On Gout,
and the Gouty Diathesis

A Thesis presented to the Medical Faculty of the University of Edinburgh by
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in the said University

April 1864
History of Gout.

Gout is a disease which has been known from the most remote antiquity, and has numbered among its victims some of the most celebrated men of all ages. It is entirely unknown even in the present day, according to the reports of the most eminent travellers, among nations who live chiefly on the produce of the chase, obtained by the sweat of their brow. In our own, and in all other civilized countries, it is extremely common, both in its typical and well marked forms, and in its lurking and underdilated condition, embittering the lives of some of the most eminent men of our own, as well as of other professions.
The first mention of this disease which I have been able to find is in the Old Testament (II Chronicles XVI: 12) where it says: And Asa in the thirty and ninth year of his reign was diseased in his feet, until the disease was exceeding great. This was about the year 940 B.C. Some of our best commentators on the Bible tell us that this disease was gout.

The disease was also well known to the ancient Greeks, who gave different names to it, according to the situation in which it occurred. Thus, in perusing their writings, we not unfrequently meet with such names as Podagra, from ποδός a foot, and γάρ a seizure, applied to the disease when the foot is affected; Oxyagra, from λεία the hand; Gonagra, from γόνος the knee; Oxyagra, from ὄξος the shoulder, and so on, the suffix always indicating the part affected.

The word "gout" appears to have been introduced into Medicine about the end of the 13th century by Radulfe, and it is probable that it owes its origin to the theory which has been prevalent in all ages, that the disease was due to some mortifl poison, which distilled into the joints drop by drop, and in different modern languages.
languages, terms expressive the same notion are employed. In France the disease is called "Goutte"; in Germany, "Gicht"; in Spain, "Cóta"; in Italy, "Gotta". The term Arthritis has sometimes been used to indicate gout, and even Bullen was in the first instance inclined to adopt it, but as arthritis would imply inflammation of all, or any of the joints, he afterwards adopted the ancient name of Podagra.

Hippocrates, who lived 350 years before the Christian Era, shows by his aphorisms, that the disease was very familiar to him. He remarks that jointy affections occur in dry weather, chiefly in spring and autumn. (Aph. Hipp. Sect. III. 16. 28), that old men are particularly liable to it (III. 31); that lambs do not suffer from it (IV. 28); that women do not have gout until the menses have stopped (IV. 29); and that young men are free from it before venery is indulged in. (IV. 30), his treatment consisted in the administration of purgatives, and in the application of cold in the affected parts, for, he says, "moderate torpor has the power of allaying pain." Celsus, who lived about the beginning of the Christian Era.
era, spoke of the beneficial effects of bleeding in some cases, freeing the patient from the disease sometimes for a year, sometimes even for life. He recommends warm or cold applications locally according to the presence or absence of inflammatory action, and specially recommends a regulated manner of living, avoidance of indulgence, and frequent exercise.

Galen, who lived in the latter half of the 2nd century, thought that gout was caused by an unnatural accumulation of matter in the part affected, the collection consisting of phlegm, bile, blood, or a mixture of these fluids, which, becoming concrete, formed tophi or gallstones. About this time, both men and women seem to have been liable to this disease, for we find Seneca remarking that the nature of women is not altered, but their manner of living; for while they come up to the men in every kind of licentiousness, they equal them in their very lowest disorders. They have, by their vices, thrown away the natural advantage of their own sex, and by putting off the woman, are doomed to suffer all the diseases peculiar to the male.
Aretaeus, a contemporary of Galen, describes very accurately the invasion of this disease. "Pain" he says, "seizes the great toe, then the forepart of the heel on which we lean, next comes into the hollow of the foot, but the ankle swells last: and they blame a wrong cause, some the friction of a new shoe, others again a long walk; another, again, a stroke, or being trod upon, but no one will of his own accord tell the true cause; and the true one appear incredible to the patient when they hear of it." He gives a very excellent description of the formation of tophaceous deposits. "Tophi also form in the joints: at first they resemble abscesses, but afterwards they get more condensed, and the humour being condensed is difficult to dissolve; at last they are converted into hard white tophi, and over the whole there are small humours like vari, and larger, but the humour is thick, white, and like hailstones." (Works of Galen: Ed. Sir H. C. A., ed. and transl. by T. Adams, L. H. D.}

Paulus Aegineta, who lived about A.D. 600, considered gouty and arthritic complaints as being of the same nature, and differing only in the part they attack and depending on a humour which fixes in some of the joints that are already in a weak state, and

Stretching...
stretching the nervous ligaments, produces pain.  
When, therefore, the humour is seated in the 
joint of the feet only, the complaint is called  
Podagra; but when the cause is diffused 
over all the joints of the body, and all the 
joints are affected, we commonly call it Arthritis.  

"The humour is different in different cases, as  
sometimes bilious, sometimes sanguineous, and some-  
times melancholy, but for the most part phlegmasious  
and crude, being produced by excess of food, indige-  
ation, and want of exercise."

St. Cyril, and other Arabian Physicians, looked  
upon the disease as being occasioned by collections  
of superfluities in some joints which is labouring  
under debility, and these superfluities are caused  
by repulsion and indigestion. In treating such af-  
flections, they relied chiefly upon purgatives,  
and some of them, as Avicenna, and Rhazes, spoke  
in high terms in favour of Hermodactylus. As to  
local application, some, as Serapion, recom-  
mand cold affusion; others again, as Avicenna  
and Rhazes, speak of burning the joint; while  
others recommend anodyne applications.
Definition of Gout.

Savagæ placed arthritis et Gout. in Clas. VII. Doli. O. I. Vogæ, and defined it as follows: "articulorum dolor spontaneus periodicus." Hennæus spoke of the disease under the same name, put it into Clas. IV. Dolorosi. O. II. Strinæus, and defined it as "articulorum dolor periodicorum, i synovia corrupta." Læger also spoke of it under the same name, placed it into his Clas. IV. O. I. Doli. Vogæ, and defined it as "articulorum dolor spontaneus periodicus a synovia corrupta." Vogæ spoke of it under the old Greek name of Podjæra, placed it in his Order of "Doloris," and defined it as "dolor rheumaticus, articulæ in pede ancæus." Gulæus spoke of it under the same name as Vogæ, but gave a much more elaborate and comprehensive definition of it, of which he was very proud. It is as follows: "Morbus hereditarius ovium, sine causa eburna evidentia, sed præsumtæ plerumque ventriculi afectiones involuiæ, pyæthia, dolor ad articulæm et plerumque pedis pollicis, et pedem et manusm juncturas, polypægnum infectæ, per intervallo reversæ, et sepæ cum ventriculi et internarum partium alternans." This definition
definition caused a great deal of discussion; every article of it has been disputed, and although it is correct enough as far as it goes, yet it does not take into consideration the important changes in the composition of the circulating fluid, which we will subsequently see has such an intimate relation with gout. Dr. Airtham has given, in his recently published work on the Science & Practice of Medicine, which, although perhaps too lengthy, gives one a good notion of what gout is. He defines it as follows:—"Fibrile gout is attended with a specific form of inflammation, favoured by congenital or hereditary constitution, associated with disorder of the digestive or the internal organs, characterised especially by an affection of the joints, and especially of the great joint of the great toe—by nocturnal exacerbations and morning remissions—by vascular plethora, and the presence of lithi acid and probably of phosphoric acid in the blood. The disease tends to repeat itself, at longer or shorter intervals, when various joints, tendon, or parts of the body are apt to become affected." Varieties of Gout. Gullen describes four distinct
distinct varieties. 

1. Regular, when the affection is confined to the joint alone.

2. Acute — with abdominal pain, in other internal parts, either with or without the expected inflammation of the joint, — or slight transient pains alternating with dyspepsia.

3. Retrocedent, when the inflammation of the joint suddenly receding is quickly followed by atony of the stomach or some other internal organ.

4. Displaced, with inflammation of some internal part, inflammation of the joints, etc., not having preceded, or having preceded and quickly disappeared.

Dr. Mason Good has three varieties of gout: —

1. Regular (a regular fit of the joint; P. larvata, diabetic, lingering, atonic gout; P. complicata, retrograde gout, misplaced gout.)

Sir Charles Semmamore divided gout into acute, chronic, and retrocedent.

Prof. Laycock in his "Epistology of Gout," places gout amongst the acute fevers, and speaks of these varieties of arthritis, fever: (i) Paroxysmal or acute gout — formation or deposit of urates in synovial membranes and derma, with neuralgia in inflammation; (ii) Rheumatic gout — formation or deposit of urates, with analogous transition.
motions of articular ligaments; and (ii) of gouty inflammation of the skin, serous cavities, and elastic tissues of viscera, such as pneumonia. In the same author's Onology of Constitutional diseases, under the head of Arthritic diseases, he speaks of (1) Acute Gout. — A pyrexic disease with production of uric acid in the synovial membranes and skin. (2) Chronic gout. — Aachexia with formation of concretions of uric acid and urinary salts, and with deathbed degeneration of the ligaments involved. (3) Talarus? Aachexia with deathbed production of uric acid in place of uric acid. A Neurosis?

In the present paper it is my intention to describe the first and third varieties noted by Prof. Laycock, that is, the phenomena of an acute, or paroxysmal attack of the disease, the character of gouty inflammation, attacking internal parts, and to describe also chronic gout, or the symptoms which gout produces in the body after it has quieted and continued to occur for any length of time.
The phenomena of a paroxysm of acute gout may be considered under three heads, or stages, each stage being marked by certain peculiar symptoms. The first stage is characterized by certain premonitory symptoms; the second stage is characterized by pain and inflammation; and the third stage is marked by the decline of the inflammatory symptoms. The occurrence of edema, of sloughamation... The division is however only arbitrary, but is convenient for purposes of description. (E) of the premonitory symptoms. These vary very much in different individuals, and sometimes are so slight as scarcely to attract notice. Seldenham thus describes them: "The fit comes on suddenly and most commonly without giving any notice, only the patient has been troubled with indigestion and crudities of the stomach some weeks before. Moreover, the body has been oppressed and puffed up with wind, which daily increases until the fit thundereth upon him; but a few days before it comes, the body are as it were dumbed and there is as if were a descent of wind through the flesh of them, with convulsive motions, and the day before..."
before the fit, the appetite is sharp, but not natural." In persons who are liable to disorder or weakness of any organ, symptoms referable to such organ are present; thus, some are troubled with palpitation, and an intermittent pulse; others are troubled with hemorhage and irritability of the bladder, and in some there is a profuse discharge from the urethra; others again are subject to cramps and itching of the skin, and who can wonder, if under such ailments, their temper should be ruffled and irritable. If subject to bronchitis, or any other chronic affection of the chest, an increase of cough and dyspnea may precede the fit. I lately heard from a gentleman, who had just recovered from a paroxysm of jact, and the only paroxysmal symptom of the fit was driving away.

