that the organic principles of the blood should be developed and carried forward to the tissues. For this purpose, however great the sacrifice, those habits must be abandoned which engendered the disease.

The idea of extirpating gout by means of an extremely restricted diet is very apt to seize upon men who think seriously and earnestly on its origin and nature. They often jump too quickly to conclusions, and push their ill-ordered judgment to extremity. Such an error is full of risk to those who have hitherto lived in a state of too great repletion. The collapse of parts accustomed to great dissension is often more than can be borne with safety. The case of a gentleman of great eminence, which drew the attention and sympathy of a wide circle of friends, was, I believe, of this kind. Being of a full and robust frame he became much subject to gout in its regular form. To overcome this, he adopted a system of the most abstemious diet, and reduced himself greatly, I believe much too greatly in bulk, yet only succeeded in changing his gout into the atonic form. He was going on with his experiment, when he was seized with an accidental complaint, for which it was found necessary to bleed him at the arm, but he sank immediately under the remedy.

To accumulate proofs is needless. They are not wanting to those who seek them, and are willing to be convinced that the return of the disease may be prevented when the patient concurs with his physician : but we may well propose to ourselves a higher object and a greater result. In races where the gout

is as certain an inheritance as the patrimonial estate, what greater benefit can be offered than to extinguish the first germ, and prevent altogether the growth of a malady which may very justly be regarded in the light of a family curse. I have already said that the incipient signs of gout may be discovered in infancy. Morgagni also observes: "I have myself seen little children who were seized with severe pains of the joints, and greatly disordered thereby, before they had well got out of their infant state; and have, at the same time, known that their father, grandfather, and great-grandfather had been subject to gout." A relation of my own had a well-marked fit of gout, at the tender age of eleven years; her grandfather had suffered much from it. She was a person of very feeble constitution, and died at an early age after much distressing sickness from chorea and hysteria. I have seen two other cases of well-marked regular gout, in young girls. In one there was a strong hereditary claim to the disease; in the family of the other it was not unknown: but in both the mismanagement of their childhood had been remarkable. To this cause, indeed, I unhesitatingly attribute much of the gout which we see around us. I have almost daily occasion to witness and deplore the extreme folly of mothers and nurses, to whom the care of children is committed. With the smallest possible modicum of

knowledge, their bigotry to some trifling conceit and obstinate perseverance in error are very surprising. Their natural and amiable anxiety about their children is ever on the alert to discover disorder, and nothing can exceed their hardihood in the application of remedies. Where the most skilful physician cannot find any malady, their fancy discovers much, and the unhappy innocents suffer martyrdom under the poison of gray powder, calomel, &c. These mothers and nurses are equally brave in the administration of food. Nature in her wisdom has given the child an aliment, but the skill of the nurse puts to scorn the bountiful provision. The discovery is readily made that the mother's supply is insufficient or vicious, whereas by far the most common fault is that it is too profuse. Ale and porter are called in aid, and fever is excited; by means of which, that which was before thought little is made less, or entirely dried up, and the busy nurse attains her end of showing skill *at bringing up by hand*.

These truths which are plain to the most common observers, are confirmed by the discoveries of modern science. I am hopeless, however, of convincing mothers and their assistants. It is not, indeed, to be expected that *they* who can misunderstand and set aside the teaching of the *Great Physician* should listen to ordinary advice; but

perhaps the following facts may reach their understanding. No one can surely doubt that the foetus in utero depends for its entire nourishment on the blood of the mother. In other words, the nutrient principles of which its body is composed, albumen, fibrin, oleaginous and earthy matters, are furnished to it in a state fit to be immediately employed in the composition of bones, muscle, sinew, &c., and little labour of assimilation is required on its part. All this work is performed in the body of the mother; but at the period of its birth, a great change takes place in this little being. The lungs for the first time are called into use, and a much larger amount of nutrient matter is required to supply the waste which takes place there as well as at other emunctories. But Nature has provided a continued supply of the very same principles—albumen, casein and oil—which ministered to the growth of the foetus, so that the newborn child has neither the fatigue nor the risk of converting its food into its own substance. The most accurate chemical analysis has proved that the casein of the milk approaches in composition the albumen and fibrin of the blood; and though, after what has been said in the VIIIth and IXth chapters of this book, a reasonable doubt may be entertained of the accuracy of the following statement, still the albumen and casein of the mother's milk may be received on chemical as well

as physiological grounds as by far the best nourishment for the infant. "The young animal consequently receives, in the casein, the blood of the mother, at least, as far as its chief constituents are concerned: for its conversion into albumen and fibrin no third substance is required, and none of the original elements of these two bodies separate from them in the organism of the mother, when they are converted into casein.

"The casein of the milk contains, chemically combined, a large quantity of bone earth, in a dissolved form, which is consequently capable of being carried to all parts of the body." (Liebig's 'Animal Chemistry,' p. 54, 3d edit.)

The oily and fatty matters found in both, also very closely resemble each other. These considerations prove sufficiently that every natural arrangement has been made to temper and adapt the child to a new mode of existence, and make a new world and new channel of nutrition as tolerable to it as possible. Food is again provided for it, which Dr. Prout, as well as Liebig, has pronounced to be the happiest combination of all the nutrient principles required to build up the human body; and as little labour of conversion or assimilation as possible is required on the part of the infant.

The same thing may be remarked of that large class of herbivorous animals in whom the labour of

assimilation is greatest, and in whom is found the most complex structure of digestive organs. Nearly all of them belong to the class of mammalia, but though destined at a future period to manifest the greatest power of conversion and assimilation, they live or are intended to live for weeks on the milk of the mother. It is only by slow degrees, and after the lapse of a long period, that they learn to live wholly on grass.

But all these beneficial and well-contrived arrangements of Nature are overturned by maternal pedantry. The wholesome milk is found fault with, on the most slender pretexts. The bottle, tops-and-bottoms, biscuit-powder, farinaceous foods, arrow-root, and other poisons are thrust upon the miserable little being, whose taste, like that of older profligates, is soon swayed from the course of nature. The digestion is disturbed and perverted, and the results are flatulence, colic, consuming diarrhœa, and frightful convulsions, by which thousands of these young creatures are destroyed.

It may seem almost incredible to those whose observation has not been called to this subject, that childhood, that time of fabulous health, should be represented as the beginning of disease. Such, however, too certainly very often is the case; but as the child increases in years, the stomach becomes educated to its office, and the youth acquires the power of

assimilating to his own substance matters alien and unlike. The importance of diet at this season cannot well be overrated. It is during the growth of the body that the most effectual means may be used to oppose the inroad of constitutional diseases, and stifle their seeds. We owe to neglect or misdirection at this time the miserable spectacle so often witnessed of dyspeptic and melancholy beings, who pass their lives groaning under every variety of suffering. Unfortunately at this time little aid can be looked for from the patient; reason has not yet obtained ascendancy, and experience has no existence. But it cannot be too strongly impressed on the guardians of the young, that the health of future years depends on their management. The food should be of the most wholesome and blandest kind. The reverse of all this is often true. It would seem that schoolmasters did not consider the health of children any concern of theirs. Sometimes from motives of economy, sometimes from perfect indifference, the most improper food is given to them. A few years ago I was sent for, along with Mr. Copeland, to see a boy, who had returned from school affected with scurvy. The thing appeared so improbable, that we doubted the evidence of our senses, but a closer inspection confirmed our opinion. On further inquiry, we were amazed to learn that the boys at this school were fed on salt-beef through the week, and were

allowed fresh food only on Sundays ; yet the youth belonged to one of the wealthiest families in England. Young people in the more affluent classes thus sometimes lose the advantage of their birthright, and society is equalized by our own folly. The children of the labouring classes, who are restricted by penury to a frugal meal, though it be often composed of matter more hard of digestion than the above, are saved from some of the complaints fastened on their superiors by their scanty allowance. It is well established, indeed, that the chyle varies exceedingly little in composition, no matter from what food it be derived ; but an overload of food, which is the daily and universal custom of the children of the better classes of life, if it be of bad quality, must break down the finest health. On this subject Dr. Prout has the following words, which are full of wisdom : “ I believe no one will deny, who has studied the subject, that, about the age we are now considering, the assimilating organs in strumous and consumptive habits are peculiarly deranged ; and that great attention to diet, &c. at this age (when diet is least apt to be attended to, and all sorts of crudities are taken,) will not only ward off these phthisical attacks, which when once established, will inevitably run their fated course, but prevent many nearly-allied diseases in after life.”

At the next period of life, puberty, no less care

is required, and still greater errors are committed. The nervous system now receives its greatest development, and the purely animal functions are disclosed. Leaving out of view all moral considerations, everything now points out the necessity of moderating the action of the system, and tempering the vehement promptings of nature. How little this is attended to, let the daily experience of every one decide. This is the particular season chosen for the first emancipation from all restraint in food, in wine, in everything. When the heavy occupations and great cares of life fall on beings thus prepared for them, the consequences are obvious and certain.

It is not my business, and it is no part of my intention, in a medical treatise, to inculcate moral duties ; but believing that there are some persons who are not merely willing, but most anxious, to rid themselves of so great an hereditary evil as gout, it becomes necessary that I should point out to them the way. Let the child be taken from the birth, and I doubt not that, in the vast majority of instances, the adolescent will resist not great excesses indeed, but all the ordinary causes of ill health which men are called on to bear. These are the means, and these the sacrifices, by which the complete extirpation of this painful disease is to be attained ; but even when the gouty diathesis is formed, we may obviate its attacks without so much

forethought or such long preparation. The late Dr. Gregory, of Edinburgh, a man of no ordinary capacity, struck by the very serious sufferings he had witnessed among his relations, resolved at an early period of life, to subdue the tendency to the disease in himself. He prescribed to himself a frugal diet, with much bodily exercise. He attained his object of being the first individual of his family who lived and died free from gout. I have already quoted cases of men who had got rid even of inveterate gout by like means, and examples constantly occur of persons born to labour, who have, by accident or their own industry, acquired wealth, ease, and gout. Not only are all these things true, but it is equally certain that the same individuals, if, by like accidents, reduced to their former poverty and to daily exertion, with the loss of their fortune recover their health. I have already quoted a case from Musgrave which illustrates this point. The following one, for which I am indebted to an old medical friend, is also worth relating. A gentleman of the Stock Exchange suffered so much from gout as to become quite a cripple. He was seldom seen but wrapped in flannel at his chimney corner, where, notwithstanding, he retained great cheerfulness of character. He was overtaken by one of those great reverses of fortune to which persons in his kind of

business are much exposed. Compelled by necessity, and assisted by abstinence, he returned to his occupation, and surprised his friends by becoming once more one of those hurried and nimble individuals so well known to all men who frequent the City.

Everything, therefore, which helps to impel the nourishing fluids of the body aids in the cure of gout. With an enfeebled heart, these subsidiary powers become of great importance. Nature has provided not a few of them ; and fortunately they are greatly under the dominion of the physician.

It will aid us much in determining what the subsidiary forces are, if we cast our eye over those parts of creation endowed with life, in which a circulation of fluids is carried on without the assistance of a central contracting organ, or heart. The whole vegetable kingdom is thus situated. The greatest power impelling their fluids in their channels appears to be derived from the waste and exhalation which takes place at the leaves. The amount of this exhalation is very extraordinary. Hales found that a small sunflower gave out thirty ounces of liquid in twelve hours. The force, too, with which the juices of plants are driven is hardly less surprising. The power of the animal circulation by no means equals it.

The chief exhaling organ of animals is not external, as in the vegetable world. The exhaustion of the fluids is principally effected in the lungs, which appear to be the analogous organ to the leaves of plants. The perspiration, when the animal is at rest, is comparatively slight. The influence exercised by this function over the circulation is undoubtedly considerable, apart from all thought of the chemical changes which take place in the lungs.

These changes, however, are not unimportant. Whatever view we take of the physiology of respiration, no doubt carbonic acid is given out in expiration. Much of the energy of contraction of the heart must depend on the more or less perfect decarbonization of the blood. Let any one who doubts this, compare those persons who have risen from sickness, or, what is nearly the same thing, who have suffered long confinement in the impure atmosphere of towns, consumed by anxiety and toil, with the same individuals when they have had the benefit of free, pure air, with wholesome exercise, in the country; and say whether the clear skin, freed from its cachectic eruptions, and the blue lips restored to a roseate and healthy hue, do not eloquently testify to the benefit of exercise and air. Physicians, at least, will entertain no doubt of these things. By the purification of the mass of arterial blood, there cannot be a doubt that the circulation is quickened, the

heart roused to more intense action, and all the fluids of the body propelled with greater vigour. To use theoretic and technical language, tone is improved.

But I believe the most important subsidiary force in aid of the contraction of the heart is that to which the attention of physiologists was first called by the late Sir David Barry. I have been surprised to find so low an estimate of this force formed by Dr. Carpenter, in his excellent work on 'Human Physiology.' To me, not only does it seem, next to the contraction of the heart, the greatest power applied to the circulation of the blood, but it possesses another important characteristic, that it is a function which is much under the dominion of the will.* During a quick and powerful inspiration, the lung expands less rapidly than the walls of the chest, and a vacuum would take place, did not the blood of the sinuses and head instantly rush forward to fill the deficient space. It must be evident to any reflecting person how much exertion increases this power, by promoting the free play of the chest; and the fact that gout is contemporaneous with the

* A recent experimentalist, Hamernjk, of Prague, who has devoted much attention to the mechanism of the circulation, has even very plausibly argued that the force generated by respiration and muscular motion, without the aid of a central muscular organ, would be sufficient to propel the blood through the valvular apparatus of the circulation, could its equable and invariable action be maintained.

relinquishment of the habits of youth, and co-ordinate with ease and indolence, will again connect it with the function we are considering in a very remarkable manner.

The play and pressure of the voluntary muscles of the limbs also aid to propel the stagnating current of blood in the veins, and add to the beneficial uses of exercise. Great care, however, must be taken not to urge this to a degree unsuited to the age and infirmity of the patient. If there be reason to suspect dilatation of the thoracic aorta, as in the case of Cardinal Corneli, or disorganisation of the valves and attenuation of the walls of the heart, the utmost prudence is necessary in prescribing exercise. The heart may be suddenly overwhelmed, and the most fatal consequences arise from urging patients in this condition beyond their power. In the remarkable cases of recovery to which I have referred, the patients owed their safety and their restoration to the fact that the great central and vital organ had not suffered in any irremediable degree. In the case of the stock-broker, this was marked by his unbroken spirits and cheerful character.

Hence arise the great uses of exercise. It is of much consequence that we should not condemn laziness and sloth in a mere empirical manner, and that we should see clearly the way in which gout is removed or mitigated by exertion. I do not hesitate

to say that indolence and sedentary pursuits are the greatest enemies of the gouty, and that there is no hope whatever of cure if they cannot be reclaimed from self-indulgent habits, or be persuaded that it is necessary to give up some time from the cares of business to the care of health. It is by means of exercise that the circulation is to be quickened, that the redundancy of the blood is to be diminished, that its organic elements are to be more highly developed, and fitted to form part of the firm structure of the frame itself.

Strictly connected with this part of my subject is the consideration of that great indication of cure so much dwelt upon by the older physicians, of forcing the malady to the extremities, in order to relieve the internal and central organs. If, with impending gout, the heart be feeble or oppressed in its action, the languor of circulation may well be felt at the extremities, and a great indication be derived from this state of things. This, no doubt, is a principal and the most frequent immediate cause of the various forms of atonic gout. There is, however, a distinction to be made between those cases in which the symptoms of this form of the disease proceed from a redundant circulation in a frame yet tolerably healthy and vigorous, and those in which they are equally a sign of plethora, but in a body either naturally feeble or exhausted by excess and age. In the former, to

drive the malady to a crisis is an unquestionable error; in the latter, it may be a judicious, and even a necessary treatment to foster the powers of the constitution, and give the patient strength to achieve the natural termination of his disease, or, to use the language of the older physicians, to relieve the viscera, and discharge the morbid matter at the feet. With this latter notion Sydenham was deeply imbued; indeed it forms the great plan of his cure: "Tum quod vita ut plurimum elabitur antequam morbus naturalibus symptomatis stipatus ad ἀκμὴν pervenerit, tum etiam quia calore nativo et vigore corporis imminutis, nec ita jugiter nec vehementer in articulos displodi potest." (Thomae Sydenham, M.D., 'Opera Omnia.' Edit. G. A. Greenhill, M.D., p. 410.) "Natura partim ab onere materiae peccantis oppressa, partim ob senium, eandem in corporis extremitates jugiter ac strenue relegare non amplius valente." (Op. cit., p. 415.) "Tandem aeger (ut funestissimi hujus morbi catastrophē semel expediam) visceribus a materiae peccantis incubatu complexuque ita laesis, ut secretionis organa non amplius suo munere fungi queant, unde et sanguis quasi limo et faeculentis refertus stagnat, et materia peccans non jam, ut olim solebat, in corporis extremitates disploditur atque rejicitur." (Op. cit., p. 416.) These quotations from Sydenham give a tolerably correct notion of his theory of gout. I

give them somewhat in detail, and in his own words, because his opinion has had much influence on the minds of his successors. But rejecting altogether the notion of a morbid matter, my conviction is not the less strong that it is frequently necessary to sustain the patient both by food and medicine, in order to give him nervous and vascular power sufficient to form a paroxysm of the disease.

But I have written to little purpose if it be not manifest to all that gout is not to be cured, nor even benefited, by a very low diet. In every age there have been physicians who have advised starving in this disease, and, spite of the oft-disproved fallacy, our own day is not free from examples of the same kind. Not only is it true that much injury accrues from this practice, but all real nourishment contributes to the cure of this disease. Whatever food is taken and converted to the proper uses of the system, to the construction of bone, muscle, &c., and the increase of moving power, is most useful. Indeed, this is the great thing to be aimed at; and the chief obstacle to treat the latter stages of gout with success arises from the difficulty of nourishing and supporting the body when the organs and their functions are much impaired. But though all increase of strength and power is most salutary in gout, every oppression of the system, whether in the form of superfluous fat or redundant circulation, is most pernicious.

Milk diet has been very often recommended in gout, and always ended in disappointment. It seems to have had some very earnest advocates at the time of Sydenham, who expresses a more favorable opinion of it than might have been expected from so judicious an observer. But he admits that he never heard of any permanent benefit derived from it. His experience of the remedy, in fact, amounts to this, that it does no good unless it be rigidly enforced; that it cannot be very long continued, on account of its debilitating effects; and that, on a return to better diet, any relief it may have given quickly disappears.

A purely farinaceous or vegetable diet is still more to be condemned. For the same reason that it is inadmissible in infancy, it is equally misplaced at the other extremity of life. In the one case, feeble organs and undeveloped functions, in the other, decaying organs and impaired functions, are unequal to the conversion of such food. But it has been recommended in many chronic diseases. I have seen it more than once attempted in gout, and, in my mind, always with great aggravation of the patient's sufferings. Moreover, a perfectly vegetable diet never can, I think, be reconciled with a life of leisure and ease. The great experience of the world is against it. All animals adapted to continual labour are graminivorous. The fowl beasts of prey have long periods of sloth, and short inter-

vals of great exertion. Labouring creatures, too, have a lower quality of food in proportion to the length of their work. The draught-horse is chiefly fed on hay; the race-horse consumes corn almost alone. The same rule applies to labouring man; the farm servant is a great consumer of bread; the soldier could not undertake his duties unless fed on meat. Some persons can undergo great mental labour on a vegetable diet; but this is the exception. The more common case is, that men who lead a life of mental application and anxiety must have a diet more or less animal. I believe the most suitable regimen for the gouty is a mixture of animal and vegetable food, in which the former greatly predominates, but frugally administered, within the power of the stomach to digest, and of the constitution to assimilate.

I have known elderly gentlemen and ladies in France and Switzerland take their leisure in the vineyards, and go through what is called *La cure des raisins*. It is not improbable that some of them may have received benefit in the mitigation of the incipient symptoms of gout, but I never heard of anything better than a very transitory relief; and I think it not unlikely that they who have had recourse to the remedy in the latter stages of the disease, may not have escaped without injury. But people who give themselves up to such whims, with or without a

physician's encouragement, generally conceal unfavorable results as carefully as they would misfortune and disgrace.

The drink of the gouty has always been a matter of great discussion, and now that chemistry has been called so much in aid of the physician, it is not of less interest than formerly. The use of beer has been thought favorable to the gouty. I believe that this observation was first made by Van Swieten, and has been repeated without much thought or examination, from age to age, ever since. That great physician observed, when the Dutch people were poor, they drank beer and had good health, but having become a powerful and wealthy nation, they drank wine and were gouty. He seems to have taken no account of the many other luxuries which follow in the train of wealth. In like manner, we jump to a great conclusion, because we find beer-drinkers much more rarely attacked with gout than the consumers of wine, without adverting to the fact that the beer-drinkers are the laborious and frugal livers, and the opulent classes alone take wine. I see no reason for thinking that beer is more adapted to the gouty than wine, and certainly should never think of prescribing it from any preference of its salubrious qualities. All the observations I could make in the wine countries of France, and whatever information I have been able to obtain, impress on me

strongly the conviction that the inhabitants of these districts are decidedly less subject to gout than the people of England. It is said, and, I believe, with truth, that the disease prevails in no common degree among the Germans of the Rhenish provinces; but they are certainly not a sober people. I am greatly convinced that spirits are pernicious to the gouty, and have repeatedly seen much mischief result from a modern practice of prescribing brandy and water, in order to avoid the small quantity of acid to be found even in the most generous wines. Indeed, I have observed the lighter sorts of French wines, and even champagne, if taken in moderation, agree better with the gouty than those stronger wines which are usually called English. Port wine, indeed, has seemed to me the only wine which has a sure, rapid, and pernicious effect; but then it is the wine with which those who love it sit the longest.

It would aid us much in understanding the salutary and pernicious influence of wine, did we make a sufficient and the requisite distinction between its local and constitutional effects. No one who has ever smelt the breath of a drunken person, can doubt that spirits taken into the stomach are absorbed into the blood, and pervade the whole organism of the individual. But this does not rest on the evidence of the senses alone. Their presence in distant parts of the body has been detected and

proved. Dr. Prout has shown that one of the effects of the imbibition of spirituous liquors is to diminish the exhalation of carbonic acid by the lungs. We have seen in a previous part of this book, that the decarbonization and fibrination of the blood are co-ordinate. Bouchardat has found that the oxygenation of the blood, is so much interrupted by drunkenness, that it presents something of the same aspect in the arteries and veins. I have repeatedly also had occasion to verify the fact, that in drunkenness even the globulation of the blood is very imperfect. The whole constitution of this fluid, physical and chemical, is disturbed and impeded.

But we have no reason to believe that the poisonous effects which characterise the inebriating influence of alcoholic liquors, exist, even in a minor degree, when their use is confined within those limits which reason and observation of their profitable service prescribes. It requires but few opportunities of observation, to be convinced of the aid which is given to feeble digestion by the moderate use of wine. Let the calmness, cheerfulness, and comfort which attend this case, be compared with the uneasiness, flatulence, acidity, torpor, and comatose stertor of intoxication, and it will surely be admitted, that one may be salutary, and the other pernicious.

But the very uses of wine are sometimes a snare.

It enables the stomach to receive a larger quantity of aliment than the system can admit without offence. This often happens when it is so made use of as to obtain its local stimulus and avoid its disturbing influence on the brain and blood. It may generally be observed, that full livers require the habitual use of wine, and the more abstemious find less occasion for it. An undue assimilation thus takes place; a superfluity of nutrient matter and greater amount of positive organic principles than are required for the uses of the system, are notwithstanding introduced into it, with all the evils to which I have already so often called attention.