II Stage. The unsuspecting victim, who has been suffering from one or other of the preceding symptoms, although they may have been so slight as not to attract his attention, goes to bed as usual, and generally falls into a sound sleep, from which he is awakened generally about two hours after midnight.
by a pain in one or other of his feet, mostly in the first joint or ball of the great toe, often accompanied by slight shivering, which gradually ceases as the pain gets worse, and is succeeded by heat. The pain grows more and more violent and intolerable. It is spoken of as a rending, crushing, wrenching pain, or a burning sensation, as if a hot iron were pressed into the joint. It is attended with great redness and misery, and is so exceedingly tender that the patient cannot bear the weight of the bedclothes upon it, or even the jar of a heavy footfall in his chamber. He is perpetually shifting his foot from place to place, and from forefoot to forefoot, in the vain search after relief. At length, about the evening, midnight, the pain ceases, sometimes gradually, sometimes so suddenly that the patient attributes the relief to his having at last found an easy position, and was being in a gentle perspiration, or as by Dr. Bowdler calls it, a breathing sweat, he falls asleep. When he awakes the next morning, he finds the part, which had been so painful, to be red, swollen, tense and shining, surrounded by more or less edema, and by oedematous veins. The same series of symptoms re-
occur, in a mitigated degree, for some days and nights; and then the disease often gets entirely off, not to return till after a long interval. As the edema subsides, and the redness fades, desquamation of the cuticle takes place, often attended with troublesome itching. At the time of the greatest febrile disturbance, the urine is generally scanty and high coloured, its acid is generally increased, often giving rise to a dark reddish-brown sediment on evaporation. Its precise nature is more particularly referred to in a subsequent part of this paper. During the severity of the pain, the abdomen is generally impaired, but after this has subsided, it may be as good as in health; nay, it is in some cases even augmented. Stitches is usually present when the inflammation is violent. The stools are for the most part constipated, and the stool pain, or of a dark green colour, and very offensive smell. Patients frequently complain of extreme cramps in the legs. When the fit is over, the patient is left in very perfect health, enjoying greater ease and alacrity in the functions of both body and mind than he has for a long time before experienced.
<table>
<thead>
<tr>
<th>Part affected</th>
<th>Left of leg</th>
<th>Other leg</th>
<th>Light of morning</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great toe</td>
<td>314</td>
<td>27</td>
<td>32</td>
<td>373</td>
</tr>
<tr>
<td>Ankle</td>
<td>36</td>
<td>11</td>
<td>19</td>
<td>66</td>
</tr>
<tr>
<td>Instep</td>
<td>25</td>
<td>6</td>
<td>7</td>
<td>38</td>
</tr>
<tr>
<td>Outer side of foot</td>
<td>10</td>
<td>1</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Knee</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>396</strong></td>
<td><strong>46</strong></td>
<td><strong>64</strong></td>
<td><strong>506</strong></td>
</tr>
</tbody>
</table>
The above description has reference to acute ethmoidal pain, as it occurs in robust and otherwise healthy individuals. When acute pain is of the asthenic type, the symptoms are somewhat different; there may be much pain and tenderness, and some amount of swelling in the part affected, but there is little heat or redness, and all febrile disturbance may be absent. There is generally some amount of edema observed, and both desquamation and itching usually follow in the same order as in the acute disorder. This form of pain is doubtless of the same nature in its essence and pathology as acute ethmoidal pain, the difference depending upon some peculiarity of the subject in which it occurs.

In considering the phenomena of a fit of pain, there are certain circumstances, or rather, I should say, certain symptoms which call for special mention. Perhaps the most striking of these is the part affected. In first attacks, the metatarsophalangeal articulation is most usually implicated, and when exceptions to this rule do occur, they are due to accidental circumstances, and are most frequently met with in those people who have acquired the disease. In 516 cases, noted by Sir...
Sir E. Sendamore, the great toe alone was the part most affected in 241 cases, and the great toe along with some other part in 373 instances. In point of frequency, the ankle is the next part most usually attacked, afterwards the instep, next the outer side of the foot, and then the knee. From this it will appear that the term podagra, as descriptive of the part affected in first attack of the disease, a term which was used by many ancient writers, and adopted by Cullen, contains the general truth, yet so much exception prevails, as to render it too limited a term even to mark the first fit. The extreme frequency of the affection first locating itself in the ball of the great toe cannot be looked upon as a mere fortuitous occurrence—a mere coincidence; and must, as we shall afterwards see, have something to do with its pathology.

(1) Tendency to periodic recurrence. This is sometimes very well marked, being sometimes punctual almost to a day in its annual visit. Sir E. Sendamore records one instance in which the fit returned for three successive years on the 12th of April.

(2) The character of the pain and inflammation. Many authors speak as if these symptoms were
in relation to each other as cause and effect, and that the pain is produced by the inflammation of the synovial structures of the joints. That the pain is due to inflammation, I admit, but I do not think that it is the pain of ordinary inflammation, but of neuralgic inflammation and Dr. Baycock insists upon this point in his Eulogy of Gowers. I have come to this conclusion from the consideration of the following particulars. (1) The pain is very intense and resembles very much the pain attending neuralgic affections in other situations. A French author writing upon gout, and attempting to give his readers an Idea of the pain, says, "Place your joint in a vice, & draw the vice up, until you can endure it no longer. That may represent rheumatism. Then give the instrument another twist, and you will obtain a notion of the joint." I have heard an individual who suffered from this disease, say that the above was not an inapt comparison. (2) The pain is different in character from that produced by an ordinary injury, or by inflammation occurring in other joints, and not due to gout. A gentleman for example, who broke his leg, and then had an attack of gout in the opposite great toe,
oe, expressed his opinion that the pain in the latter far exceeded that in the former. (3) The pain, in some instances does not appear to be so intense, although the inflammation may run high, and this has been known to occur even in first attacks.

(3) The occurrence of edema and of subsequent detachment of the cuticle is another peculiarity of gouty inflammation, when it attacks superficial structures, and is sometimes of considerable value in diagnosis. During the early part of the attack the edema is not so easily made out on account of the great tension; but when the severity of the inflammation is over, pitting can clearly be detected. With regard to the cause of edema occurring so frequently in connection with gouty, as compared with other forms of inflammation, nothing very satisfactory has as yet been made out. Dr. Harrod thinks it may be due to the presence of impurities in the blood — such as urate of soda and a small amount of uric acid, in the same way as the edema occurring in connection with renal disease, is associated with, and supposed to be due to the presence of impurities in the blood. A more probable hypothesis, I think, is, that it is due...
to some change in the innervation of the depths
of the joint, permitting their contents to escape.
The degeneration of the cubicle is a subsequent
symptom, taking place after the complete sub-
stance of the gouty paroxysm. It is often slight
and is said not to be present in all cases, but
it is a symptom which is easily overlooked un-
less specially looked for. Out of 234 cases, recorded
by Sir J. S. Geramone, it was present in 156 or 23
of the whole number. It seems to bear some rela-
tion to the amount of previous edema, and con-
sequent distension of the skin, and is frequently
preceded and accompanied by considerable eleva-
tion of the affected part. Patients frequently
complain of great heat in the part, but the ther-
ometer shows no more increase of temperature
than is found in ordinary inflammation elsewhere.
The sensation of increased heat is probably due to
2 causes. (1) To the slight increase of temperature
due to the inflammatory action. (2) To a pecu-
lar vasodilation or perversion of the Nervous function.
(3) To tendency to suppuration inflammation. This is
the most important distinction between gouty and
ordinary inflammation of the joints. Any
person seeing for the first time in his life an
attack
attack of gout in its full intensity, and possessing a little knowledge of surgery, would probably think that the inflammation must necessarily terminate in suppuration. Indeed, the first case of gout which came under my observation, I fell into this mistake. As this case made a great impression upon me, and afforded me a useful lesson, I shall give a short abstract from my case book. E. J. a female, at 33. married, no family. No hereditary taint made out. Had been a house laundress in a gentleman's family up to 3½ years ago, and had made 'pretty free with the good things of the house.' She had enjoyed pretty good general health, had suffered occasionally from digestive symptoms, never had any disturbance of the menstrual function. Three and a half years ago, she left her situation, took to drinking, and brought on a fit of gout in the left great toe. For this, she was under treatment in the Infirmary, and recovered her health perfectly. Previous to her present illness, she had suffered from some of the ordinary premonitory symptoms of gout, which she attributed to disorders of the stomach, brought on by indulgence in drink. The above history was obtained by my examination at a subsequent visit; but at first, only...
On entering the room and asking what was the matter with her, she told me she had got a sore foot, and that she had had it for two days. On asking to see it, she removed a large porridge bubble from it, and the ball of the left great toe was seen to be very red, tense, looking, and presented a peculiar shining or glistening appearance; the part was also very painful. Looking at the appearance of the part, I concluded at once that it was an inflammation brought on by some injury, and would very likely lead to suppuration. The pain and tension I thought would be relieved by a few incisions. I accordingly proposed this plan of treatment to the patient, and, amazed at my ignorance, she said, in broad Scotch, "I ye no kae what it is; but my ... foul, man." On making a little enquiry into her history, I came to the conclusion that her diagnosis was correct, and mine wrong. Healed my wound and ordered her 20 x 5 of Gin. (Keliin) to die, a simple purge immediately, and to keep the part affected boiled up in flannel. She was ordered to lie in bed, and take simple farinaceous food. In the course of a week, she was well, no suppuration followed, but a few weeks later, the right great toe became
became affected, and the attack can its usual
course, and proved amenable to the same treatment.

Apropos of this depression, I resume, and state
that in my opinion true and acute inflammation
is never followed by suppuration and when suppuration
does occur in connection with acute inflammation,
other causes are present to account for it. Sir. C.
Lindamore regards it as extremely rare; he only
met with 2 cases, and in each the result was
seriously modified by a secretion of urate of
soda, probably there had been a deposition of
urate of soda previous to the attack, and the abeyance
was caused by the irritation set up around a
foreign body. In some cases noted by Parrot the
same thing seems to have taken place. He also
says that he never saw it take place in a first
attack, nor is he aware of its ever having been
noticed to occur during the first fit.

Future Progress of the Disease

Occasionally a patient experiences but a single
attack of gout, but this rarely happens, if his
life is prolonged. The interval between the fits
and second fit varies considerably in different
persons, depending upon the patient's constitutional
and emotional tendencies, his mode of life, and the amount
of exciting or predisposing causes to which he is subject. As the disease advances, the interval between the attacks becomes less, and the disease itself, if it have first fixt upon the great toe, has a tendency to travel upwards, affecting first the ankles, then the knees, and afterwards the hands and elbows, and still later other joints of the upper and lower extremities. The early attacks are not usually followed by any very appreciable evil consequences, and as one of the effects of a severe paroxysm is to relieve the blood of the impurities which had been lurking there for some length of time, patients often apply themselves as benefited by the occurrence of the gouty fit. The truth, however, is, that every attack is attended with permanent local mischief, while although generally slight at first, may by frequent repetition be sufficient to induce serious inconvenience. There are some cases in which the formation of chalk stones occurs very shortly after the first fit, and even in two or three years increases to such an extent as to cripple the patient. Occasionally, also, acute gout will cause severe stiffness, and ankylosis even in its first attack.

Chronic
Chronic Gout.

After gout has existed in any person for a length of time, it comes to assume the character of a chronic malady, and is spoken of, and described, as chronic gout. It does not cause so much suffering as the acute disorder, yet by its longer duration and almost constant presence, it is apt to ruin the patient's health, and by the forming of chalkstone, leading to distortion and rigidity of the joints, embitter the patient's life, making him perfectly miserable, and at last killing him by a fit of apoplexy or apoplexy. This, however, is by no means a constant occurrence, for the fit, if the patient takes proper care of himself, may become rarer and rarer, and even after a lengthened period, little or no apparent injury may have resulted from them. In the less favourable class of cases, the fit become more frequent and keep regular, and instead of being annual only a month or two may elapse between the attacks, and a fresh fit may frequently come on before the disappearance of the preceding one, so that in some cases the patient is never free except for two or three
Months in summer. Sometimes it is confined to one joint, sometimes numerous articulations are involved, and not infrequently it travels from one joint to the other. This form of joint seldom continues long in one place without giving rise to some serious and permanent change of structure, either partial or complete ankylosis, or the formation of the so-called chalkstones around the articulations, or in other parts of the body. The occurrence of these so-called chalkstones, or bouchonous concretions, as they have also been called, is quite characteristic of gout, and distinguishes it from all other diseases.

These deposits were well known to the ancients and gave rise to much curious speculation. Lydenham looked upon them as fine gouty matter. Besides being found near the joint, they have noticed to occur in different and very unlikely parts of the body; these most frequent seat is the heels of the foot; and when found on the ears, they will usually be found in other situations also. They have also been noticed on the cartilages of the nose, the eyelids, and even on the penis.
<table>
<thead>
<tr>
<th>Name of Choral</th>
<th>Site from Copper and Silver</th>
<th>Carbone of Soda</th>
<th>Carbone of Ammonia</th>
<th>Ure of Chloride of Sodium</th>
<th>Phosphate of Lime</th>
<th>Annual Total</th>
<th>Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marchand</td>
<td>34.20</td>
<td>7.86</td>
<td>2.12</td>
<td>14.12</td>
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<td></td>
<td></td>
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<tr>
<td>Lehmann</td>
<td>52.12</td>
<td>—</td>
<td>1.25</td>
<td>9.34</td>
<td>4.32</td>
<td>25.49</td>
<td>9.2</td>
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If one of these topics of recent formation be punctured, a semifluid cream-like matter escapes, soluble in hot water, and giving rise on cooling to crystals of carbonate of soda. If the deposit has lasted a longer time, it will be found to be in a semisolid or solid state, but if it is removed and treated with hot water, it gives rise to similar appearances. They are in the first instance probably poured out in the form of a limpid fluid, rich in carbonate of soda, a very sparingly soluble salt, and gradually harder from absorption of the fluid portions until they acquire a very firm consistence. Their true composition was first truly demonstrated by Dr. Wollaston, and subsequent chemists have confirmed his analyses. They consist chiefly of uric acid in combination with Soda, and small quantity of Phosphate of Lime, Chloride of Sodium, and organic matter. When the deposit is slight in amount, it may cause partial or complete ankylosis without visible enlargement of the joints, or any appearance of deposit, but if the attacks of the disease are often repeated, a distinct bulging of the joint will be observed, and sometimes white spots are seen beneath.
beneath the skin, showing the approach of urate of soda to the surface. As these deposits enlarge, the skin over them becomes thinner, and the cuticle at last gives way, permitting the escape of small fragments. A very curious case is recorded by Dr. Henry Watson (in Vol. I of Medical Communications (1823)) of a man who was accustomed, when playing at cards, to chalk or score upon the table the number of the game with his gouty knuckles. Sometimes, as before mentioned, the concretions, acting as foreign bodies, set up suppurative inflammation, followed by ulceration and often proving very difficult to heal. If the deposit is very extensive, occurring in many different joints, and crippling the patient, it is usually due to some debilitating or depressing cause, or to some serious injury.

Before proceeding to describe the morbid anatomy, the etiology, and pathology of Gout, it will perhaps be better to introduce here a short account of the changes which the blood and urine undergo in this disease.
On the Condition of the Blood in Gout.

The corpuscular element is by no means necropag altered in the acute ethmic affection, but in chronic and aesthmic cases, as in any other debilating disease, they are often notably diminished. Whenever lead enters the system, it is found to produce an anaemic condition of the blood, and consequently in gout occurring in painters, hunters, and other workers in lead, it is common to find a diminution of the globules, due to the metallic impregnation and not to the gout.

The fibrin in acute cases, as in other inflammatory diseases increases in proportion to the intensity of the inflammation, but in chronic cases, it is nearly normal. When drawn from the vein, it may be coagulating, exhibit the buffy coat, or it may be both buffed and curdled, or it may present no unusual appearance.

The specific gravity of the serum has been found lower in gout than in any other disease, with the exception of albuminuria, and scrofula. This fact is not noticed in the acute disease, but only after it has lasted for a long time and is accompanied by defective nutrition, or with marked kidney disease.
The chief deviation from the normal standard of healthy blood consists in the increase of those principles which exist in health in such minute traces as to be detected with great difficulty. These principles are urea and uric acid. They have been shown to exist in healthy blood by Ströhle, Lieberkühn, and Dr. Garrod, but Dr. Garrod was, I believe, the first to demonstrate their increased quantity in the blood of gouty subjects. Dr. G. has discovered a test which will not detect uric acid as it exists in healthy blood, but if it is increased in gouty even if the increase be as slight as 0.025 g. in 100 cc. of blood, the test will detect it. Now in all cases of gout, uric acid is found in much greater amount than this in the blood.

According to Dr. Budd and Garrod, uric acid is often contained in abnormal quantities in the blood of people suffering from gout. During the inflammatory stage of gout, uric acid as the form of uric acid often, or urate of lime, has been found in the blood, the result probably of the disintegration of the uric acid which occurs at that time. It may be as well perhaps in this place to speak of
The Secretion of the Skin in Gout.

Swedesius noticed in one of his patients that the skin was every day covered with a whitish powder. Others have noticed a similar occurrence. This powder is supposed to be due to the presence of uric acid, generally in combination with Soda. It has even been alleged that uric acid itself has been found in the secretion, but this is doubtful.

Condition of the Urine in Gout.

[1] In the acute disease.

It has long been a prevalent opinion that there is always an exep of uric acid thrown out of the system by gouty individuals, and especially when suffering from the acute form of the disorder; but more recent analyses have shown that the average amount of uric acid secreted by the kidney in 24 hours, during a fit of gout, is not necessarily increased, but is frequently diminished. Bleeker (in his "Semeiotique des Urines") gives the average amount of uric acid excreted in 24 hours at 8 gns., whereas the average amount of uric acid excreted during a fit of gout was found to be 3.62 gns. (Garrod.) The error of saying that the uric acid was in excess arose no doubt from...
from the fact, that during the height of the febrile disturbance, the urinary secretion is scanty; its acidity is increased, and nearly the whole of the uric acid is thrown down, and from its tendency to attract the colouring matters of the urine, it appears greatly increased in amount, whereas, as already mentioned, it is really diminshed.

An important question here arises—Does the diminution in the daily amount excreted by the kidneys depend upon defective elimination by the kidneys, or from any diminution in the formation of this principle by the economy? That the former is the true cause is proved by the fact, that when the uric acid is greatly diminished in amount in the urine, it is very abundant in the blood (serum). During the fit, the amount eliminated by the kidneys varies; at the beginning of the fit it is usually small; if then increases in amount, then diminishes, as the fit passes off. Urine is excreted in most cases in normal amount.

Traces of albumen are not infrequent, especially as the disease advances, and deposits of urate of soda are found; although in the interval no trace of albumen can be detected.
When the patient is free from an attack, and only complaining of pain and uneasiness in the joints, the urine presents the following characters:—usually it is pale, below the average tint of healthy urine; density sometimes increased, sometimes diminished; the amount of uric, considering the patient diet is normal; the uric acid is diminished but varies greatly in amount, being often under 1 gr. in 24 hours, and rarely exceeding five gr. Albumen is also very frequently present.

In persons who have suffered from repeated attacks of gout, but who are at present free from the disease, the uric acid excreted in the 24 hours is diminished in quantity, far below the healthy standard, but the blood often contains an increased quantity. The urine is generally in normal quantity.

Microscopic examination of urine in gout in the early stage, the urine frequently present a deposit of urate of soda, either amorphous, or in masses and groups of speckle, or uric acid may be present, or the two may be combined. As the disease advances, along
the small amount of albumen usually present, tube casts have been detected, generally of a granular character, indicating that a degenerative process is going on from the lining membrane of the urinary tube, a change closely associated with the deficient secretion of some of the elements of the urine, and more especially of the uric acid. In more advanced forms of the disease, these granular casts are often replaced by waxy or fibrous casts. In the latter stages of gout, copious deposits of uric acid or urates are not often met with, and the urine becomes much brighter and more normal in appearance. The patient is apt to flatter himself that his health is going to improve, whereas it is in reality an indication that the kidneys are becoming deficient in their power of eliminating uric acid. Sometimes uric acid is excreted in an intermittent form, often absent for a while, then suddenly returning. Oxalate of lime is not unfrequently found in gout, but as it is found in connexion with so many other diseases it is of no diagnostic value.
Morbid Anatomy of Gout.

Many careful descriptions have been made of persons who have died, either during or shortly after a fit of the gout, from a fit of the gout, and of those who have died of exhaustion from the long continuance of their tormenting malady. Reports of such descriptions have been published by Morgagni, Duprez, Cruveilhier, Moms, Hume Jones, and Tarroll.

And from an examination of such reports, we may safely conclude that joint inflammation is always accompanied by the deposition in the part affected of a peculiar salt, carbonate of soda, and as the inflammation is liable to attack various tissues, so also the deposit may be found in various situations. Sometimes in severe and protracted cases, these deposits are superficial, on the cartilage of the ears, on the surface of the fibrous sheaths around the joints, and sometimes within the joints themselves. The synovial fluid of the cavities becomes thick, and now and then, of the consistency of plaster, which on examination is proved to be due to the presence of carbonate of soda.
The joints are often either partially or completely encysted by the rigidity of surrounding ligament and bone, and some of the smaller joints, especially those of the great toe, are occasionally so completely surrounded with deposit as to exhibit the appearance of being enclosed in a bony or chalky case. The cartilages of the joints that have been affected are found encrusted with carbonate of soda, but on careful examination, it will be seen that the deposit is not on the free surface of the cartilage, but is entirely interstitial in its character, and generally a thin layer of synovial membrane will be found separating it from the cavity of the joint. Cuvier states that small deposits often exist within the bone-lay as in the astragali of one case he mentions, but such an occurrence must be rare, as it has only once or twice been noticed by subsequent observers and in the analysis of the bones of gouty subjects made by Lehmann and Marchand. No mention is made of either luteous acid or any of its salts. Another fact has been noticed by Dr. Budd and it is this—that the walls of soda appear to avoid the condignity of bloodvessels, for he noticed that towards the edge of the larger cartilage
cartilages, where the bloodvessels are abundant, there is usually little deposit, but where the vessels are scanty, there the deposit is abundant. Appearance of the kidneys in gout. They are diminished in size, weighing from 2½ to 3 ounces (normal weight about 5½). They are pale and contracted, the cortical portion is shrivelled, point and streaks of white matter are seen at the edge of each pyramidal and running up in the direction of the tubuli renaefer. The amount of deposit in the kidneys, as also in the joints, vary according to the duration of the disease, and if there is no deformity of the joints, and only few small nodules on the ear, the amount of deposit in the kidneys is 1½, although it is always present. If a patient has died after having only one single fit of the gout, and an opportunity be afforded of examining the joint after death, a small deposit of urate of soda will in all likelihood be found, as in all cases of such a nature that I have read of, such an appearance is noted. The establishment of this fact is important, and points to the conclusion that gouty inflammation is always of a specific character. A microscopic examination of any of these deposits
will at once show their true character, and other crystalline salts presenting similar microscopic characters ever occur in the same situation.