A young friend of mine much accustomed to philosophical research, imparted to me the following observation, which he could not explain in a manner satisfactory to his own mind. He had been led by circumstances to indulge too freely in the use of fermented liquors for a considerable length of time. Disapproving his manner of life, and feeling its inconvenience, he abstained wholly from the use of wine. He expected to experience an immediate relief, and was surprised and distressed to find that his meals were followed by great oppression and suffering. He had recourse to my advice in great apprehension, lest he should have very seriously and permanently injured himself. On explaining to him that his stomach, which would receive quite

enough of food for all the purposes of nourishment, still would not, without the aid of its accustomed stimulus, admit as much as he was in the habit of eating, he considerably reduced his diet, and instantly recovered his cheerfulness and comfort.

When patients have undergone a long and severe fit of gout, attended by much disturbance of the system, and when they have suffered much from its erratic and atonic forms, it is generally necessary to limit greatly, and often to prohibit entirely, and for a great length of time, the use of wine and spirits. There is much reason in all such cases to suspect a diseased state of the blood, and there is little hope of restoring its healthy condition if fluids be imbibed, the tendency of whose operation is too clearly to suspend and defeat the organising processes by which the standard of the blood is raised.

It seems to me most unnecessary to give more than general hints on diet to a well-instructed physician. In the choice of meats, so much depends on idiosyncrasy, and so little on science, that no directions of great value can be given. One person can live entirely on fish, and be in good health; another repudiates it even as a part of his repast. One stomach admits veal and lamb with favour; another will only receive beef and mutton: while game and poultry are favorites with nearly all, yet some entirely refuse them. But these differences may be dismissed

with the remark, that if the quantity do not exceed the power of digestion, no great harm will accrue from taking the opinion of the patient. The function of digestion is evidently so contrived, that a healthy chyle may be extracted from all the different kinds of food we have enumerated. It is chiefly as they affect the *primæ viæ* that their noxious qualities are shown. But I believe, that though there may often be an artificial craving, engendered by habit, for salads, pickles, and other crudities, the inclination and the appetite err very little when the choice is confined to the usual articles of wholesome nourishment. That suffering, however, may not be created in the *primæ viæ* by too great labour of digestion, or absolute indigestion, it is of much importance that the food should be good of its kind, tender, bland, and easy of reduction, and it is of still greater importance that the enfeebled powers of the stomach and bowels should not be overwhelmed by too heavy a load.

Before I quit the subject of diet, I must call attention to the fact, that not only does much depend on the idiosyncrasy of the individual, but there is also an idiosyncrasy of the complaint to be prescribed for. In another part of this treatise I had occasion to state, that patients themselves had made this distinction, and observed that their own gout was not the same as that of their neighbours and friends.

This observation is matter of the greatest importance in practice, though it cannot be set down in writing as clearly as I could wish. It has not, however, escaped the observation of any physician whose practice has brought him in frequent contact with gout. All men will understand that gout, which is accompanied with great pain, and yet hardly disturbs the constitution, is to be very differently treated, as far as diet is concerned, from that which inflicts only a dull feeling on the part, and yet deranges every function of the body. Gout, attended with great dyspepsia, surely requires a different regimen from that which leaves the appetite unimpaired. Where fever or much nephritic disorder is present, the propriety of diluents and of some abstinence from animal food is clearly indicated. On the other hand, when these symptoms are absent, and no great degree of congestion of the liver is suspected, though a sparing diet may be indispensable, the patient's comfort will often be better consulted, and the removal of painful symptoms more readily accomplished by frugal meals of animal food. This is particularly true of the atonic forms of the disease and of its advanced stages. In such instances farinaceous food, and very thin potations, will often do serious mischief. But we frequently meet with cases in which these plain rules are altogether reversed; and both food and stimulants must be

administered even in acute cases of the regular disease, if we would avoid some of its distressing, irregular, and metastatic forms.

In London practice such cases are not at all unfrequent. A vigilant and practised eye will readily enough detect the small signs by which they are revealed. They are too often connected with considerable previous abuse of wine and spirits. If there has ever existed even the most incipient state of that miserable disease, delirium tremens, it behoves us to be very greatly on our guard. The gout in such individuals will be always found more or less masked by the condition of the brain and nervous system. It is easy to use depleting remedies too freely, and bring on very melancholy accidents. Of these truths a case which occurred to me some months since affords an excellent illustration. A gentleman, who had led a somewhat licentious life, contracted a sore, concerning the nature of which the surgeon who attended him unfortunately doubted till it assumed a very threatening aspect. At this time it was decided, in consultation, to use mercury with great freedom, in order to arrest fast-spreading mischief. The consequence was a very severe ptyalism; but accompanying it was the most intense pain of the occiput and nape of the neck. I have already pointed out this as one of the most distressing forms of the gouty attack. But the absence of

all other symptoms of the disease, and the presence of great inflammation of the gums and fauces, made the real cause be overlooked, till a very painful explosion took place in the foot. This was the most complete case of ecchymosis I ever saw. The whole foot, from the ankle downwards, was literally a bag of blood, and its colour varied from the darkest hue to a purple blush. This gentleman is unfortunately an unsteady patient, and in his wanderings from doctor to doctor has repeatedly been rudely handled. I am imperfectly acquainted with the subsequent details of his case; but I saw him not long ago, in a very pitable plight. But a year back he was a man of great strength, of powerful limbs, and seemed destined to long life. He is now wasted to a shadow of his former self, has a haggard and miserable look, and speaks of himself as a dying person.

Since the above sentences were written in the first edition of this book, this unfortunate man has sunk under the combined effects of gout, syphilis, wine, and mercury. Had he been treated steadily and reasonably for any one complaint I believe his life might have been preserved, but this he would not permit.

CHAPTER XII.

TREATMENT OF REGULAR GOUT—MORGAGNI AND SYDENHAM'S
 OPINIONS—QUACKS AND IMPOSTORS—BLOODLETTING—PURGATIVES
 —ALKALIES AND ANTACIDS—TONICS—HYDROPATHY—COLCHICUM
 —MINERAL WATERS.

THE popular distrust of medicine in gout should only stimulate to exertion, but it is discouraging to find the opinions of very eminent physicians so heavily pronounced against the utility of remedies in this disease. Morgagni writes: "Most of them have either never been at all useful, or at least very little to most persons, and some of them have thrown patients into very great danger, or been the cause of their death." (Epist. lvii, § 9.) Sydenham dissuaded from the use of remedies during the fit. So far, indeed, was he from having any desire to abridge it, that he expressly declares, "*quanto enim magis aegri dolores lenit, tanto magis humorum concoctioni adversatur; quantoque claudicationem arcet, tanto materiae morbificae expulsionis officit.*" (Op. cit., p. 443.) "*Et fidenter assero, multa et longa observatione suffultus, maximam partem eorum qui Podagra periisse putantur, non tam ipso morbo*

quam sublesta atque indebita medicatione fuisse peremptos." (Op. cit., p. 448.) When these things are considered, it clearly appears that Sydenham's opinion did not fall far short of that of Morgagni. In combating the opinions of two such men, I am comforted by reference to their practice. It does not appear that they refused to employ remedies in the cases of which they have left us a record.

A host of authors, and the daily experience of practitioners, must suffice to set aside such hopeless maxims. I have already expressed my own opinion, that, in the whole catalogue of chronic diseases, there is not one which is more amenable to treatment, and which receives greater relief at the hands of the physician than this. It is indeed illogical to hope for its removal while the cause is permitted to remain; but the resources of modern medicine have established great mastery over the fit, and I have already shown how much the diathesis and morbid tendency may be obliterated. There is this consideration, too, to confirm our faith in the use of curative means for the relief of gout, that our practice in these days should be rational and not empirical. The time is undoubtedly arrived, when the light which has been shed on pathology by the discoveries of physiology and chemistry should regulate our practice, and for ever separate the physician from the quack. This is probably more true of gout than

of other diseases ; and yet of none could it be less seriously affirmed in former days, which is perhaps the reason why remedies, dangerous in themselves, and used without guide or principle, were rejected by the wise and great men whose opinions I have quoted. We find, indeed, scattered through the writings of the older physicians, the most painful regrets concerning the mischief done by impostors in this disease. Such will ever be the case while the wealthy and self-indulgent are its principal victims. Van Swieten has well expressed the reason of this : “*Empyrici soli, qui audacter adeo de corio humano ludere solent, jactant, se suis arcanis vel radicatissimam podagram funditus tollere posse. Cumque ditiores præcipue infestet hic morbus, undique advolant ut ingenti sæpe pretio nugas suas vendant credulis.*”

The first remedy, in point of time as well as of importance, which falls under our consideration, is bloodletting. It is not a question with me that this remedy, employed in the usual manner, is much to be deprecated in gout. They who have read the foregoing pages with attention must see that the facts I have stated, and the opinions I have expressed, cannot warrant any other conclusion ; but it may well suggest itself to those who believe with me in a plethoric and hæmorrhagic tendency in gout, whether relief to the circulation may not some-

times be a useful preliminary to the employment of any other remedy. Very eminent physicians—eminent not as authors only, but as practitioners—have expressed favorable opinions of the use of bleeding in gout. It is the only curative means which Sydenham does not condemn. Heberden affirms—“*Novi podagricum, cui in more positum erat singulis morbi accessionibus venam incidere; quod sex et triginta annos facere consueverat. Alius quoque, sæviēte dolore arthritico, ad sanguinis missionem semper confugit, unde dolor illico delinitus est, et somnus placidus recreansque inductus. Neque, quantum intellexi, aut hunc aut illum pœnituit tam abnormis curationis.*” (‘*Comment.,*’ edit. 1802, pp. 41-2.) Dr. Hosack declares that “the most effectual means of removing the inflammatory action attendant upon the first stage of the paroxysm of gout consists in depletion by the lancet, cathartics, and such remedies as operate by restoring the excretions from the surface of the body, the physician paying due regard, in the use of these means, to the constitution of the patient, his time of life, and the season of the year.” (‘*Essays,*’ vol. ii, p. 236, New York, 1824.) This remedy appears also to have been used without fear by Rush, Huxham, De Haen, Hofmann, Musgrave, and Cullen. There is no want, therefore, of good authority for its employment, and there cannot be any doubt of the relief it

often affords; but a very inexperienced physician alone would bound his view to the immediate effect of any remedy in gout. Unless there be inflammation of some important internal organ, I do not doubt of the great impropriety of even ordinary bleedings. I am quite sure too, that, when driven by necessity to the use of copious bloodletting in gouty constitutions, a good observer will seldom fail to discover its very serious evil. Of this I have given striking instances, and I could add to them others. Gout being something different from, and in its essence even opposed to, inflammation, we must ever remember the great probability there is that the curative means employed to subdue the latter may very greatly aggravate the former.

Notwithstanding the two striking cases mentioned by Heberden, and the experience of Hosack, I am convinced that bleedings, to such an amount as is necessary to subdue inflammation, are much to be avoided in gout. Those who prescribe them will not fail to find out, in a very short time, particularly in London practice, that they have sacrificed their best resource in the cure, namely, the strength and stamina of the patient, and have made a lengthened and distressing case, where they meant to make a short and brilliant cure. Depletion is, in every way, contra-indicated. The patient is already weakened by the peculiar action

of the disease; and the state of the blood itself, loaded with urates, and in a sense poisoned by their presence, forbids great depletion. If the patient have sustained several attacks of the disease, it will probably be found that the whole nervous system has lapsed into a condition extremely unfavorable to the abstraction of blood.