Microscopic examination of the Kidney. The white points and streaks formerly referred to present microscopically the appearance of bits of soda; and the occurrence of these crystals is characteristic of gout. The contracted and atrophied organ is found sometimes in albuminuria, but in no other disease do we find the presence ofurate of soda as indicated by the white streaks. If the kidney be examined in the early stage of the disease, when there is no appreciable abnormality to the naked eye, the microscope detects an altered condition of the epithelial cells of the convoluted tubules. Upon this point, Dr. E. Johnson, who has paid much attention to renal disease, remarks: "In some tubules there is an appearance of entire cells, having been shed so as to fill the tubules and render them opaque; while in others there is an equal filling and opacity of the tubes from containing epithelium in a disintegrated condition and which has become co, ether from the crumbling..."
Crumbling of the cells while they are still attached to the basement membrane, or from the disintegration of the epithelial cells, which accumulated in the tubules after they had been shed in an entire form by a force of desquamation.

In concluding this part of the paper, I must allude to the occurrence of gouty matter in other organs, and I must here express my belief that observers should call those deposits gouty which occur in the heart, lungs, brain, simply because the person who died from the gouty, and without making any chemical or microscopic examination of these, some have not uncommonly observed that calcareous deposits, and especially those of lime, are not uncommon in these situations. Schönlein is said to have detected urate in the meninges of the brain of a gouty old gentleman, but I do not know of any similar case on record.
Anatomy of Gout.

The causes of Gout are usually considered under two heads. I. Predisposing Causes. II. Exciting Causes.

II. Of the predisposing causes of Gout. Some manifestly depend upon constitutional peculiarities, or are inherent in the individual, while others are from without or produced by external influences.

1. The hereditary predisposition as a cause of gout. Cullen believed it was purely hereditary, but abundant evidence has since been brought forward to show that the disease is occasionally acquired. Out of 522 cases collected by Sendarmine, the hereditary predisposition could be traced in 332, or in the ratio of 3:2, to 1:10, but taking those cases in which the predisposition could be considered immediate, i.e., derived from either or both parents, the ratio would be 258 to 264. Similar percentages have been noticed by other authors. But on the other hand, the guilty habit may frequently be acquired even in this country, and become manifest at an early age. It even prove inextirpable in patients who cannot trace the most remote hereditary taint. When a predisposition exists, it is said that the disease comes on earlier in life than when simple agneph.
A table illustrative of influence of age in duration of occurrence of

<table>
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<th>Occurring in life</th>
<th>No of Case</th>
<th>Occurring of 1st</th>
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<td>Under 10 yrs.</td>
<td>1</td>
<td>35-40 yrs.</td>
<td>89</td>
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<td>10-15 yrs.</td>
<td>2</td>
<td>40-45 yrs.</td>
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<td>15-20 yrs.</td>
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<td>25-30 yrs.</td>
<td>85</td>
<td>55-60 yrs.</td>
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<td>30-35 yrs.</td>
<td>105</td>
<td>60-65 yrs.</td>
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at age of 66. 2 cases.
Influence of Sex. That women are less subject to gout than men, is, I think, unquestionable, and the reason of the comparative immunity of the female sex, will perhaps be found in the fact that they are less exposed to those causes which tend to the development of the disease. When it does occur in women, it is generally hereditary and very rarely acquired.

Influence of Age. Youth enjoys almost complete immunity from gout. Cases are recorded of its occurrence before puberty, but these are rare. I only know of one case of a woman hereditarily predisposed to gout, who, at the early age of 7 years, suffered from an inflammatory attack of the big toe, and which was cured by the antiquity plan of treatment. The medical attendant pronounced the attack gouty, but as no recurrence of the attack has taken place, and the patient is now 22 years of age, the diagnosis may be considered doubtless. I shall, however, continue to watch the case for any gouty symptoms, that may become developed. The period of life most exposed to gout, as seen from the table on the opposite page copied from Sandeman's work, is from 30 to 35 years.
Influence of Debilitic Tendencis. There are two diseases which especially predispose to gouty diseases. These are the sanguine and the bilious arthritic diathesis. It is true from Dr. Laycock's work ("On Medical Observation and Research") the characters of each.

Physiognomy of the Sanguine arthritic or the other form of the arthritic diathesis. External characteristics are as follows:—Bloodvessels numerous, heart large and powerful, blood corpuscles numerous, skin over, smaller bones highly vascular, giving a flowing look to complexion. Skin fair, firm, oleaginous, penetrable. Eye blue, hair thick, not falling easily; teeth massive, all enamelled, regular, even, not decayed in advanced life. Mosse bones flattened, head symmetrical, neck long well formed, nose aquiline, or of mixed form, lower jaw massive, lips symmetrical. Form.—Figure for the most part tall, thorax broad at summit, ribs well curved; abdomen full; muscles firm, large; limbs large, erect, guilt erect, well poised. Nature active, digestion vigorous; appetite great for animal food, & alcoholic stimulii. Respiration deliberate, deep; circulation vigorous; animal heat above locomotion; aptitude for exercise or outdoor exercise. Reproductive powers active; inco-
vation abundant; the mental powers vigorous and enduring. Frequently seen after 60, it tends to pro-
some life. The predisposition to disease in the
arthritic diathesis may be general, and consist
in the retention of aed in the blood, or in its
less rapid production; or, local, and constant in
inflammation, or inflammatory irritation of the
products of the softer layer of the embryo, ending in
calcification or long change. When the retention
of the aed is associated with a depraved blood-
feresis, or with vesical disease, the arthritic
cachexia is developed. The diathesis is modified
by age and sex. It is shown most purely and
distinctly when nutrition is most active, and
vesical disease at a minimum. In male children,
by lithiasis; by gout; vesical diseases, principally
constituent; and by an abnormal appetite for animal
food; in male children about puberty by gouty
hemorrhages, and functional cardiac disorder. In
middle age; by gout; by hepatic and cardiac con-
gestion; by hemorrhoids; and often by chronic
congestion of cheeks and nose.
The arthritic predispositions in women have
been well studied, and little is known of the arthritic diathesis and cachexia, as it

O'Connor
occur in women. They predispose at puberty to hysteria in abnormal forms, to varied uraemia, nephritis, phlebitis, acute cutaneous inflammation, and utricarious urinary and menstrual discharges.

The arthritic cachexia in the female predisposes to chronic skin diseases, especially desquamative chronic erythema of cheeks and nose, to chronic inflammation of uterine cervix, and in the decline of life to nodose fingers, joints, & rheumatic gout. Physiognomy of the bilious asthenic asthmatic diathesis. Blood corpuscles few, blood corpuscles away, or below par (oligamia); no capillary development over malar bones; complexion tending to olive, hair dirty, teeth small, features small, limbs small, tendency to emaciation; appetite feeble; circulation feeble; caloricic powers defective; hepatic functions imperfect; predisposition to gout at an early age, and in the females of a family as well as the males, to asthma, to tubercular hemophysics at puberty, to rubcarv, to atomic gout, to nephritis, and to chronic putrefaction at more advanced ages. Sometimes, this diathesis is complicated, and while still of the asthmatic type is characterized by a tendency to tubercular deposit, or else by fatty rather than by albuminous or calcaeous change in the tissues.
Influence of fermented and distilled liquors.

The use of alcoholic liquors is one of the most powerful of all the predisposing causes of the disease. There is a considerable difference in the power of each in producing the disease, and that this varying power does not depend upon the amount of spirit they contain, is proved by the fact that distilled spirits, such as whisky, when intemperately appear to exert little or no influence in the production of the disease, whereas, with wines, sherry, ale, and porto, the reverse holds good. Van Swieten says that gout was little known in Holland until wine was introduced as a substitute for beer, and Linnæus, from his observation on the Laplanders, concluded that wine was almost the sole producer of gout, seeing that they (the Laplanders) partake plentifully of malt liquors, and among them gout was unknown.

Although malt liquors are not so potent as wines in the production of gout, they are by no means temperate, and many cases are on record of men consuming large quantities of porter and strong beer, and in whom no hereditary predisposition could be traced, becoming the subject of gout. The wines ordinarily in use in this country, as port, sherry, and other stronger varieties, appear to be the most
most potent, but we must also remember that those who are in the position to procure large quantities of wine, are also in a position to procure other delicacies, and especially the licorice, of which circumstances greatly favour the development of the disease. The lighter French wines, although capable of exciting a paroxysm in a gouty patient, have comparative little power in inducing a predisposition to the disease. Stout and porter rank next to wine in their power of producing the disease, and consequently gout is not uncommon in men employed in large breweries. Strong ales and even bitter beer exert a similar influence. In some of the countries in the South of England, where cider is much used, gout is very prevalent, and cider has got the credit of producing it. I do not think it is entitled to this credit for Dr. Wood remarks that in New England, where cider is much used, gout is comparatively rare. This, I think, more likely to be due to the cider being impregnated with lead by being kept in leaden tanks. That the cider is sometimes impregnated with lead to such an extent as to prove injurious is well known, for only a few weeks ago, I noticed, in an English paper, that
Several members of one family in Denmark had suffered from the symptoms of lead poisoning after partaking freely of cider. Although I believe that cider has no power as a predisposing cause of gout, yet I believe it is a very powerful trigger of a paroxysm in a gouty subject. The question now arises: Why do different alcoholic stimulants produce different degrees of gouty in inducing gout? The influence they possess certainly bears no direct ratio to the amount of alcohol they contain. Is there any difference in their composition to account for this? All the wines are more acid than malt liquors, but the presence of acidity won't at all account for it. For port and sherry, which possess considerable power in inducing gout, are among the least acid wines. No direct ratio can be established between the presence of sugar and the predisposing power of any alcoholic beverage. Little is known respecting the saline matters of wine, or other liquors. None of the known principles contained in these liquors can as yet be proved to impart to the alcohol its predisposing influence, for wines, the least acid, & liquors the least sweet, are often the most dangerous.
Influence of strict of animal food and defective exercise. Allen remarked that gout seldom attacked those engaged in constant bodily labour, or those who live much upon vegetable diet, but on the other hand, the disease is far from being infrequent in those who partake of highly seasoned dishes, and who consume a quantity of nutrient far above the requirements of the system. This may be explained by the fact (established by Lehmans from observation on himself) that a large excess of highly seasoned food tends greatly to an increased secretion of uric acid, which we have previously been known as bearing a close relation to the development of gout. Excess of food may also act by impairing the digestive and assimilative functions, producing dyspepsia, and observation has shown that that form of dyspepsia, which tends most to the development of the gouty diathesis, is accompanied by an increased elimination of uric acid.