But rejecting altogether the opinion, that gout is in any degree of an inflammatory nature, and believing that such a bloodletting as is necessary to subdue any of the phlegmasiæ is most injurious, it does not follow that this remedy may not be employed in such measure and with such precaution as will surely avoid the above great and recognised evils, and yet give that relief to an overloaded heart and vessels which the symptoms of this disease point out as required. The use of small bleedings is hardly understood among us. The late Dr. Parry, of Bath, was, as far as I know, the only physician who made much use of them. I believe that, instead of being debilitating, they may be ranked with tonics, on account of the cheerfulness, energy, and sense of power they suddenly restore to persons oppressed by a state of plethora. They most beneficially, too, supplant the use of purgatives, which are very often noxious in gout, and attended with considerable risk, when used after the manner recommended by Sutton for the relief of the fever which attends this disease.

It may seem absurd to open a vein in order to abstract from three to six ounces of blood ; but they will not say so who have made trial of this method, and seen the great and speedy relief it frequently affords. Unfortunately, the prejudices of our patients very often oppose themselves to its use. The very mention of the word bleeding rouses all their alarms, and the physician is obliged to do, not what he would, but that which he is permitted. I can truly say that I have, very many times in my life, witnessed, with great regret, very tedious and painful cases, which might have been shortened and disarmed of half their distress by the remedy in question, and I do not remember having ever had occasion to repent its employment.

These small bleedings, too, are quite free from the great objection commonly and very justly urged against more copious effusions, namely, that of forming a habit of making blood. This, indeed, may easily be made intelligible. It has been already seen how much the heart and great vessels are strained and dilated by accumulated blood. I believe the same condition exists throughout the whole sanguiferous system. We may readily enough conceive to what prostration the sudden and copious abstraction of their contents from vessels thus filled and tense with blood may give occasion. The whole powers of the digestive and assimilating organs must be immediately called into

requisition to remedy so great a cause of disturbance. Either from the food, or from the disintegration of the tissues and solid structures of the body, new supplies of blood will be derived, and the same condition of vascular plenitude will soon be re-established.

It is quite otherwise when the abstraction of blood is limited to that small amount required only to relieve the oppression of the system. The secretions of the kidneys and liver, which were arrested by the too great pressure on these organs, are now re-established; the fulness of the head, which prevented the due discharge of the functions of the brain, is also relieved, and the unclouded nervous influence is transmitted to the most distant parts of the system with an undiminished power. The consequence of this is not a return to a state of hyperæmia, but a condition of things in which, with a well-regulated diet, the patient may, if he will, contend successfully with a gouty diathesis.

It is well, however, not to conceal from ourselves the truth, that this remedy is by no means to be recommended to those who will not submit to the necessary restriction. If we give a speedy relief to the system, and place in a condition fit for use and enjoyment the organs of a self-indulgent individual, we have only given a momentary ease, at the expense of great, and by no means transient dis-

advantage. The patient will, in all probability, repeat the practice as often as he feels the smallest occasion for its employment, and will live to suffer more serious evils than he would have endured had the disease been allowed to run its course. In this case he will not blame himself. After the manner of such selfish persons, he will probably impute his suffering to his physician. But I have repeatedly used this remedy with the happiest consequences, in the cases of men who were affected with symptoms of incipient gout, in the midst of the heaviest occupations of life. I was once sent for to see a gentleman who, at the time of his seizure, had given notice to bring forward great public business in Parliament. He had been bled before in similar circumstances, and had suffered so much afterwards, that he was very averse to return to the use of the same remedy; but he was a person of very dispassionate judgment, and not wholly unacquainted with medicine. On hearing my explanation, he consented to lose four ounces of blood. This small quantity was quite sufficient to relieve the system. He made his speech with great facility; and told me two years afterwards that he had not for ten years previously enjoyed such uninterrupted good health. I ought, however, to add, that he was a person who could place restraint upon his desires.

The greatest difficulty I have met with in the use

of this remedy arises from the very universal prejudice against bleeding in gout—a very well-founded and very just prejudice I freely admit it in general to be. It is rare that we meet with patients to whom we can offer the necessary explanations to satisfy them of its propriety and safety in the manner I have pointed out. I have been dismissed for only proposing it. And this is not wonderful when the opinions of the medical profession so strongly concur with the prejudices of others. Yet I have been greatly pleased to find the proposal I have made of small bleedings in gout meet with very general approbation from the reviewers. With a single exception it has been well received, as founded in reason and sanctioned by fact. I am very well satisfied, that they who try it with circumspection and prudence will not be displeased with the result.

There are cases of plethora and atonic gout which, but for this remedy, would have baffled me, and yet were speedily and very thoroughly relieved with its aid. When a plethoric condition of the sanguiferous system has been well established, and the limbs remain crippled by lingering gouty pains, the patient is unable to use the required exercise. Any great effort of walking brings on a fit. Meanwhile the particular form of the disease forbids that long-continued course of low diet which would enable us

to restore the circulation to a healthy state. In such cases the course of nature is a very painful one. The patient undergoes a gradual depletion by a succession of fits. It is with me no matter of doubt, but of absolute certainty, that in instances of this kind, much suffering may be saved and no injury done by the practice I have recommended.

It is necessary I should state that I never make use of this remedy in, and that I consider it wholly inapplicable to, cases of gout in an impaired or defective constitution, even though there may be evidence of plethora of the system. I believe that some considerable degree of vigour is necessary to its legitimate use, but this is generally met with in the early stages of gout.

I prefer ordering the blood to be taken from the arm ; but in cases where there is much suffering in the head, there is an advantage in drawing it by cupping from the nape of the neck. Many years ago, I remember to have seen, with the late Mr. Morrah, a very severe case of gout, translated from the foot to the eye, in a horse-keeper. The inflammatory process was arrested, and the whole case disposed of quickly, by taking six ounces of blood from the temporal artery. I do not know what became of the patient afterwards; but he was a careless fellow, and therefore I do not doubt he had a return of his disease. In such a case I should now

take not more than half the above quantity of blood, or perhaps not any.

Physicians who have differed so greatly about bloodletting have not been more harmonious on the subject of purgatives. Even the partisans of the humoral pathology, from whom a similarity of opinion might have been looked for, have dissented concerning the use of purging, and have not even agreed in their dissidence. The reason which has seemed good to one for recommending its use has appeared quite sufficient to another for advising to abstain.

Mead condemns all purgation. Like Sydenham, he considers the extremity of pain most salutary. "Nature only makes use of pain as an instrument, and the sharper it is, the more speedily and safely she finishes her work." He ends with the paradox, that "gout is the only cure of gout," and with singular inconsistency, but still swayed by his humoral theory, he recommends, in the decline of the disease, the remedy which he denies in its early and feverish stage. Boerhaave objects to the use of purgatives as disturbing the nervous system, and interfering with the salutary process of nature in expelling the morbid matter. His great commentator so far adopts this opinion, that like Mead he condemns their employment during the fit.

Sydenham forbids their use altogether. "*Ego certe persuasissimus sum, a jugi et saepe iterata*

experientia edoctus, catharsin omnem tam per lenientia, quam per fortiora medicamenta, qualia pro more articulis expurgandis destinantur, plurimum nocere; sive in paroxysmo ad minuendam materiam peccantem, sive in fine ad dissipandas morbi reliquias, sive in perfecta intermissione et recta valetudine ut venturo paroxysmo occurratur, purgatio in usum revocetur. Etenim tam mei ipsius quam aliorum periculo compertissimum habeo, catharsin quovis horum temporum administratam, ita parum votis respondisse, ut malum, quod debuerat averruncare atque evertere, accerseret." (Op. cit., p. 420.) The only aperient he employed in his own case was manna, as a gentle relaxing medicine.

Morgagni affirms that "present danger and even death may occur when any internal cause prevents the matter being carried to the joints." (Morgagni, Epist. lvii, § 9.) Yet he approves of the use of purgatives, and mentions the cases of two eminent contemporary physicians, Drs. Marcus Gatinaria and Peter Bayrus, as proofs of their utility. (Op. cit., § 6.) Both these physicians made use of purgatives at regulated intervals, as part of the plan of their lives, and were delivered from the painful attacks they had suffered. Gatinaria took purgatives once a month, and never had a return of the disease. Bayrus underwent a course of laxative medicine three or four times a year, and was also free from

the paroxysms of gout. It ought to be added, that they also adopted a rigorous system of diet; and when it is considered what is the usual frugal diet of Italian physicians, we may doubt whether their plan would have an equally beneficial effect on a denizen of London.

Hofman, whose theoretical opinions coincide with those of his contemporaries, yet very earnestly advises the use of purgatives, and considers that nothing can be done in the way of cure, unless the *primæ viæ* be kept clear. ('System of Practice of Medicine,' 1783, vol. i, p. 587.)

Such were the opinions of the older physicians. It would be easy to add to the above, but I am convinced my readers would find it an unnecessary labour even to peruse such a history. In more modern times, a great revolution has taken place in men's thoughts. Dr. Sutton led the way by a much bolder practice than had yet been seen in gout; and as he practised on himself, he induced many to follow his footsteps. The opinion of Scudamore, that gout was chiefly owing to obstruction of the liver, confirmed all these prepossessions; and, for some years past, the strongest cathartics have been used with a freedom, which, I think, in the highest degree dangerous.

But, lately, the public mind has been much disabused. Patients themselves have felt the evil of the

practice, and, I believe, this has had much influence in giving currency and credit to novel, absurd, and even dangerous doctrines. Whatever may be our opinion of these heresies in physic, I believe all physicians will admit that it is fortunate for our profession that medical science sometimes attracts the notice of men of education, who correct our errors, and restrain our bigotry. This, I believe, is not only the best safeguard against our own proneness to systematic opinions, but I regard it, also, as our surest defence against quacks. Had we not fallen into the very great error of using the most drastic purgatives, with a rashness, which has received so stern a rebuke from the public, it is probable we should have heard little, in this country at least, of homœopathy. But it seems to have flourished here, even more than in its parent land. It found us enslaved to a system of overdosing of the most reckless and pernicious kind. Many who became ardent and proselytising partizans of this new sect had really been much benefited by it. They made, however, a sad mistake, when they imputed the good they received to the agency of the miserable globules they swallowed, instead of ascribing it to the loss of the injurious potions they had abandoned. But the safety of the public now requires that there should be a limit to indulgence, when we see these sectaries falling away from the

decorous and useful forms which confine the pursuits of science to its real followers, and banded with foreign adventurers, disappointed practitioners, and a few amiable, but very ignorant, enthusiasts of both sexes, to bolster up a worn out faith and falling craft, and decoy the unwary poor into institutions where their real and serious maladies will, at best, be neglected.

But though I would unhesitatingly and earnestly dissuade from the free use of drastic purgatives, I conceive it to be a great error to carry the dread of purging so far as was done by Sydenham. Laxatives are essential in gout; even when patients lead a most abstemious life, it is necessary that the bowels should be occasionally relieved by medicine. The effect of the disease is to lock up the secretions and suppress the evacuations. This must be counteracted by laxative medicines, among other means. The frequency with which they should be administered varies in different cases.

Much care is necessary in the selection of remedies. For some years past I have made little use of the neutral salts as aperients in gout. The profuse watery evacuations to which they give rise are, I think, injurious. The warm and even the more powerful vegetable aperients, such as senna, rhubarb, aloes, jalap, and scammony, seem to me far better adapted to the constitution of the gouty. They may

be given with great advantage in the form of tincture, and also associated with the warm aromatics and tonic bitters. These are the aperients I have long used in my practice, and I find much reason to be satisfied with the result.

It is impossible to establish any rule concerning the dose. Each case of gout is a separate study. The dose must be proportioned to the patient's degree of susceptibility. Yet there are some hints which may prove useful. The atonic forms of gout require much more gentle handling than the regular disease, and persons with accumulated fat about the viscera of the abdomen ask for stronger means than the spare and paunchless will bear. As the disease gives way, gentler and gentler remedies are required. At this period, indeed, it will often be found that the smallest doses of laxative medicine cannot be borne, and drastic purgatives may produce the serious accidents I have described in the history of the disease. In fact, as the paroxysm wears off, secretion returns; and the excreted fluids having found their way to their accustomed and natural channels, aperients become less necessary. The advice given by Mead and Van Swieten is quite otherwise unaccountable than by supposing, that having convinced themselves the disease was to be entirely abandoned, to follow uninfluenced the course of accident, which they supposed to be the direction of nature, they really

used no remedies at all. I cannot suppose that any one would use purgatives freely at the end of gout without soon finding out his mistake.

In our study of individual cases, much regard must be had not only to the constitution but to the idiosyncrasy and form of the patient. Heberden relates to us, that he knew a man whose bowels were relieved only once a month; and another, who had twelve motions a day, during thirty years, and then seven motions a day, during seven years; yet both in good health. ('Comm.,' p. 14.) While writing these lines, I am consulted by two men, one of whom obtains relief in his bowels only once in five or six days, and is very miserable some hours thereafter; while the other has rarely passed a day, for years past, without several loose motions, the effect of medicine he has taken. The latter tells me, also, that he suffers great oppression at the epigastrium, and intolerable headache whenever his ordinary dose fails to relieve him. Yet both these men are in good ordinary health, of which the best proof is that they lead laborious lives, and carry on anxious and thoughtful business. The first is a spare person. His chest is not capacious. It is flat-sided and protuberant, while the abdomen retreats. He is, what is vulgarly called, lean-gutted. The heart sounds can be heard sonorously over a large surface of the chest. The second is short in stature, fleshy, replete

in the belly, round barrelled in the chest, with large breathing power, and the lungs cover the heart well, so that its strokes are heard over a comparatively small space. Purging, in these two individuals, must evidently have a very different signification. The first is frugal in his diet, temperate in his passions, and aims at a calm and pensive existence. The second is joyous and sensual. Both are gouty; but the first has slight and evanescent touches of the disorder, while the second pays heavy tribute to it. Its severe and long-continued paroxysms have hitherto, at least, left him improved in health.

Though I object to the use of the neutral salts as purgatives, yet I have found much advantage in their employment in small doses as diuretics, particularly such salts as are formed by the vegetable acids and by phosphoric acid: the latter have seemed to me singularly useful. I know not whether this be due to their power of dissolving the urates, as pointed out by Liebig, or to their influence on the nervous system, but I have certainly observed very beneficial results from their employment in half-drachm doses, frequently repeated. They aid much in mitigating the pain and assuaging the general irritation, which accompanies the paroxysm. Dr. Alexander Ure observed the same effect from the use of benzoic acid; he supposed that the benefit he obtained arose from the agency of the benzoic acid in converting

insoluble uric into soluble hippuric acid, an idea which is now universally admitted to be erroneous. Froriep, however, in some accurate clinical experiments, has, to a certain degree, confirmed the statement of Dr. A. Ure, respecting the beneficial effect of benzoic acid. (Simon's 'Animal Chemistry,' vol. ii, p. 277.)

The use of the alkalies and earthy carbonates has, in all times, been warmly recommended in gout. The account I have given of the nature of the disease, and the *ratio signorum*, must prepare my reader for the admission that these medicines have been praised far beyond their value. As remedies, they cannot be esteemed of the smallest account, and they will much disappoint those even who look to them for any signal relief of the symptoms. Few things have more disappointed me in practice than the minute and transient influence of these substances in correcting the vitiated condition of the assimilated or secreted fluids. Notwithstanding the confidence with which they are recommended, I do not hesitate to pronounce them, in most cases, wholly inefficacious, and not at all durable in their effect on those they appear to relieve. I never saw the uric acid of the urine disappear under their use, or even in any marked degree diminish; and I have seen it vanish under the influence of the neutral salts I have mentioned above, the phosphates,

the tartrates, and the citrates of potass and soda, when it had resisted all change from the employment of carbonates. This fact may perhaps receive a chemical solution, but I have no doubt of its truth. The benefit, however, to be derived from the use of these salts is chiefly confined to that period of the disease when the paroxysm is on the wane ; but it must be admitted that a less animal diet, abstinence from wine and fermented liquors, with exercise and copious draughts of pure fresh air, will do more than any drugs for the removal of this symptom, which might indeed be expected from what we now know of its origin.

An observation of Mr. Gulliver throws some light upon the action of small doses of neutral salts in gout. He says the flat shape of the blood corpuscles is preserved by the salts of the serum, which also prevent their tendency to aggregate, as in buffy blood, and keep them effectually asunder. “ ‘This may be a cause of the well known efficacy of salts in inflammation.’ ” (Note on Hewson, p. 231.)

Very distressing cases of catarrh of the bladder and spasmodic stricture of the urethra will yield to change of air with exercise suited to the patient's condition, which refuse all relief from the means in ordinary use. I have seen more than one case, brought on by the acrimony of urine abounding in

urates, receive a complete cure from a journey to the country and an excursion at sea.

The gouty have often been accused of great sensuality with women, and I do not doubt that their indulgence frequently exceeds the limits which a just appreciation of their constitutional power would impose. I believe it often proceeds from the irritation of parts which the acrimony of the urine creates. I have in a former part of this book pointed out the fact, that in the night time and during sleep the secretion of urates is most abundant. Under the irritation they occasion, the impulse to indulgence is yielded to when restraint should be the rule. I have been obliged to advise separation under such circumstances, and always with admitted benefit to my patients.

Tonics have, in all ages, been used in gout, and are recommended by most physicians. Even Sydenham, who treats other remedies with contempt, admits them among his means of cure. He gives a long receipt for an elaborate and complex posset, which would be very ungrateful to modern stomachs, though he talks of it as regaling to the senses. The chief tonics used by the older physicians are the snake-root, sage, fenugreek, centaury, gentian, &c. : the latter alone being preserved in modern practice. If used at the subsidence of the fit, and accompanied by exercise and suitable diet, I am convinced

that tonics have not been too much extolled—hardly even duly appreciated ; but it is not at the close of the fit alone that they are useful. In all those forms of lingering and atonic gout which affect the distant parts of the body with irregular and flying pains, the stronger tonics will be found useful and potent assistants to the warmer vegetable purgatives. Quinine, in doses of two grains, twice or even three times in the day, accompanied by a mild laxative at night, will very often succeed in restoring comfort. Dr. Giannini, of Milan, under a very false theory, made use of a plan somewhat similar with great success. The virtues of the celebrated Portland powder are probably to be referred to the same cause. I never saw this remedy used but once, and then without any good effect. I am unable, therefore, to speak in its praise ; but I have no doubt that any good it has ever done may be accomplished by much simpler means.

Tonics are chiefly useful in the later periods of gout. In the last painful stage, iron will often be found a most important resource, unless there be signs of a strong tendency of blood to the head : this, however, is seldom the case at the close of an attack of gout. There is a form of the disease chiefly seen in old people, which is manifested by swollen articulations of the hands, with slight derangement of stomach, faltering in the action of

the heart, and intermission of the pulse, for which iron seems to me the best, if not the only, remedy. The forms in which I have chiefly used it are the saccharine carbonate of the Edinburgh Pharmacopœia, a most useful preparation, the citrate, and the tartrate. I have an objection to giving prescriptions in practical works in medicine, because each case has its own idiosyncrasy, which must be taken into account, and no intelligent practitioner will adopt the formulæ of another; but I am tempted on this occasion to say, that in such cases as those to which I have referred, 5 or 10 grains of the above preparation, in any aromatic water, taken twice in the day, and followed occasionally at night by 8 or 12 grains of extract of rhubarb, with one drachm of phosphate of soda, half an ounce of compound decoction of aloes, and an ounce of pimenta water, will often be found to suit the case well.

Having never advised the cold drinking and bathing which have lately sprung into fashionable use, and never having seen them employed, I can only speak of their effects from the experience of others. I hear accounts of them as various as the persons who give them; but all my reflections, and all my experience, lead me to dissuade the gouty from venturing on such hazardous courses. Where the remedy is efficacious I believe it to be dangerous. In the latter stages of the disease I do not doubt that

it is fraught with the utmost risk ; and I believe that the facts in this instance, could an honest statement of them be arrived at, would fully confirm this opinion. Since the first edition of this book, I have heard of much to confirm the impressions recorded in the above sentences. Unfortunately it is not possible to arrive at facts in so certain and exact a manner as to justify their publication. The wounded feelings of survivors who reproach themselves with errors encouraged, demand silence and oblivion. The vague and often slanderous statements of others, ought not to be repeated. But I should fail in that respect which is due to truth did I not, after having written so freely on one side, here candidly admit that I have seen many persons who have given me the unequivocal history of benefits received and health recovered without accident of any kind. The misfortune of hydropathy, as of many peculiar methods in physic, is, that we cannot place any reliance on our facts. Some are withheld, others are garbled. The practice is, sometimes at least, in the hands of those who, having failed in the ordinary and legitimate pursuit of their profession from ignorance or incompetence, have betaken themselves to this shift as a matter of trade. They are little qualified to make observations, and conceive it to be their interest to frown on all the most approved maxims of science, and oppose themselves to the

most eminent physicians, as if the accumulated knowledge of ages would sink before the hostility of advertising nostrum-mongers.

It remains that I should now treat of the great specific remedy of gout, Colchicum. My first endeavour must be to remove some prejudices entertained against its employment. These, I believe, spring very much from the old humoral theory of the origin of the disease, which I have combated in the early pages of this work. It has often been asserted that the use of colchicum, however great the degree of relief immediately afforded, tends to the eventual and permanent increase of the disease, and the opinion has even been expressed, that while curing the paroxysm, it lays the foundation of other far more serious evils, and of those heavy accidents which suddenly deprive the gouty of life. That these opinions and assertions are vain and futile may be made evident by considerations of a quite general nature.

The gouty are naturally timid and suspicious, and readily attribute the sufferings they undergo to any preceding events, especially if they happen to be of an unusual kind. Most of them are influenced by the nearly exploded medical opinion of a morbid matter, which must be turned out of the system. Even when they do not rejoice with Sydenham, that the severity of their pain is the best road to health,

they still think with Mead, that "gout is the cure of gout," and deem any powerful and rapid interference with the natural course of the disease to be imprudent. It cannot then be wonderful that they should attribute any accident which happens to health and life to the unwise meddling of the physician.

Though I do not think it necessary to undertake the patronage of physicians, and affirm anything in favour of their unerring wisdom, yet patients may see reason to pause ere they adopt an opinion so prejudiced as the above, if they reflect that the accidents, which they attribute to the use of colchicum, are those which spring naturally and frequently from gout, when left unimpeded to follow its ordinary course. We have already pointed out this in the history of the disease. It may indeed be alleged by them, that colchicum aggravates the natural tendencies of the disease; and if this observation be limited to the incautious use of the remedy, and not extended to its total prohibition, it is one in which I very seriously and very earnestly concur.

Having premised these observations, we are now prepared to consider the nature of this remedy, the cases to which it is most applicable, and the limits to be assigned to its use. There is no doubt that colchicum is one of those drugs, whose claim to be considered is well established. Its effect in freeing

the body from disease bears no adequate relation to its immediate visible and tangible, or, as it has been called, its physiological effect on the system. This, indeed, is denied by Dr. Christison, who declares that he has never seen the full benefit of colchicum conferred, till it had produced griping, purging, or some disturbance of the *primæ viæ*. So far as gout is concerned, I am quite sure this is an error. Colchicum never more effectually relieves the patient than when it acts silently and peacefully, without producing any evacuation whatever, or in any way disturbing the patient's comfort and ease.