Influence of severe study and mental anxiety. Severe and prolonged study, almost necessarily conjoined with a sedentary life, tends greatly to lower the tone of the energies, especially of the urinary, at the same time.
time that it impairs the power of digestion, and hence ensues not only a defective secretion of some of the principle of the urine, but likewise their intestinal formation. Many talented men, by their severe mental labours have not only caused the development of the diathesis in themselves, but oftentimes, caused a recurrence of the disease. Sydenham wisely remarks for the special comfort of himself and other suffering from the disease, and but moderately punished with money and the grace of the Mind, "that so noble and so tried, great king, and potentate, general of armies, and admiral of fleets, Philosophers and many other such as these, that the disease kills more rich than poor, more wise than fools." And in the present day, Cabinet ministers and politicians, and many others, distinguished by their talents and abilities, application frequently become martyrs to this disease. On the other hand, deplored and slow as sorrow, chap. 2. have been known to expunge the guilty habit.

The influence of mineral spirits has at one time much interested upon, but their real influence is often difficult to define, inasmuch as they are frequently associated with immoderate indulgence in intoxicating liquors. Hence the grotes-
is, by the poet, eulogized daughter of Bacchus and Venus.

Influence of climate and season. There are so many influences invariably connected with climate, that it is very difficult to separate the one from the other, to determine their relative influence. But is, however, undoubtedly less prevalent in hot than in temperate climate. In the interior of Africa, it is according to Dr Livingstone, unknown. I am told by students from India that it is unknown there except among European residents. It is less frequent in Italy than in France, and in the latter country, it is less prevalent than in England. But whether this is due to climatic influence, or not, would be difficult to determine, inasmuch as the inhabitants of these different countries are exposed to the predisposing causes in various degrees. For example, we know that in Rome under the Republican government, syphilis was little known, but under the Empire, when luxury and indolence prevailed, it became extremely common.

The influence of season is often shown at an early period of the disease, in determining the period of the attack rather than in developing the malady. Epidemiologically this is explained by the fact that the diseases have a preference for hot weather.
that during the end of January or beginning of February the disease usually breaks out and sub-
sequent writers have borne testimony to the correctness of this statement. During the summer months, forty
patients, as a rule, suffer relief from the disease, although
remarkable exceptions to this rule frequently occur.

10. Influence of lead in producing gout. Dr. Garrod was
the first to notice and make public the frequency
XXXVI. 1854). At least one in four of the gouty patients
who came under his care, had at one time of their
lives suffered from some of the effects of lead
in the system. Seeing this to be the case, he was led
to make some experiments from which it would appear
that lead has the power of diminishing the secreting
power of the kidneys for uric acid, and conceivably
there is an increase of that substance in the blood.
But an increased amount of uric acid in the blood
is not found in all cases of lead poisoning. After the
administration of lead medicinally, the uric acid
in the urine is frequently diminished one half.

Exciting Causes of Gout. Several of the predisposing
causes, will if increased in intensity act in immediately
eliciting a fit of the gout. The amount of an exciting
caloric
Cause necessary to produce an attack depends greatly upon the proneness of the patient's system to take on gouty action, and we frequently witness attacks of gout apparently produced in one patient by a feat of irregularity which in another would be productive of no inconvenience; as, e.g., exposure to cold, mental emotions &c.

(1) Alcoholic Beverages as exciting causes.
The drinking of an unusually large amount of an alcoholic fluid is frequently the cause of the attack, but I have known an attack brought on in a gouty individual by drinking a single glass of wine; on another occasion the fit appeared after drinking a glass of strong ale. Some patients may drink certain kinds of wine without getting a fit, whilst others, if they even take in moderation of the same wines are unequally affected. Some suffer from taking champagne, others from port, and others again from strong beer.

(2) Diphteria. Patients frequently attribute their attacks to certain article of diet, inducing disorder of the digestive organs. Highly seasoned dishes, different varieties of alcoholic beverages taken at dinner, by inducing indigestion, often hasten on a gouty paroxysm.

(3) Cold and moisture although incapable of inducing a gouty
a gouty diathesis, act powerfully as exciting causes of the paroxysm. The local application of cold, as getting the feet wet, will often be sufficient to excite a gouty paroxysm. Cold probably acts by arresting the elevation from the skin, checking the escape of acid usually thus eliminated, and thus rendering the blood less alkaline. Or, cold may sometimes act by its depressing influence on the nervous system.

(4) Severe mental or bodily labour, or sudden depression from any cause by lowering the tone of the nervous system, will produce a fit. Sitting up late at night, especially when combined with severe study, will often occasion an attack. Anxiety of the mind, fits of anger or may occasion it.

Great bodily fatigue may be the cause of it, as may also a blow or injury to the part usually affected, or if the patient has not previously suffered, the injury often determines the part affected. Hemorrhage by inducing depression may be the cause of a fit. The depression of the spirit after an exhausting disease is frequently the cause. Dullness of all causes, which lead either to an increased formation of acidity, and its accumulation in the blood, or the suppression of the natural acid secretion of the skin, and all causes depressing the nervous energy, and in reducing digestive operation, have a powerful influence in exciting an attack of gout.
Pathology of Gout.

The ancient Physicians looked upon gout as being produced by some morbid condition of the Blood; but different views were held regarding the exact alteration in the condition of that fluid, some saying it was due to the presence of bile, others to phlegm, and others to a mixture of these fluids. Sophi were regarded as being due to their eruption and concretion. The ancient humoral pathology was strongly opposed by Bullein. He argued very able, and conclusively, enough with all that was then known of the disease, against the doctrine of a morbid poison in the blood, and stated his own belief that gout is a disease of the whole system, or depends upon a certain general constitution, and state of the body. But as the general state of the system depends mainly upon its primary moving powers, therefore the gout may be supposed to be principally an affection of these, and as the primary moving power are lodged in the nervous system, gout is manifestly an affection of the nervous system. His great argument against the humoral pathology was that no morbid poison could be shown to exist, and his other arguments had reference to this. As a morbid poison has
has been detected in the blood of gouty patients it will be unnecessary to refute at greater length his arguments.

Horace Wemyss. In 1793, Murray Forbes published a work upon Gout and Cyst, asserting that lithurine (since called lithic or uric acid) must be present in the blood in gout, as it was found deposited in various parts of the body, although he confessed his inability to find it in the fluid. He thought that uric acid consisted of free uric acid and its deposition was caused by the admission into the economy of some other fixed acid. The latter part of this theory was proved to be erroneous by the publication of Dr. Wollaston's analyses. About this time, Berthelot advanced a similar opinion with regard to the presence of phosphoric acid in the blood. He noticed that phosphoric acid is more sparing in the urine of gouty than of rheumatic subjects. Notwithstanding the publication of these theories, and the discovery of Wollaston, the doctrine of Cullen continued to hold their sway in a modified form, and were for a long time supported by Geddesmore, Barlow, and many others. Dr. Gallinans' theory is somewhat different. He considers venous congestion as the first condition
Essential to the formation of the gouty diathesis.
He also says "There is a general state of vascular plethora of the great chyluseous organs, and constant presence of varicosed veins. Flows arising that the heart is oppressed with a flood of returning venous blood, associated with an improper condition of this fluid, from the non-elimination of urine and urine, and probably, of bilious constituents, which cause the symptoms of disordered function of this organ.

But the greatest 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, thus, 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, the vessel gives way, and a true hemolysis is occasioned in the part affected. If the rupture takes place in a minute capillary, carrying the serous portion of the blood only, death is the consequence; but if the vessel be one carrying red blood, a true ecchymosis is formed." He adds, "This view of a fit of gout may strike from its novelty, but I am thoroughly convinced from long observation of the disease.
disease, that I have given the true rationale.

He believes the pain to be due to distended capillaries pressing upon the extreme and tender fibres of the nerves. Having briefly stated the hypothesis of Dr. Lambret, it is now my duty to bring forward some argument which to my mind requires the whole theory. With regard to the vasomotor action of the chylephrenic vessels, which Dr. G. says is always present, I admit that this state of vascular action is generally present in robust gouty patients, but in persons not robust, or persons early attacked with the disease, and in females, this state seldom, if ever, exists; at least no external manifestations of it are visible. Again, if congestion of the digestive organs be intimately connected with, and even a necessary antecedent of the gouty paroxysm, how does it happen that in these, in which congestion of these organs is so prominent a symptom, the sufferers are not more frequently afflicted with hemorhage, which he thinks is the true rationale? He does not say whether he has ever seen
The true
cause of gout is alluded to, and as far
as the serum of uric acid is concerned, this occurs
in other affections besides gout, and may be ac-
counted for without implying the very questionable
evidence of vasa serena.

Before the discovery of an excretory system for
uric acid in the urine of gouty people, it was conjectured that
it existed there and formed the true matter
oncib. In opposition to the opinions of Boullee,
Wollaston, Parkinson, Sir E. Home, Lt. H. Holland,
this country, and Enraville's & R. Pech in France,
advocated the urinary pathology.

The next theory of gout that I have to speak of, and
the one now generally held in the present day, is
that known as Dr. Garrard's theory. In his capacity
of physician to a large London Hospital, he has
had large opportunities of studying this disease, and
has brought out one of the most valuable, and at the
same time most scientific, works on the subject of gout
in the English language. From his various observations
and experiments, he concludes that gout appears partly
to depend upon loss of power, temporary or permanent
of the uric acid-storing function of the kidney; the
removal symptoms, and those also which constitute
the paroxysms, arising from an excess of the acid in the urine.
and from the effort to expel the muriatic matter from the system. Any undue formation of this acid would favour the occurrence of the disease, and hence the connection between gout and the acid gravel and calculi; and also the influence of high living, wine, pork, want of exercise & in inducing it.

It appears also probable that, as in albuminuria, the usual secretory function being chiefly impaired, we find a vicarious discharge of this body in the renal secretion, so in gout the urine acid-secreting function being defective, chalk-like deposits are produced, by a similar vicarious discharge of urate of soda. This hypothesis also explains the hereditary nature of the affection, and also its frequent occurrence in lowest degrees of the social scale.

We can understand that the peculiarity of the kidney may be transmitted, and likewise when the function in question is permanently impaired, it will not require an excessive formation of this acid to cause it accumulation in the blood. These views of Dr. Germain were first made public in 1825 in the Melbourne Medical Journal, and since that time, he has added confirmatory evidence of their correctness derived from many experiments & he has negatived since that time. From what stated in a previous part of this paper, it will be see that an uric acid, case acid is invariably present in the blood.
Blood, in abnormal quantities, in the form of brine of soda, both prior to and at the period of the seizure, and
is central to its production; but it has also been found
that the acid may exist largely in the blood without the
development of inflammatory symptoms, e.g., in
cases of lead poisoning. Its more precise, therefore, does not
explain the occurrence of the gouty paroxysm. Gouty inflammation
says Dr. Garrod, is always accompanied with an intense
deposit of brine of soda, or a crystalline form, in the
inflamed part. This deposit may be looked upon as the
cause and not the effect of the gouty inflammation.
In proof of this, he says that when tissues little liable to
take an inflammatory action, become infiltrated with
brine of soda, but slight vascular disturbance is produced,
this is especially the case with the subcutaneous layer of the ear;
and although we now and then meet with instances such
of the formation of the little nodules, who experience in
fact a gouty felt in the ear, yet in most instances, at
least where has not been directed to the part so slight has the
inflammation caused by the effusion. The inflam-
matory tends to the destruction of brine of soda,
in the salt, and consequently of the system generally.
The affection of the kidneys is at first functional
but subsequently becomes structural. The premonitory
symptoms of a paroxysm, and also many gouty
symptoms.
symptoms to which gouty subjects are liable, are probably due to an impure state of the blood. The causes which predispose to gout, independently of those connected with individual peculiarity, are either such as lead to an increased formation of uric acid in the system, or which lead to its retention in the blood. And the causes which induce a gouty fit, are those which induce a less alkaline condition of the blood, or which greatly augments the formation of uric acid, as e.g., aggravated dyspepsia, or such as temporarily check the urine acid-producing function of the kidneys, as e.g., mental shocks, and acute fevers. With regard to the diminution of the alkalinity of the blood, causing the deposition of urate of soda, and thus exciting gouty inflammation, any one may easily satisfy himself by experiment; for example, take a solution of common phosphates of soda, which is the principle that gives its alkalinity to the blood, and add to some uric acid in it, but only in such an extent as to cause the fluid remaining alkaline. This diminishes the alkalinity by the further addition of uric acid, and you will cause the precipitate of urate of soda. On this view we can reconcile certain apparent discrepancies in the class of exciting causes, e.g., some of them are of the same nature as those which predispose to gout, while others, however long their action be continued, will fail to excite the disease.
Before concluding the part of the paper, I must say a few words in answer to the question, 'Why does gouty inflammation in its earlier attacks usually select the ball of the great toe? And why in old standing cases, are the parts affected more numerous than in early attacks?' The feet, say Strickland, 'are the genuine seat of the peevish matter, which may settle itself upon other parts; but in that case it is plain that either the progress of the distemper is invincible, or the patient strength from repeated attacks is impaired.' Van Swieten says that 'considering the difficulty with which the liquids pass through these parts, we may frame an improbable notion why the gout is observed for the most part to begin in the feet: for these suffer a very great pressure upon the parts about the heel, having the weight of the whole body to sustain; and being for some time from the source of circulatory motion, the head, they are subject to cold and over strain, and the liquids that are brought down to them through the arteries, by course of circulation ascending through the veins again, have the general effort of gravitation to overcome.' In addition to the remarks of Van Swieten, which are in great part true, I have only to say that the great toe contains in abundance the tissues, particularly prone to be affected by tissues, either of little vascularity, or tissues nourished altogether independently of blood-vessels. The muscles...
Phalangeal joint is also much subject to injury, and in many diseases, it bears more or less trace of injury. Again, we know that certain poisons are as it were attracted to particular parts, and the external phenomena displayed by their action are usually symmetrical in form, as exemplified in many syphilitic skin diseases. As the disease becomes engrafted upon the system, the amount of urate of soda in the blood is necessarily augmented, and as the cartilages and ligaments in the part first affected become incrustated with deposits so that no further deposit can take place there.

**Diagnosis of Gout.**

Great pains have been taken, especially by Webster, to lay down the distinguishing characters between gout and rheumatism. In their typical forms, the two diseases can scarcely be confounded with each other. The main points of distinction are principally as follows:

**Gout is strongly hereditary.** Rheumatism is much less so; distinctly so;—as frequent in females; more frequent in young, and before middle age, occurs in weak, not caused by sine, excited by cold and damp. Large or more of smaller joints; especially in the ankles. Physically, gouty joints, usually many, more affected.
<table>
<thead>
<tr>
<th>Gout</th>
<th>Rheumatism</th>
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<tbody>
<tr>
<td>Great pain, edema and the</td>
<td>Pain in joints, seldom edema</td>
</tr>
<tr>
<td>quantitation of uric acid. Does</td>
<td>Often causes acute peri-</td>
</tr>
<tr>
<td>not induce acute inflammation of</td>
<td>and endo-carditis</td>
</tr>
<tr>
<td>the structure of the heart</td>
<td></td>
</tr>
<tr>
<td>Febrile disturbance moderate</td>
<td></td>
</tr>
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<td>Paroxysms periodic in</td>
<td></td>
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<tr>
<td>Early attack, Early attack</td>
<td></td>
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<td>lasting but a week or 10 days</td>
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<td>Blood rich in uric acid</td>
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<td>Constant deposition of uric</td>
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<tr>
<td>acid of uric acid and ligaments</td>
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<tr>
<td>Often leads to kidney</td>
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<td>disease. After produc</td>
<td></td>
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<tr>
<td>Chalk stone, &amp;c.</td>
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Prognosis of Gout.

Is Gout a curable disease? is a question that is often asked, and as one which is not so easily answered. It has long been a prevalent opinion both among the public, and even among the profession that gout is an incurable disease, and that a fit of the disorder is essential to cure the system of its impurities which have led to its productive. But I have before stated that gouty...
attacks, although they may in a certain degree be regarded as curative, are also destructive, and that a depression of the morbid principle, invariably occurs in the inflamed joint, which must henceforth act in some degree as a foreign matter, and frequently lead to ulceration ensuing. As regards the acute fits, it is quite as controllable, and so much under the influence of remedies as any other inflammatory affection. In the more chronic form of the disease, much relief may be afforded to the patient, although little hope of ultimate cure, especially if the joints are much crippled. If the crippling is to any great extent, and the pain attending the disease great, the patient's life is rendered extremely miserable, and is often worn out by a partial atrophy. When it attacks the extremities, it is not fatal; it is only fatal when it attacks some internal organ.

Treatment of Gout

In this case, I think it is most essential to consider the treatment appropriate to the acute disease, secondly, the treatment of the chronic disease, and lastly, the treatment of the interval between the attacks. But gout being a specific inflammation, it must be remembered that each particular case requires a particular plan of treatment.
Treatment of Acute Gout.

Bearing in mind that the inflammation is due to a particular state of the whole system, capable of modifying the various symptoms that they present themselves, we to a great extent follow the rules which apply to the treatment of ordinary inflammation of equal intensity. Enforce the anti-cholactic regimen, except perhaps under peculiar circumstances, but as the appetite is usually keen, this is sometimes difficult to do. The digestive functions are mostly weakened: and if the patient does indulge in animal food, he augments the impurity of the blood, and thus keeps up the febrile state of the system. For the first two days, until in fact the disease has shown a tendency to abate, the patient should be confined to a diet consisting of little more than diuretic and farinaeous food. When the febrile disturbance has abated, and the local affection has become distinctly relieved, a return to a more nutritious diet arises—anything likely to cause indigestion: beefsteak at first, and then white fish, afterwards fowl or tender meat, not giving more than is absolutely required for the nutrition of the body. Malt liquors are to be prohibited. Of alcoholic stimulants, really necessary to promote digestion, a very small quantity of
of brandy and water, or of wine may be allowed, watching carefully its effect. The patient should be kept in bed for the first day or two, until the severity of the febrile disturbance is past. The medicinal treatment may be simply constitutional, or both general and local.

The constitutional treatment should be directed towards the diminution of the inflammatory, and febrile disturbance, and the restoration of the blood to a healthy condition. The first of these indications is assisted by giving

1) Purgatives. These remedies act without by exciting functions previously dormant, as e.g. castor oil, scrup, rhubarb, etc., and not by exciting any specific effect upon the affections of the joints, or upon the state of the blood. If given too soon to cause marked depurative of the system, they are very injurious, producing the disease more liable to recur, and assume a chronic and often chronic form. The amount of purgation must be regulated in each particular case, as must also the kind of purgative used. For example, if only constipation persist, simple laxatives are best, as magnesia, abbott in the form of Pilus Aloe, or Pil. Rhei co., or Pet. Rhei co., colostrum pill, or Blackstrap. If the liver be in fault, medicines should be given which are known to act upon the liver.
such as three pills, either alone or combined with digitatum
or Rhubarb at night and followed in the morning by a
black draught. Saline purges occasionally is good in
strong and plectoric habits.

2) Emetics may afford relief if the stomach should
happen to be greatly loaded and oppressed at the
commencement of the fit, but of course exists no influence
on the progress of an attack.

3) Mercuroids do not give any specific control over
inflammation, and should only be used as purgatives to
relieve hepatic congestion. In advanced cases, they should
be avoided on account of the kidney complication, as
they are very apt to produce salivation under such circumstances.

4) Diuretics and Diaphoretics. The secretion of the urine
being usually scanty, the action of the kidney may be
promoted by the acetate, nitrate, or Bicarbonate of Potash
salts which also act by rendering the blood more alkaline
and thus there is a double indication for their use. When the
skin is hot and dry, and it is desirable to induce diaphoresis,
the hot air bath may be tried, or the acetate of ammonia,
or sponging the body with water, or vinegar and water.

5) Anodynes and Narcotics. Opium often specifically relieves
the pain, yet when given in the beginning of the gouty paroxysm
Cullen says that it causes it to return with greater violence
hence we must if possible give relief by other means.
If opium is really required, it may be given either in the solid form, in the form of tincture, or in the form of Petroleum Pneumaticum & Dye. Other modifica, such as Perunica or Belladonna, may be useful, where form some peculiar idiosyncrasy, opium is antidotal and they possess an additional advantage: they do not diminish the eczemas.

(6) Bloodletting can neither remove the impurity of the blood nor the defect which has taken place in the inflamed tissue. It is therefore of no use except to relieve general or local distension.

(7) Colchicum Autunnale. That this drug possesses a great control over gouty inflammation is undoubted, and is admitted by most physicians of the present day. Some say it is as much a specific for gout, as Cinchona bark is for ague. It is in this drug that the quick remedies, Eau Medicinale D'Knox, Wilson Tincture, and Reynolds' specific, owe their popularity. Much discussion has arisen regarding its mode of action. That its effect does not depend upon its purgative action is proved by the fact that it is often useful without producing any purgative action. That its beneficial influence does not depend upon its power of a vascular sedative is proved by the fact that it is not of equal service in other than gouty inflammations. Dr. Christie found that
Under its administration for 2 days, the quantity of urine was nearly doubled, as the quantity of urine excreted, but no reference was had to the quantity of urine passed in the 24 hours, and although a given sample was richer in urea than acid, no proof was afforded that the total daily elimination was augmented. Prof. Cheirico of Heidelberg thinks that it acts by increasing the secretion of urine acid by the kidney, while Dr. Gravé regards the power of colchicum codie to its depurating the formation in the system, and act to any increased elimination by the kidneys. Dr. Garrod concludes from his experiments that it does not act by increasing the urea acid-secretory function of the kidney, and if long continued, excites a contrary effect, he does not think it has any influence upon the secretion of the urine, or the remaining solid portion of the urine, as far as acting as a diuretic, frequently diminishes the quantity of urine. Some have said that it acts upon the nervous system as a sedative, but this emulsion is of too general a character, and applies to many other drugs besides. At the present time, I do not know of any theory which satisfactorily explains the mode of action of colchicum, although I think that further investigation will prove it to be through the agency of the nervous system. The urine is the preparation.
preparation generally used, and many prefer giving a full dose at first, say 3/4 to 1/2, and follow up by smaller doses, as from \( \frac{1}{16} \) to \( \frac{1}{8} \) from three times a day, carefully watching to effect upon the pulse, and never allowing sickness or delirium to come on. After taking it for some time, patients seem to acquire a tolerance of it, hence we must regulate the dose. Other preparations of the drug may be given for the active principle Parallelo the whole plant. The New Pharmacopoeia contains the Extract, the acetic Extract, and the tincture, but other preparations have been much advocated, as the Tincture of the Seeds, and the Ammoniated tincture.