For this reason, I consider the very smallest dose which will suffice to give us the specific influence of this drug and mastery over the fit, as the most efficacious and the best. A little reflection, however, on the nature of remedies of this class, will, I think, put this in a clear and indisputable light. Narcotics, to which order I think colchicum must be referred, must all be deemed hostile to living bodies. Administered in certain doses they are all poisons. The farther we remove ourselves from this destructive operation, yet retain the virtue of the drug, the wiser surely will be our practice. But the effect of too large a dose is to rouse all the repellent powers of the system for the extrusion of that which is offensive. A smaller dose absorbed into the blood is retained there longer, and has a more permanent

as well as more beneficial influence. There is another reason for exhibiting small doses of this remedy derived from its atomic constitution, which will have much weight with scientific chemists. The alkaloids in which the virtue of many narcotic medicines resides, are composed of elements which present a great contrast to the analytic structure of the organic principles of animal bodies. It is difficult to conceive any alliance between them. The former must always be treated as foreign bodies when admitted into the system.

The *modus operandi* of this remedy is not wholly involved in mystery. Dr. Douglas Maclagan, Professor Chelius, and Dr. Lewins, have demonstrated that it causes a more copious discharge of urea from the system; and it will now, I think, be admitted as an established truth, that the increase of urea is attended by a great diminution of the urates in the urine. The idea, therefore, which I have expressed in another part of this work, receives confirmation here. Urea and uric acid are again found to be correlative and vicarious substances.

This effect of colchicum on the secretion of urine would seem to confirm the opinion of Dr. Holland, that "it owes its virtue in the disease to a specific influence on this secretion." But this is hurrying too fast to a conclusion. The connection of vitiated urinary secretion with gout is indeed very manifest,

and it might, even *à priori*, be expected, that a remedy which puts an end to the paroxysm, should very powerfully affect the symptom in question in common with all others. I fear we are hardly yet prepared to explain the action of colchicum. Longer observation is necessary to solve this difficult problem; but I quite agree with Dr. Holland in the expectation that, from this source, a strong light may be shed on the pathology of the disease. I cannot, however, understand why he should deem it so improbable that the operation of colchicum should be through the nervous system. When I consider how much gout is influenced by the condition of the nervous system, and that the most notable effect of colchicum, whether acting as a remedy or as a poison, is that of a narcotic; and when I further consider the great rapidity of its action, it appears to me probable that the nervous system will be found to be the principal channel through which this medicine exercises its powers. I cannot conceive any medicine capable of removing, in so short a time, all evidence of so much bodily disease and suffering, save one that acts immediately on the nervous system. By what means, indeed, colchicum restores the secretion of urea, and accomplishes that mutation of principles which I have ascribed to the influence of respiration, is a mystery which I cannot thoroughly penetrate. Yet even this appears to me to receive its most

satisfactory explanation through the nervous system. I believe I have made it certain that the heart is enfeebled in gout, and that its action is irregular and spasmodic. All practitioners know the value of narcotics in quelling this desultory action. May not some part of the great effect of colchicum, and of veratrum album, aconite, and opium, (all which remedies may often be made coadjutors to, and sometimes substitutes for, colchicum,) be ascribed to their power of regulating the action of the heart, so as to induce a better and more even distribution of blood in both the systemic and pulmonic capillaries? But whatever degree of credit may be given to these speculations, it is undoubted that no sufficient explanation can yet be given of the action of colchicum; in other words, it must be classed among specifics.

The cases to which colchicum is most applicable are, without doubt, those of the regular disease, without injury of organs. If there be injury of tissue, so as to argue a destruction of function of any considerable portion of the kidney or liver, the relief to be obtained from colchicum will be problematical. The cases, too, of atonic gout certainly receive less relief from this medicine, and some of them are so little influenced by it as by no means to compensate for the low and depressing feelings it often creates. These effects may, however, be much obviated by combining it with warm aromatic

tinctures and waters, and with the vegetable laxatives. The latter do not in the least destroy the specific action of colchicum, but, on the contrary, much promote it. I have often been obliged, in cases which received subsequent relief from colchicum, to renounce the use of the remedy till some defect in the general health, or some local disorder, had been attended to and relieved.

But the most common reason of the failure of colchicum is the unnecessarily large dose which is frequently administered. I have often seen quite a poisonous influence from doses carried to the length of producing sickness and diarrhœa. It is true that this is not a cumulative poison, and if the medicine be intermitted, the symptoms vanish quickly ; but the effects of the narcotism induced often remain to such a degree, that the patient cannot return to the remedy without a reproduction of his painful symptoms, and its good effects are lost for a considerable time.

I have said that the incautious use of colchicum might aggravate the natural tendencies of the disease, and I feel well assured that many persons have suffered much from, and even paid the heavy forfeit of their lives to, the extreme readiness with which they fly to the relief which this remedy affords. Physicians may indeed dispute about the proximate cause and peccant matter of the disease, but surely

no one will doubt for a moment that it has a cause ; and it will be granted by most men that the various painful symptoms by which the presence of the disease is manifested constitute an effort by which Nature seeks to relieve herself from a malignant influence, and recover the equilibrium of health. In this sense the paradoxical expression of Mead, that "the gout is the only cure of the gout," contains a great truth. If this be the case, it must surely be apparent to the most careless reasoner, that it can neither be good philosophy nor good practice to use a means which simply puts a stop to a salutary process. Nature seeks a relief *quâ detur porta*, and the physician must not arrive only to forbid it, and to lock up the mischief.

The first bad effect seen from too early an administration of colchicum is that of a total failure of the remedy. The local disease is indeed relieved, but the distress of the patient is in no degree mitigated. His constitutional symptoms remain the same, and in no great length of time an explosion takes place in some other part, in all probability nearer the centre of the system. A metastasis has been effected ; but the serious consequence is a prolonged disease ; and a prolonged disease is often a great injury to the constitution.

If, on the contrary, the disease be permitted to expend its first violence, colchicum may be both

safely and effectually used. When the fever has abated, the œdematous swelling of the part been established, and the bowels well relieved, colchicum may be used with good effect and perfect safety. A long experience of the medicine now enables me with great confidence to recommend to younger practitioners to abate much the amount of the dose they use. I have seen doses of one drachm of the wine or tincture, given twice and three times in the day with no effect on the disease, but with sad disturbance of the patient's constitution; and I have seen the same cases led back gently and quickly to health with doses varying from 10 to 15 minims after a little time had elapsed, and the fire of the disease was in some degree extinguished.

If there be sufficient vigour of constitution to permit the practice of a small bleeding, according to the method I have already mentioned, colchicum may be used much sooner, and its administration will generally be attended with happier effects; but I have mostly found it prudent, as well as advantageous, to pause for a couple of days after bleeding before using colchicum.

Nothing can be more unwise for a patient than, immediately after a cure of gout by this means, to revert to the usual course of life. Yet this is generally done. Indeed colchicum is chiefly valued as a remedy because it permits a speedy return to

the pleasures, the occupations, and cares of life. It is of no use to argue with the voluptuary ; we might as well lose time with the wretched beings who have lost their reason, or with children who have not attained it ; but men who are involved in business would do well to consider how much depends on the use they make of this moment.

Some years ago, I was desired to visit a gentleman who had just gone through a very painful fit of the gout under the care of a very eminent physician now dead. He had quarreled with his doctor in consequence of the troublesome, but very wise advice, the latter had given. I found that the fit, from which this very foolish individual thought he was emerging, had not at all been permitted to run its course. Notwithstanding its duration, no issue had been given to the disease. It had been stopped in limine by very heavy doses of colchicum, against all remonstrance on the part of his physician, and the earnest entreaties of his wife, for even she had learned, by experience, the folly of this course. The consequence was a series of devious and perplexed symptoms, with metastasis to different parts of the body. Each fresh local manifestation of the disease was assailed by a renewed application of the poison. Every absurd error of diet was meanwhile committed. After eleven weeks of this practice I was called to the case, and not permitted the advan-

tage of a consultation with my predecessor. At this time, however, nature was operating a cure after a fashion very usual with her. The patient's excesses were restrained by a total loss of appetite; and this continued till the fierceness of the disease was in some degree removed. There was little difficulty in managing him while this state of things remained. But when appetite revived, and his sufferings were in a degree abated, it was impossible to deal with the great perverseness of this man. It was the month of May, and he was eager to go to the clubs, and to parliament, which to him was nothing better than a club. He got well enough to do so, still using, as I afterwards learned, colchicum largely and frequently, and living freely. In this manner he hobbled on till the month of July. I was again desired to visit him. He was a pitiable spectacle of helplessness, pain, and querulous impatience. Nearly every joint was seized. In vain he now attempted to dictate. Everything was decided for him. During half of July and throughout August he underwent indescribable suffering. I believe he had the folly and injustice to ascribe this attack to his physician. I never saw him after the month of October, when he left town, but he died four years after of disease of the heart and hydrothorax. I have been credibly informed, that he continued the use of colchicum with the same imprudence, till it failed in giving even

transitory relief, yet did not fail to inflict on him its own peculiar evils.

Cases like the above are of frequent occurrence among weak and pampered individuals who are their own physicians. They stem every approach of the disease in the manner I have related above, convinced that no greater evil can befall them, than the interruption of their habitual amusements. The treatment of such persons is extremely perplexing. Their cases are puzzled and perverted. But the rule of practice is undoubtedly to let the malady return to its regular form, and, no matter what the suffering of the patient, to allow it to exhaust itself. It will leave him less shattered and exhausted, than after it has burst through the impediments which mistaken practice has imposed.

I recommend a perfect holiday to all men who have gone through a fit of gout. It should be passed in good bracing air, with as much exercise as their feeble state will enable them to take, in order that the lungs may be well expanded, the assimilation of the food be perfected, and a pure and well oxygenated blood be worked into the organic textures and moving structures of the body. During this time of seclusion, it is of much importance that a light but nourishing diet should be used, and that the bowels should be gently acted upon, so as to relieve the system of any remaining oppression. These purposes may be well

accomplished during a residence at some of the fashionable watering-places. The waters of Buxton, Wiesbaden, and Marienbad suit such cases well. If there be much visceral congestion, the waters of Cheltenham, Leamington, Carlsbad, or Vichy are preferable. In advanced cases, with great debility, Kissengen, Pyrmont, Spa, or Tonbridge, may be recommended; and where the fit has left great debility of limb, a visit to Bath or Aix-la-Chapelle will be found profitable. Of these remedies I do not write at greater length; it would require a separate treatise to do them justice.

The local remedies of gout are few, and of little efficacy; yet it is of importance they should be attended to. A dependent position of the affected limb should be carefully avoided. Patients generally make this discovery for themselves; but from first to last, and while any swelling and pain remain, the parts should be kept studiously elevated, so as to favour the gravitation of the blood from the seat of the disease.

The limb should also be kept warm. The great Harvey, indeed, did not observe this rule, and applied cold to his gout; but his practice is condemned by all physicians of ancient and modern times. I have no doubt of the risk attending it; even when unattended by danger, unless quite inefficacious, it must tend to prolong the attack, to

seriously disturb the regular course of the disease, and bring the patient into risk. This will be apparent from a consideration of the nature of the disease.

I have seen much comfort from practice of an opposite kind. When the pain is violent, great relief may often be obtained by wrapping the limb in a poultice ; and I have often caused to be placed, with great good effect, underneath the poultice, a rag dipped in tinct. of veratrum, or belladonna, laudanum, or hydrocyanic acid. Instead of a poultice, this local application may be covered with oiled silk, which answers nearly the same end.

Leeches are frequently applied in cases of regular gout, and sometimes, though rarely, with relief to the local suffering. They never, indeed, have any effect, unless the blood they abstract be sufficient to affect the system, for it is through the system that relief is alone possible in gout. But I prefer much to obtain such influence in another manner, which is more manageable and more certain.

The treatment of chalk-stones requires a brief notice. Practitioners are often tempted to open the collections of fetid ichor, very falsely called abscesses, which gather around them. Nothing can be more unwise. No relief to the patient is obtained by the operation, and nearly always a foul, painful, and sometimes dangerous sore is left behind. If let

alone, the most unpromising appearances will end in absorption and resolution. The only fit application to them is a pledget of tepid water.