(8) Veratum album, which belongs to the same natural family as Colchicum (Colchicaceae), has been proposed as a remedy for gout, but is, I believe, entirely useless.

Local Treatment of Gout.

Leeches have often been tried, but experience does not sanction their employment; for sometimes their application has been followed by a transference of the inflammation, either to some other joint, or to an internal organ, sometimes by the occurrence of a diffuse form of inflammation.

2. Blister
Blister. Dr. Todd has advocated the use of small blisters, about the size of a sixpenny piece, and allowing the blistered surface to heal immediately. They seem to be most useful in cases of arthritis joint, when the inflammation has a tendency to linger in the articulation and cause liquid effusion. (3) The moxa was used by Dr. Temple, and was of great use in many cases. (4) Hot fomentations, and poultices, or cooled cotton, or soft new flannel, applied to the joint, are very good. (5) Evaporating lotions were used by Sundamore. His favourite lotion consisted of a mixture of one part of spirits, and two parts of camphor water, heated to from 75° to 85°, and applied by means of linen cap. (6) Other local applications. When pain is very intense, preparations of opium, belladonna, and acetate have been used. Some physicians looking upon gout as a local afebrile, have tried local applications of cold, by dipping the part into cold water, but various results sometimes follow such applications, and hence they are now given up entirely. The celebrated cure for gout, Dr. Mason Dodd, died, I believe, from putting his foot into cold water while suffering from this disease.
Treatment of Chronic Gout

As in the acute disease, our treatment depends upon the idiosyncrasies of our patients. So in chronic gout, it becomes very necessary to attend to these circumstances, as differences in this respect modify very materially our treatment.

As in syphilis, many have attributed many of its internal manifestations to the effect of Mercury on the system: so in gout, many of the symptoms of colchicum have attributed to the many of the chronic forms of this disorder. But cases have been observed over and over again of great pain in its chronic stage, without any medicine ever having been given.

Medicinal Treatment of Chronic Gout. This must have special reference to the condition of the blood, and be directed towards removing the impurities which this fluid contains. This object is best affected by attending to the various symptoms, and by attending to the causes which tend to the production of the disease. The inflammatory state of the joints is best treated by small doses of colchicum, but as the inflammatory condition of the joints may often be kept up by old deposits in or about the joints, other remedies are required, and in these cases Sulphate of Potassium and Eau de Javelle are most useful. The Sodide of Potash seems particularly useful in removing the remains of...
of the inflammation. The dose need not be large, from 0.5 to 1 gr. twice or thrice daily. Guaiacum is most useful when the circulation in the affected part is longest, and relieved by the application of warm water. There is no danger in its administration for any of its ill effects, as nausea, or purging are soon enough noticed by the patient. It may be given in the form of Muttera Guaiaci, or of the Ammoniated Tincture. When active inflammation, symptoms are present, its use is contra-indicated. Other stimulant remedies, as mezereum and opium, are sometimes useful. Our next object is to endeavour to restore the blood to a state of purity. The causes of this impurity, as before mentioned, are either to induce formation from some form of dyspepsia, or mal-absorption, or its deficient excretion from the renal organs. Usually, these two causes are combined, something one is more prominent, sometimes the other. Our treatment must accordingly vary. The undue formation of urea acid will be found to be specially influenced by diet and regimen, whereas the deficient excretion is more under the influence of remedies, and these remedies must be steadily, and perseveringly administered, and merely taken by the dose. Those remedies which seem best adapted
for purifying the blood are such as increase the activity of the secreting organs, more especially the kidney, consequently alkalies and salines are peculiarly called for. Magnesia and Lime, as well as the fixed alkalies, have been largely used, and steady perseverence in their use appears in some cases to have ward off an attack for some time. The salts of Potash, the Bicarbonate, the Acetate, and the Citrate are most usually given, for in addition to their greater action upon the kidneys, they appear to have a greater solvent power for Uric acid than the corresponding salts of Soda. Many recommend small doses of salines, largely diluted with water, for patient suffering from chronic gout, but who present no acute symptoms. They are best given before food, as they are then most readily absorbed. Gartner says administered they are more liable to produce dyspepsia. The function of the skin is imperfectly performed, the salts of Ammonia are indicated. D. Birkles, of Ballymena, and others have found the Phosphate most useful. D. G. Arnold speaks very highly of the salts of Lithium. They appear to be more active than the salts of Potash in dissolving gritty deposits from the cartilage. Their alkalineforming power is of the highest order, their solubility power for Uric acid and Urate far greater than any other.
agent, their local influence is slight, and their use does not appear to be attended with any injurious consequence.

The preparation which Dr. Garrod uses is the extract, in the dose of from one to four grains two or three times daily. The great objection to their use is their expense. A decoction of the Leaves of Fraxinus Gelleri or common ash have attracted some notice in the treatment of gout. Dr. Pouget considers it a specific, and Dr. Moncorps speaks favourably of the preparation. Dr. Garrod found it of little benefit in the acute disease, but of considerable value in chronic gout. An ounce of the extract is boiled for 10 or 15 minutes, in 3/4 of a glass of water, and taken in divided doses during the day.

Vomiting and Stomachic. If there is a want of tone in the stomach, better infusions are indicated, such as Chamomile, Chicoria, and Calumba, with small doses of Tincture of Capericum, to give a little increased stimulus. If headache combines it with an alkaline salt, as the Dicarbonato of Potash, assists this, as this is that which the well-known Powdred Gout is so much as its celebrity. The ancient were in the habit of using better drugs very analogous to the above. Syphilis gives a very list of plants which may be used for the same purpose. Preparations of Cinchona bark have
have been greatly loaded by some, whilst they have been as much denounced by others. Dr. Ranke states that sulphate of Quina diminishes the secretion of urine and in the urine, and the diminution must depend either upon its delaying the formation of this acid, or checking its excretion. If the former should prove true, we should expect quinine to be of special service in gout, whilst if the latter should prove the true explanation, quinine and bark would be injurious. These observations have not been confirmed. In three cases of gout under there is a great want of tone, along with albumen, he should expect to find the careful exhibiion of some preparation of iron to be of service, and that resolution should be selected, which is least irritating to the stomach, such as the Ferrous Redactum, Salicylate Carbonate, or the Citrate. For purposes of mineral water, some of Schwabach, and Demont would probably do.

Local Treatment of Chronic Gout. False ideas of the composition of quinine cures, at one time led to the supposition of acid lozenges, but alkaline lozenges were in much greater favour. Lozenges containing the salts of Potash are most in favour, because we now know they possess a greater solvent power for uric acid than the salt of Sir J. Seccomine used to prescribe. Addition of Potash, mixed
mixed with an equal quantity of recently prepared Almond milk, and applied by means of friction, two or three times a day. In some cases of recent depurin, the congestion becomes gradually abated under this treatment. In cases of older standing, although much less could be accomplished, head was still steady perseverance in this plan of treatment.

For the edema of the extremities, which is an uncommon sequel of gout, the hot-air bath, friction with Camphorated oil, and elevation of the limb are usually sufficient. If stiffness of any joint be the result of the fit, friction and passive motion should be cautiously tried. Gentle means continued over a lengthened period, are more likely to be attended with success than the harsh use of medicinal appliances. Douches baths, or the mineral baths of Villers, Wiesbaden, and Rastow have been found useful. If it should be thought desirable to remove any of the small nodules which form on the ear, this may be easily enough effected by puncturing them with a lancet, and squeezing out their contents. In account of the little susceptibility of the ear to take an inflammatory action, such treatment is not followed by any injurious consequences. Bow and then small sphyri may be separated from other parts in a similar manner, but before doing
so, be careful to ascertain if they possess a deep origin. When concretions are formed around joints and project so as to be of much inconvenience, they may be punctured with a lancet, making only a small incision, and not using much subsequent precaution. Occasionally, when incisions thus made don't heal, or when the tumours have burst of themselves, the sores become troublesome, and remain open for a long time. This abnormality arises from the deposit of slake being deep seated. In some of the cases, the nitrate of silver seems of some service in restoring the healthy action.

**Diet and Regimen in Chronic gout and Gouty habits.** However valuable remedies are in chronic gout, they are insufficient single-handed, and need to be accompanied with great care as to diet. Broth in meat and drink must be strictly attended to, in order that the stomach should receive no more food than it can easily digest. But the other thing is equally injurious, for abdominal weakness the part by withholding from them their due proportion of that aliment which is necessary for supporting their vigour and strength. The rigid diet, if necessary in the acute paroxysm, must be replaced by one capable of sustaining the strength.
of the patient, but as all which exceeds this is productive of injury, there is no little difficulty in correctly apportioning it. Sir W. Temple says, "Simple diet, limited by every man's experience to his own lazy digestion, and thereby apportioning as nearly as can be the daily repairs to the daily decay of our vital system." The use of all indigestible dishes, and especially all those which contain fric acid, must be cautiously avoided. An exclusively vegetable diet is said to have been sometimes successful. Sudden changes in diet are to be avoided as tending to bring on a paroxysm. As regards animal food, careful restriction of quantity is necessary, and this is perhaps best effected by making the number of dishes few, as mixtures of different meats are more difficult of digestion than an equal quantity of any sort. The more digestible kinds of meat, as mutton, are kept self and poultry, while kinds of fish may be partaken of, whereas salmon, seal and fowl should be avoided, as also should salted meat and raw vegetables. Potatoes, being valuable in giving certain consti to the blood, may be freely partaken of. Of fruits, strawberries, grapes, oranges, and plums may be taken. Strawberries were said by him as to prevent attacks, which habitually taken. The time of taking food should be
be carefully regulated. Animal food should only be taken once in the day, and if in the middle of the day, an egg, or rash of bacon may be allowed at breakfast, and late suppers must be carefully avoided. Wine and malt liquors should not be allowed. If alcohol in any form be required, a little weak, brandy, whiskey, or gin and water may be had recourse to. If from long habit, wine should be necessary to the proper performance of digestion, a little sound sherry is best. Port wine must be forbidden. Stock, shaffelle, and claret should be shunned, unless perchance they should agree better than sherry. The amount taken should always be moderate, but much depends upon the previous state. Milk from its highly nutritive qualities, and unirritating nature will prove very beneficial in many cases. Tea and coffee should be taken in moderation after the meal. Exercise is most useful in chronic gout. In respect to the kind of exercise, Sydenham remarks, "riding a horseback, unless forbidden by old age or a cold, is by far the best." It should be moderate and regular. Foot and horse exercise are both good. Carriage exercise saps so, but still of advantage when other cannot be employed. Friction may occasionally be resorted to. The amount of fluid
must be carefully apportioned to the age and strength of the patient. Fresh air is of great advantage in certain cases, and change to a warmer climate is sometimes of use, especially in those cases where the attacks are dependent on the state of the skin and readily excited by the bleak east and north-east winds. Upper Egypt and Mardin are favorite places of resort for such sufferers. It is very necessary to attend to the cutaneous function by wearing flannel next the skin, woollen stockings to keep the feet warm, and by taking warm baths occasionally. If an individual be subject to biennial or annual fits of gout, or even more frequent paroxysms, and the general health otherwise good, proper attention to diet and active and regular exercise, and sometimes small doses of celticium and quinine will generally prevent an increasing frequency in the recurrence of the disease, and sometimes even prolong the interval.