These are the remedies in gout. But let it not be forgotten that they are only remedies for the fit. They who desire to prevent its recurrence, and still more they who look higher, and would eradicate all tendency to the disease, must not depend on the means furnished by pharmacy. Drugs, in this disease, only alleviate and shorten suffering. This, however, is much for men who cannot choose either their condition or position in this world, and who, in their pursuits and occupations, must submit to many a hard necessity, little compatible with health. Besides this compulsion of circumstances, it is, I believe, according to the experience of all physicians, that patients much more willingly swallow any amount of medicine, however nauseous, than relinquish long-cherished habits. For my own part, I can truly say that I pass my days exposing the absurdities of custom, and preaching against the noxious lives of my patients.

But, before concluding, I would again warn the gouty against expecting too much from drugs. If the functions of the body do not preserve their respective relations,—if the balance of the machine be lost,—disease of one kind or other must be at hand. It is in vain to expect to enjoy health with

erring functions, and it is a gross and imperfect view of the practice of medicine which sees disease only in substantial and tangible disorganisation of the body's structure. If too much food be administered to the stomach while its assimilation is imperfect, if the primary function of digestion be active while the secondary and equally important one of assimilation is inert, health is impossible for any great length of time. Gout may not, indeed, be the result, unless that unknown something in the constitution, which is the real essence of the disease, be there. But disturbance of health, and possibly organic disease, must ensue.

We are too much accustomed to look upon the bowels as the only road for the excrements of the system. I believe it would be both more true and more wholesome to associate the skin, the kidneys, and the lungs, in this office, and to assign to each of these organs a parity of rank and equal influence in the depurating function. It is certain, however, that if the carbonaceous and nitrogenous principles be not freely and constantly expelled by their proper channels, they must find their way out by vicarious roads, or be retained to disturb the health. Purging is then a necessity for the indolent.

But how much better would it be for those persons to permit the offices of nature to go on in the way which has been ordained for them, to limit

their diet and increase their exercise, to take only the amount of food necessary for the sustenance of the body in vigour, and sufficient exercise to keep it in comfort, to direct the nutritious part of the food to the repair of the frame, and to permit the expulsion of all those matters which should go to waste.

CHAPTER XIII.

TREATMENT OF IRREGULAR GOUT—HASTY INTERFERENCE CONDEMNED
—CASES—ABUSE OF BRANDY AND CORDIALS—BENEFIT OF PATIENCE
AND DELAY—CASES—FREQUENCY OF ORGANIC DISEASE—ITS NATURE
—DIET — COLCHICUM — PURGATIVES — TONICS — GALLIC ACID —
METASTASIS TO THE HEAD—BLOODLETTING—COLCHICUM—LAXA-
TIVES—DIET.

THE treatment of the metastatic forms of gout is beset with difficulties. I regret to say I cannot, either from the result of my own observation, or from the writings of others, lay down any clear or certain rules to guide us in these perplexing, and too often alarming, cases. Indeed, I do not know any circumstances in which a physician can be placed more calculated to try the firmness of his character. The patient is in intense suffering, believes himself in great danger, and entreats relief; the friends are clamorous for active measures, and will accept any kind of interference; its propriety does not trouble them, at least at the moment; but the prudent practitioner who calmly observes the case, and seeks delay till he can satisfy himself as to the best mode of proceeding, too often excites the

distrust and anger of the attendants, even when he satisfies the patient.

Repeated observation constrains me to believe that opium and the powerful stimulants, brandy, ether, and ammonia, so freely used in cases of translated gout, are often very unnecessary, and when not required, are surely very injurious. If time be given, and if forbearance be practised, it is wonderful to observe what painful and alarming symptoms will quietly depart with little artificial aid. But reflection on the cause of the attack will diminish our wonder. Though persons subject to the metastatic forms of gout are, for the most part, deeply imbued with the disease, yet the immediate seizure has generally, if not always, an exciting cause in indigestion, some disturbance of the circulation, or some emotion of the mind. Let these be removed, and their effects will pass away. I have been summoned in the middle of the night, on account of that which was represented to me as gout in the stomach or heart, and which had apparently all the outward manifestations of such an affection, but had, notwithstanding, disappeared before I could reach my patient, without the aid of any remedy more powerful than a little peppermint water. I have not a doubt that this is the occasion on which the *nimia diligentia medici* is fraught with danger to the patient. Spasm readily and stealthily becomes

inflammation or hæmorrhage, the two evils most to be dreaded. It is not always easy to discern when one state has passed into the other. I can with great truth affirm that I have never known any bad consequence proceed from delay, but have more than once seen the most fatal results of injudicious and hasty interference. The two following cases will probably place this in a clearer light. It may, indeed, be matter of doubt whether the stomach was the organ exclusively attacked in either of them, but they both belong to that class of cases commonly called gout in the stomach.

Many years ago I was asked by Mr. Assalini, at Naples, to accompany him on a professional visit to a poor Frenchman, who had been suffering severely during the previous week from gout. The patient was a courier, and, like most of his trade, a careless fellow, indulging freely in the use of wine and spirits. He could not tell his age, but thought himself under 40 years. His appearance certainly indicated ten years in advance of that, yet his constitution was in all essential respects unhurt. The heart appeared not to have undergone any organic change, of which a strong proof was afforded by the fact, that he rode as courier, a few months before, on account of the French Government, the whole distance from Paris to Turin without a pause. His person was spare, but his limbs were muscular and well formed. The

malady first showed itself in the regular form in the heel, but with little swelling and redness, though with exquisite pain, which continued undiminished for several days. Two days before I saw him, his suffering had undergone some mitigation, and the previous evening it had suddenly disappeared, without any immediate aggravation of his constitutional disturbance. He had, notwithstanding, passed a wretched night, and in the morning was seized with great difficulty of breathing, violent cramp of the stomach, and frequent vomiting of a thick ropy mucus. His case was considered one of translation to the stomach, and he was treated with large doses of the strongest stimulants without the smallest relief. When I saw him he had taken ether, ammonia, and laudanum in unmeasured quantities. His vomiting was then incessant; there was great tenderness on pressure over the whole epigastrium; the discharge from the kidneys was nearly suppressed; the breathing short and hurried; and the pulse thready and greatly intermittent. The same stimulating plan was continued, as far as the irritability of the stomach would admit. When these symptoms had continued without abatement for twenty-four hours, a vessel of some magnitude gave way, and he vomited up a very large quantity of blood. He soon afterwards became tranquil; and when his attendants imagined that an improvement had taken place, he was found dead

On opening the body, the mucous membrane of the stomach was discovered blackened and inflamed, and the abdominal viscera were loaded with blood.

The second case, though it terminated differently, is not less remarkable than the first. I give this case, which occurred many years ago, in the words of the interesting report made to me by his medical attendant. — Dowie, aged about 60, a man of humble birth, who had by industry acquired wealth as a publican, was not a drunkard, though there is reason to believe that he drank beer and spirits much too freely. He was a person of great bulk, and tall as well as stout. “He suffered dreadfully from gout, and had frequently used the *eau médicinale* to abate his sufferings. One day I saw him under an attack which I shall find it somewhat difficult adequately to describe, and which was unlike anything I have seen since. I was summoned suddenly, and found him seated in his chair, breathing most laboriously and rapidly, not less than eighty times in a minute, with evident great alarm and anxiety, a countenance heated and flushed, and every little vessel of the skin injected, with attempts to cough, which his agony seemed to impede. I pulled out a lancet; but he indicated, rather by signs than by words, that he would not allow it to be used. I believe that he had previously experienced something similar in kind, though less in degree, and that

he knew the remedy better than I did. The remedy was plain brandy, of which he drank a tumbler, in successive gulps, in the course of two or three minutes, pausing at short intervals to ascertain if it was enough. I was appalled at his bold practice. The tumbler being exhausted, he said audibly, 'No, it is not enough yet,' and proceeded to pour out one third of a tumbler more of pure brandy, the greater part of which he swallowed before he declared that the fit was 'now going off.' In a short time he breathed with his usual ease, and was not intoxicated."

Soon afterwards this man died suddenly, with symptoms of serous apoplexy, and I was present at the dissection of his body. There was considerable effusion of serum at the base of the brain and in the spinal canal. The meningeal vessels were found turgid with blood, but there was no rupture. The viscera of both cavities were likewise gorged with blood, the great vessels being everywhere swollen with their contents. The structure of the abdominal viscera and the heart appeared healthy; but they did not receive that minute examination which is usual at the present day.

Notwithstanding the rapid relief which attended the administration of the brandy, I believe that even in this case it would have been better practice to have abstained from the use of it. In a state of plethora, such as I have described, it was much too

dangerous a remedy. It would have been easy to evoke the class of symptoms which carried off the Frenchman in the first case, or the malady of which this man eventually died. With more patience, and the employment of mild antispasmodics and counter-irritants, the same result would probably have been obtained. Such, however, is not the opinion of the medical attendant of this patient, who, having seen the history of the case given in the former edition of this book, has written to me to express his firm conviction that the attack, but for the powerful remedies employed, would not have passed away harmlessly. I have, notwithstanding, a great suspicion that this is one of the cases in which homœopathy might have obtained one of its easy and groundless triumphs. That these opinions are not destitute of foundation may be seen in the three following cases, which I extract from my note-book :—

A lady, arrived at the age of 73, and who had suffered from gout for a great length of time, had been severely afflicted the last three years by frequent metastasis of the disease to the præcordial region. Sometimes the heart seemed the part principally assailed ; sometimes the symptoms seemed chiefly derived from the stomach : but both organs participated in a greater or less degree in all the attacks. Her person was stout and corpulent, and though advanced in years, she was yet active and energetic.

But her habits were of the most irregular description, both as to hours of exercise and rest, and as to diet ; at times fasting long, and then indulging in what might very justly be called excess. Having suffered much from the abuse of purgatives, she had for several years been induced to listen to homœopathic counsellors, who had altogether neglected her bowels, and to this cause she attributed in a great measure her late sufferings. She had made much use of stimulants and opium in her attacks. At first the relief she experienced from them seemed prompt and decided, but they soon lost their effect ; and on late occasions she thought they had enhanced and prolonged her suffering. She was, on this account, the more willing to concur with the directions I gave her. On comparing her case with that of other patients, I was satisfied that her own observation was correct. By means of strong mustard cataplasms externally, a draught of forty minims of sal volatile, with twenty-five of vinum colchici, repeated at four hours' interval, and more patience and forbearance, the attack was got rid of, without leaving any painful consequence behind it. A well-ordered diet, with better regulation of the bowels, completed her cure, so that at the end of two years, notwithstanding her advanced age, she ceased to fear her old enemy. This lady died a year ago at the age of 81, not having had an attack of gout, regular or misplaced, during four years.

A gentleman, 60 years of age, who had been a gouty subject for many years, was seized with influenza, accompanied with pleuritis, requiring blood-letting and other depleting remedies. The consequence was that his gout, which had always hitherto had the regular form, now assumed an atonic and misplaced character. He was not ill enough to relinquish many urgent duties which pressed on him for attention, and yet was not well enough to discharge them with ease and comfort. His condition gave much anxiety to his family. About this time, while attending a public meeting, his feelings were much excited, which brought on great pain at the præcordia, with sickness, and before he reached home he was in a state of such intense suffering, that he was removed from his carriage with the greatest difficulty. I saw him within half an hour, and found him propped up in bed, breathing, not hurriedly, but with much difficulty. The least motion of the ribs or abdominal muscles seemed to aggravate his pain. His countenance was ghastly pale, and big drops of perspiration stood on his forehead. He could scarcely speak; but in a whisper he informed me that he thought himself dying, and inquired if there would be time for him to transact some necessary business. His pulse, however, told me that matters were not so extreme. Notwithstanding the gravity of the other symptoms, the heart was acting with great regularity, and with

tolerable strength. I hastily ordered stimulating applications to the pit of the stomach and to the feet, and prescribed a sedative draught. Ere it reached us, I had the happiness of seeing all the worst symptoms giving way, the pulse increasing in power, the irritability of stomach allayed, the blood returning to the countenance, and the skin resuming its natural heat ; and before the return of the servant who carried the prescription, the attack might be said to be over. This gentleman recovered from a very alarming attack without the aid of any stronger internal remedy than a little brandy and water, (given before I saw him, but instantly rejected,) and some mouthfuls of water-gruel. I literally did not give him any medicine to swallow, but watched him carefully for many hours. Warned by this attack, he has changed his mode of life, and now enjoys better health than he has had for years. Before I quit this case, I should draw attention to the fact, that of all men the gouty seem to me to feel most heavily the blighting effects of influenza. If severe remedies are necessary, they hardly withstand them, and have a most protracted convalescence.