Many mineral waters have acquired great reputation in the treatment of gout. Some are undoubtedly very beneficial, whilst others have produced very little water, consisting principally of Bicarbonate of Soda (contains about 40%) appears to be of most

use
use in the complete intervals of acute gout, owing in strong and robust subjects, when the disease depends rather on increased formation than defective elimination of uric acid, and in cases where the liver and digestive functions are considerably at fault. In many forms of chronic gout the baths appear useful, independent of any peculiarities in their constitution, but if taken moderately they are not suitable for the majority of gouty patients, as the salts of soda rather tend to diminish than to augment the solubility of urate of soda.

The waters of Carlsbad, in Bohemia consist chiefly of sulphate of soda, but contain also the carbonate of soda, and the chloride of sodium in smaller quantities. They are purgative and diuretic, have some resemblance to the Wthy waters, and should be given under similar circumstances. The waters of Rüdenau, Marienbad, EMS, and Cheltenham belong to the same class, and may be given under the same conditions.

The mineral waters of Wiesbaden (Boppau) contain the carbonate and sulphate of lime, the chloride of sodium, carbonic acid, and iron.

Dr. Braum (Monographie des Eaux ministeriales de Wiesbaden) states...
states as the result of his experiments that they increase the amount of ice acid and base in the urine. They have been recommended as being most useful in those cases where the circulation is much sluggish, and the secretion deficient, and when there is much stiffness from previous attacks. The mineral springs of Au-à-Chapelle, [Chemise Parfum] contain Chloride of soda, and Carbonate of soda, along with minute quantities of Sulphuretted Hydrogen. They ought to be given in similar cases as the Waters of Weelrock. The waters of Buxton, Bath, and Scheeffelt prove useful when employed for bathing purposes, more from the action of the water than from any of the mineral constituents, as these are very insignificant. The ferrous or waters of St. Bridge Wells, Spa, Schwabode, and Paimont are useful when anemia is found associated with gout.
On some irregular forms of Gout.

Before concluding this paper, I intend saying a few words upon this point. All who have turned their attention to gout seem to agree that there are certain symptoms, and even many diseases which are greatly modified by the gouty habit.

Many people, even before they have a regular fit of gout, experience symptoms which may not improperly be classed under the above head. These symptoms commonly disappear on the occurrence of the paroxysm, but occasionally continue, although in a mitigated form, during the progress of the articular inflammation; they are often present during the intervals of the joint affection, and occasionally occur in subjects who have never experienced a true fit, but are either hereditarily predisposed, or much exposed to the influence of its predisposing causes. When we can demonstrate that these symptoms depend upon the same disease, as that which leads to inflammation of the joints, we are certainly justified in referring them to a gouty state of the system, and considering them as forms of irregular gout. In endeavouring to distinguish the true nature of such anomalous symptoms, let us remember that our patients may be affected with both functional and organic diseases, not necessarily...
gout, although greatly influenced by the gouty condition
of the system. Many of the most powerful predisposing
causes tend to produce other forms of disease beside
gout; and hence when these occur in gouty patients they
are not necessarily of a gouty character. The long con-
tinued existence of chronic gout leads to a depraved
condition of the general constitution of the body, and here
the slow production of many organic diseases.

But there can be no question that the same destruc-
tion which commonly leads to the development of
primary gout, may produce symptoms apart from
the joints, and which are essentially of a gouty character.
Various names have been bestowed upon these
irregular forms of gout, such for example, atomic
gout, non-articular gout, Podagra curvata, goutte
raide. In determining the nature of any of the
irregular forms of gout, we should in the first
place see if he has got the physiognomical char-
acter of either of the two forms of the gouty death,
before mentioned, vide page 3 et seq.; then inquire
carefully into his history, to see if any hereditary
predisposition exists, or if any active predisposing
cause has been in operation, or if he has suffered
from any previous afflication of the joints. If you
shall be in doubt, examine the blood for crystals.
Retrocedent Gout is that form of Gout in which a sudden disappearance of the articular affections is followed by some serious mischief in one or the internal organs, as if a metastasis had taken place, and the organs usually attacked are the stomach, the heart, and the brain. When the stomach is thus attacked, the symptoms indicating the transference of gout are apt to be an intense feeling of anxiety and oppression, often accompanied with severe pain, and vomiting. Tyndall seems to have suffered from similar symptoms on the resection of gout from his limbs, and many cases of a similar nature are on record. Cold is one of the most frequent causes of such retrocession, especially when accompanied by a heavy meal or indigestible articles of food. Are these gastric symptoms really due to gastroinflammation of the stomach? Many feel that such cases may be explained by other means, as, e.g., exposure to cold, indigestible article of food, or in some individuals, sufficient to produce such symptoms, and when a patient is suffering from gouty inflammation of the extremities, it is probable that the system is...
Predispersed to take an inflammatory action. And although genuine gouty gastritis may in many cases occur, the majority of so-called gut inflammation of the stomach are merely ordinary forms of inflammation.

When the heat is seized with retrocedent gout, there is generally a feeling of constriction about the chest, violent palpitation, intense anxiety, difficulty of breathing, accompanied by a very small thready pulse, and a tendency to syncope. This may be explained under the notion of a spasmodic affection of the heart. Some authors have gone so far as to say that there is really a gouty inflammation of the heart, just as there is a rheumatic inflammation of the heart, and Dr. Bagley records some cases which he thinks are of this nature.

When retrocedent gout attacks the head, aphasia is commonly induced, and may prove fatal. Death has been known to result in this way from plunging a gouty limb into cold water. Paroxysmal symptoms have occasionally been witnessed as the result of the retrogression of gout from the extremities to the head. The treatment in cases of retrocedent gout varies in each case. If the stomach...
be affected, and there is no evidence of the presence of inflammation, stimulants, as ether, chloroform, ammoniated and aromatics may be administered. If the pain be very severe, opium may be tried. Vomiting should be promoted by emetics.面包 is occasionally necessary. If there is any evidence of inflammation, leeches, hydrocyanic acid, or bicarbonate of potash are indicated. At the same time we should not neglect the ethereal for by the use of warmth and counterfeiting the pain may frequently bring back the inflammation to these parts. When the heart is affected, the same remedies are indicated, at least at the commencement; and when the head is affected, similar treatment to that which would be adopted in the corresponding affection of other subjects. Endeavoring at the same time to cause its return to the extremities.

There are several symptoms referable to disorders of the digestive system, not unfrequently met with even in patients who have never suffered from pain, but who strongly in their habit of life have sown the seeds of it by their mode of life. We frequently meet with such symptoms as are described as pectoral of a fit. Sometimes gastrodynia,
and enterodynia occur. Constrictions of the esophagus or of the rectum have been met with in gouty patients, disappearing on the superincidence of a fit. Hemorrhoids from the congested portal system, and prurig, are probably also from the same cause sometimes occur as premonitory of a fit.

Gout attacking the heart is sometimes mentioned as giving rise to palpitation, often accompanied with irregularity of action. Angina pectoris occurs in gouty patients not infrequently. Arthritis occasionally occurs as a result of gout.

Cough and an asthmatic condition of the breathing are frequently produced by a gouty state of the system. Occasionally severe dyspnea is connected with the presence of latent gout, which may disappear on the supervision of a regular fit. Asthma has been noticed to be very common in gouty families, and is probably often due to an impure condition of the blood.

Involatility of the bladder is not an uncommon affection in gouty people, and is sometimes accompanied by an increased discharge of mucus.
mucus, and generally with scanty and high-
coloured urine, giving rise to a copious white
deposit on cooling. Le C. Lecanaro mentions
some cases where there was a purulent discharge
from the urethra relieved by the occurrence of
gruit in the feet.
The kidneys appear occasionally to be attacked
with gruit, and some authors affirm that the
gruity inflammation is sometimes set up in
the structure of the kidney, accompanied
with deposit of mate of soda, not merely in
the tubuli uriniferi, but in the fibrous tissue
steele, and the frequency with which this
takes place is shown by the almost constant
occurrence of such deposits in the kidneys of
gruity patients when examined after death.
The prostate gland and testicles have sometimes
appeared to be attacked by gruity inflammation
and relieved by the occurrence of gruit in the
extremities.

Coat of the Eye. A form of ophthalmia connected
with gruit has long been recognised. Conjunctiva,
sclerotics, and iris are also undoubtedly
sometimes gruit.

Coat of the Ear. The small nodules on the Ear
have
have already claimed our attention. Their formation is sometimes scarcely noticed, but in others their deposit is accompanied by phenomena exactly the same as when a joint is affected, commencing with infiltration of tissue, afterwards followed by inflammation, the difference depending mainly on the amount of inflammatory action. Mr. Sydenham has pointed out the occurrence of deposits on the tympanum of gouty patients—
not affecting the skin. Pleurisy was noticed by Dr. Ballard as being prevalent in gouty families—sometimes alternating with acute attacks of the disease, sometimes suspended by them, sometimes seeming to prevent them in individuals thus disposed. Gouty has also been noticed in gouty people, and gouty and is not uncommon.

Gout affecting the nervous and muscular systems. The symptoms are usually functional but sometimes dependent on inflammatory action. Gout is not uncommon with a premonition of a fit, and also in the interic. Alluded to this is a very singular affection noticed by Dr. Graves, which consists in an inescapable desire on the part of the patient to grind his teeth, apparently originating in the teeth themselves, and momentarily alleviated by forcibly grinding them together, but immediately returning when the teeth cease.
cases to perform this action. It ceases during sleep, the
grinding being in all cases the result of voluntary
muscle action. In confirmed cases the teeth are ground down
to the level of the gums. By noticing this affection in men,
in people of the fusty breathless, he is inclined to
attribute its occurrence to the effect of the poison upon
the dental nerves. Neuralgia, as a manifestation
of gas, may occur in various situations. It is difficult
to diagnoseunless alternating with joint disease.
Van Swieten mentions, that epilepsy sometimes occurs
in a regular paroxysm. Other cases the spinal
cord is said sometime to be affected, giving rise to
great depression, pain, & hyperesthesia.

Treatment of Fusty gas must necessarily differ greatly
in different cases. When any important internal viscera
is affected, it would be our endeavor to induce fusty
inflammation of the stomach, which is best accomplished
by warmth, moderate cool fermentation, a hot bath,
mustard poultice &c. Aim at correcting the fusty
diathesis, by adopting similar measures to those used in
choleric gas. Colchicum is of use even in the
most irregular forms of the disease. A case of fusty
bronchitis was treated in the clinical wards of the Infirmary
this winter by Colchicum, and recovered in an incredibly short
space of time.