The third case is that of a woman, about 45 years of age, of a very gouty family, who has suffered under repeated attacks of the regular disease, and is crippled in nearly all the articulations of the fingers by tophaceous deposits. Spare in form and short

in stature, she yet imbibes more nourishment in the course of the day than would satisfy a strong man, though she never eats a good and wholesome meal. Day and night seem consumed in a pitiful study of certain little messes and refectations. She is nearly as unreasonable as to medicine, adhering to various family traditions, and little crotchets of her own, on which she places a bigoted reliance. Several sharp attacks of pain, translated to the stomach, have lately taught her to place more confidence in the knowledge of others. I have considerable hope that the alarm she has felt, and her attachment to life, miserable as hers is, may be the source of much improved health. But my present object is to describe one of the attacks under which I have attended her. It occurred in the night, after repeated distressing evacuations of the bowels, in consequence of a powerful dose of senna and salts. When I reached her residence, I found her quite speechless with suffering. She pointed to the pit of the stomach as its seat. The vomiting, which had been severe, had ceased; her countenance had a cadaverous hue and expression; the pulsations of the heart, which were scarcely felt, had long and irregular intervals; everything denoted a situation of the greatest danger. She could not swallow; the cordials, therefore, which in this case I should certainly have employed, were forbidden. External

applications were diligently used. Slowly and gradually the severe symptoms began to abate, the pulse recovered some firmness, the countenance its expression, her speech returned, and with it her power of swallowing. I might now have given her stimulants; but seeing that Nature was accomplishing her own work, I preferred not to interfere. As strength returned, the mischievous cathartic began once more to harass her, and threw her back into the same situation of peril, from which, however, she again slowly emerged as at first, without the aid of a single drop of stimulant of any kind.

This woman had, on previous attacks of the same kind, taken powerful doses of brandy, ether, and laudanum, and suffered much from their effects during several days afterwards. She assures me, also, that the attack did not then disappear either so quickly or so completely. She has since been treated with the same forbearance in repeated seizures of a like kind, and has every reason to be satisfied with the result; but her diet has been much amended, and with it her health.

These three cases sufficiently prove the great importance of time in the treatment of misplaced gout; that however grave the circumstances, it is always unwise to prescribe in hurry and alarm; that the seeming risk is often much greater than the real danger; and that recovery is often retarded rather

than promoted by the powerful remedies now too readily or frequently resorted to. I am convinced that careful observation of similar cases will prove there are distinct rules to guide our interference. At present it is a matter of very nice tact and judgment to distinguish the case in which the most heroic remedies must be instantly applied to sustain the fleeting powers of life, from that in which the advantage of the patient is best consulted by "*expectation*" and forbearance; but of one thing I feel certain, that medical practitioners will exhibit those qualities which entitle them to confidence, when they do not suffer themselves to be hurried into decision by the clamour of patients and their friends. In general it may be said that those cases attended with little change in the pulse, even though there be intense suffering, severe vomiting, and signs of much disturbance in the stomach and diaphragm, best bear delay, and that those in which the action of the heart is very depressed, and where there is little acute pain, are the cases which most imperatively call for prompt and effectual aid.

I believe the patient who is frequently affected by metastasis of gout to the heart is seldom free from structural disease of that organ. The alteration of structure is chiefly of two kinds. There may either be earthy formations disturbing the action of the valves, and injuring the function of the coronary

arteries, by which means the nutrition of the heart is impeded, or the muscular substance may have undergone the process of fatty degeneration, leading to dilatation of the cavities. Of this I have given a delineation in the former part of this work. Both these states, indeed, may coexist, the latter depending for its origin on the former. Much light has been thrown on this subject by Rokitansky and Paget. The latter particularly has shown clearly the connection between this fatty degeneration of muscular fibre and age, disease of organs, the destruction of the formative power, and the disappearance of the nucleated cells. If future inquiry should determine that translation of gout to the heart, with its formidable train of symptoms, and the termination in sudden death, are frequently owing, as I suspect, to this fatty degeneration of the organ, it must have weight with us in forming a prognosis, and also in deciding on our line of practice. It will probably, likewise, be admitted that the disposition to the formation of the hydro-carbonaceous product, fat, the lowest and least organised of animal substances, is another proof of the truth of the observation I have made, that gout is an asthenic disease, and that its origin is much favoured by indolence and by a deficient oxygenation of the blood.

The cause of the malady here points out the remedy. It may be questioned whether any cure of

such disorganisation be feasible—whether any return from such a state of things be possible ; and I may be reckoned a very sanguine person when I express firmly my belief that it is. My experience in my profession, which has abated much of my confidence in drugs, has rather increased the reliance I have placed in the sanative powers of Nature herself. If an artificial and poisonous life of stimulation and repletion in diet, with indolence and ease, be abandoned for the simple and wholesome habits of Nature, greater evils than those described may be repaired, and even removed.

There can, indeed, be no hope of removing calcareous deposits from the vessels and valves of the heart ; but surely the restoration of that formative function, which disease has impaired, is credible enough. The indication of cure is to put an end to the secretion of oil-globules within the fibres of the muscular structure of the heart, and to restore that of fibrin. For this purpose a diet, composed of little hydro-carbonaceous matter, and furnishing the albuminous elements to the blood—that is, a more animal diet—is required ; and greater activity of circulation is demanded, that the more highly organised principles, fibrin and albumen, may take place of those low animal products, oil and fat. For this purpose the due oxygenation of the blood, and the aid to the circulation which muscular exercise gives, are indispensable.

Great care must, however, be taken not to urge such patients to too great exertion at once. Sudden and violent efforts may be quickly fatal. Nothing is more easy than to overwhelm a heart thus disorganised. The object should be to give freer play to the lungs, and to stimulate the blood-vessels, hurrying as little as possible the action of the heart. By degrees the habits of exertion may be attained; but exercise must be increased only as the cure advances, as the patient's strength improves, and as the heart is able to bear additional strain.

In these cases the use of colchicum is, I think, much to be deprecated. This is, with me, no matter of doubt. I am quite sure that I have seen it do great and even irreparable mischief. It may in some very urgent circumstances be imperatively demanded, but should be set aside with the immediate occasion for its use. It lowers the tone of the circulation, and, I believe, rather promotes than hinders the disorganising process I have described.

Purgatives, in such cases, are also much to be condemned; in their more drastic forms they are most noxious. I have, more than once, been able clearly to trace a dreadful disaster to their employment. It is matter of doubt with me whether even the mildest lenitives are admissible in this metastatic form of gout. I certainly have never seen them of use, and even when most prudently

administered, I have witnessed unequivocal mischief from them.

At page 40, I have already related a case of atonic gout, in which excessive purging had brought on sudden and unexpected disaster. I will now relate one in which the same thing occurred in metastatic gout. I did not witness the circumstances, but they were stated to me on evidence worthy of trust. A lady, 70 years of age, long afflicted with gout, was seized with a sudden giddiness of head, and oppression at the præcordia, after the sudden disappearance of gout in the foot. A dose of blue pill was administered to her, followed by one of senna and salts. This medicine had been often taken by her before, without any inordinate effect, but on this occasion it purged her very severely. When its operation was over, she expressed herself relieved; and being a person, notwithstanding her years, of great constitutional strength, no uneasiness was felt concerning her. In the morning she was found dead. I saw her body, while yet untouched, and, from its position, the undisturbed condition of the bed-clothes, and the serene expression of the countenance, I felt convinced she had passed away in her sleep. It was one of those cases in which, I imagine, death is attributable to pause in the system, but no dissection of the body was permitted.

Chalybeates and other tonics are our most useful remedies. They may often be employed with great freedom, and in powerful doses, if united with regular exercise in the air. To be of service, they should be used not as they are exhibited during recovery from an accidental illness, but continued for many months together. A long space of time is necessary both to restore the organism and to correct the function of the part affected. For this purpose iron, in all its forms, and quinine are chiefly to be relied on. The gallic acid has also seemed to me, in several instances, of great use. I would call the attention of practitioners emphatically to it.

I have already said that metastasis to the head appears to me by far the most usual form of misplaced gout. It occurs with every degree of suffering. The headaches from which those persons suffer in whom the excretions of urates and urea have, from any cause, been suddenly diminished, or temporarily arrested, are only a commencement of this affection, which may well be likened to the effect of a poison. I believe that the substance of the brain itself is the part usually affected in these cases, and my reasons are, that they are never attended with delirium or wandering, but always accompanied by stupor and somnolency; and that when they terminate in apoplexy, the ruptured vessel is found in the cerebral substance.

It has been said that such cases are to be treated like apoplexy from any other cause. I am quite satisfied that this injunction is most dangerous. Patients affected with gout in the head do not bear the abstraction of large amounts of blood. Much regard must be had to the state of the heart, which is always more or less diseased, and sometimes in an advanced state of disorganisation. We may easily and quickly relieve the worst head symptoms; but if the relief afforded be not meted out with wariness and skill, we shall too surely discover that we have fastened on our patient worse and more hopeless evils. The abstraction of much blood is, however, wholly unnecessary. A little relief given to the system by a small bleeding will enable the kidneys to resume their office, and the worst symptoms will then safely depart.

In these cases colchicum is a most useful remedy. I have mentioned the discovery of Chelius, Mac-lagan, and Lewins, that it greatly increases the secretion of urea. The application of this fact to the case in hand must be obvious to all, and the effects of the medicine will fully answer their expectation; but here, too, I would insist on the propriety of using minute doses of the remedy, which more safely, and not less effectually than larger ones, accomplish the object in view.

Laxatives in head cases are always necessary; and

even the more drastic purgatives may be required. Prudence, however, is indispensable in their use. While no constipation is permitted which would urge the blood to the head, regard must be had to the patient's shattered condition. Precise rules cannot be laid down ; but the experienced physician will hardly err, if he do not lose sight of the impaired condition of the circulation, at present labouring under a double disadvantage from the oppressed state of the brain, in addition to disease of the central organ.

Iron and tonics of all kinds must be either forbidden, or used with the utmost vigilance and caution in head cases. When the stagnation in the brain is plainly owing to the impaired power of the heart, I can nevertheless conceive that they may be of service, though I have not made use of them.

Much skill is requisite in the management of the diet ; but, even in cases of translation to the brain, I am persuaded that it should be chiefly of animal substances. All causes of indigestion must be carefully avoided ; and no doubt can exist that vegetable food taxes much more heavily the assimilating function than animal matters. In the previous part of this volume, it has also been made sufficiently clear how much this carbonaceous aliment contributes to the production of the urates, one of

the commonest accompaniments and surest signs of gouty suffering.

After all that has been written on atonic gout, it must be frankly admitted that this is a form of malady in which rule avails less than in almost any other. Symptoms of the most opposite meaning are often curiously intermingled, and the variations of its aspect are as great and as sudden as the changes of our mutable climate. Remedies of various effect may often be wisely administered by the same hand, and physicians are often guided more by the unwritten result of their long experience than by established laws.

THE END.



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