Rheumatoid Arthritis
A Thesis
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Introductory

Nearly every work upon the subject of rheumatoid arthritis commences with a discussion of the various names which have been adopted for this disease. The best known of these names are 'Rheumatic', 'Rheumatoid Arthritis', 'Systemic Rheumatic Arthritis', 'Osteo-arthritis', and 'Serone Arthritis Deformans'. Of these I think the least satisfactory are 'Serone Rheumatic Arthritis' and 'Rheumatic Gout'. The former term implies an arthritic disease of true rheumatic origin, and Hugh Lane, (Differentiation in rheumatic disease) by endeavouring to separate what he terms 'serone Rheumatic arthritis' from 'rheumatoid arthritis', has led to still further complications. The name 'Rheumatic Gout' implies a direct relation to both rheumatism and gout and is therefore a bad term.
unless taken from the standpoint of those who still believe the affection to be a combination of gout and rheumatism.

Alfred Garrod proposed the name 'Rheumatal Arthritis', as one assuming an arthritic condition having some of the external characters of true rheumatism, although not related to true gout or true rheumatism. (Lancet 1892 Vol II p.1033). He used the name as one which is well known, and at the same time distinctive.

During my residence as house-surgeon at the Downsview Hospital, Brighton, I have had an opportunity of ascertaining the different terms made use of by the profession to designate this disease, as a report of each case, stating the name of the disease etc., is sent to the hospital before the admission of the patient. The majority of the cases are styled 'Chronic Rheumatism', most in popularly comes 'Rheumatic Gout' and then 'Chronic Rheumatic Arthritis' and 'Rheumatal Arthritis'. Many
cases known which are put on as ' Rheumatic Gout', prove to be examples of gout pure and simple, and the only reason for so calling them being that other joints than those of the feet were affected. I take the opportunity of mentioning these points as they bear upon the great difficulty that exists in obtaining a satisfactory family history in arthritic disease.

I have had the opportunity of observing a series of 390 cases of rheumatoid arthritis admitted to the Devonshire Hospital, Buxton, during the year 1893. Of these 335 were examples of the disease in its polyarticular or constitutional form, and in 55 the knee joint or joints only were the seat of affection.

I propose in dealing with those cases to keep the two forms as separate as possible. The medical anatomy may be the same in both cases, but they otherwise present so many points of distinction, that I think this advisable.

The cases were under observation during
periods varying from three to twelve months only, so that I have been unable to study the course of the disease for any length of time in any one patient. Now here I had the opportunity of investigating the changes post mortem. Although I fear that I have little to offer that is new, I hope by an analysis of these cases, and the comparison of the results of my observations with those of other writers upon the subject, to bring out some points in its connection. At the end of the thesis will be found a list of the different authorities to which reference is made. Where the authority is first quoted, the name of the work is given in full. In subsequent reference to the same work, towards repetition, the name of the writer and page only are mentioned.
Aetiology

Hereditary Tendency

Is there any direct hereditary tendency to this particular disease? Adams was of the opinion that in some cases the disease is hereditary (Treatise on Rheumatic Gout 2nd ed. 1873, p. 9). Sir Alfred Garrod thinks that hereditary tendency has no special influence, and that if it exists at all, it is much too powerful than that of gout. (A Treatise on Gout and Rheumatism and Gout 3rd ed. 1876 p. 574). A. E. Garrod states that in some particular instances the influence of heredity is well marked and that it is by no means uncommon to find two or more sisters suffering from rheumatoid arthritis. (A Treatise on Rheumatism and Rheumatoid and Arthritis, p. 239) In 500 cases he found a family history of rheumatoid arthritis in 16.8 per cent. He mentions (p. 238) the great difficulty in obtaining an accurate family history owing to the period
nomenclature. I have found this a great drawback. Many patients who state that members of their family suffer or have suffered from gouternal arthritis doubt mean rheumatoid arthritis. Then again rheumatism might mean gout. Statistics therefore obtained from the statements of patients must in a certain extent be unreliable.

In the 335 cases of polyarticular rheumatism arthritis in only 12 or 3.5 per cent of obtain an unclouded history of this disease in their patients family. One case was noteworthy from the fact that no fewer than four others all suffered from the disease.

Hereditary Influence of Gout and Rheumatism —

Of 105 gout cases (p. 234) 12.8 per cent gave a family history of rheumatism.

Obtained a family history of rheumatism in 85 out of the 335 cases or 25.3 per cent, and in 25 per cent of the 55 cases of the disease in the life. It is interesting to compare the statistics of a
family history of rheumatism in rheumatoid arthritis with that of a series of cases of true rheumatism. Of 1,500 cases admitted to the Grammar School during the year 1893, of the latter disease, there was a family history of rheumatism in 28 percent. In this respect therefore the diseases do not differ much as regards gout - an analysis of A.C. Garrod's Table (p.239) gives the percentage of 16 in his 500 cases. I obtained a family history of gout in 20 percent only.

Can we deduce anything from the above figures? Taken separately perhaps they cannot be said to indicate much, but taken together, I think they tend to show that there is an hereditary tendency to arthritic disease of some sort or another, and to bear out the view taken by Sir Dyce Duckworth on the subject (British Medical Journal 1884 Vol II p.267) i.e. That there is a basic arthritic stock or constitution from which arises
as branches two main classes of disease commonly recognized as rheumatism and gout, and that rheumatoid arthritis is one of the manifestations of this disease. Of A.E. Garrod's cases previously mentioned 43.2 per cent gave a family history of articular disease, whilst in my cases the percentage was 30. It would appear therefore that hereditary predisposition to joint disease, has an influence in the causation of rheumatoid arthritis.

Pitkeros—

Fuller states that the disease is remarkably prone to affect the children of consumptive patients, and that of 119 cases he found that 29 had a parental family history. (On Rheumatism, Rheumatic Gout, and Seirce; Ted 1860 p334.) Hugh Lane of Ball lays great stress upon the hereditary influence of articular disease. (Differentiation in Rheumatic diseases 2nd ed p36) He says "The constitutional
cause of rheumatoid arthritis as a combination of the hereditary taint of gout and phthisis” and earlier (p27) that he has been induced to look upon “arthritis and rheumatoid arthritis as cause and effect.” I think that this is going a little too far, although that appears to be a connection. I obtained a 5 percent family history of phthisis in 17.6 of the cases. This is a much higher percentage than that for instance of a number of cases of chronic articular calcification. Of 630 cases of the latter only 5 percent gave such a history. I do not think proven that the frequency of the disease occurring in phthisical families is due directly to the articular taint, but that rheumatoid arthritis being a disease which is especially liable to affect those of a debilitated constitution is more likely to develop in phthisical families.

Sex—
The special liability of the female sex
was well borne out by these cases. Authorities, however, are not unanimous upon this point. Adams (p. 13) says, "I have observed that men appear in the whole to be as subject to chronic rheumatic arthritis as women." But he says "if we make the comparison in the different joints we shall find men more affected with this disease in the hip joint than women, and that the wrists and hands are much more frequently engaged in the female patient." Sir Alfred Garrod (pp. 574-575) also appears to be of the opinion that too much stress has been laid upon the liability of the female sex. Of my 335 cases of the polyarticular form of the 62 disease, 272 were females and 63 males; and even if we add to these the 55 cases of the local form, we get the proportion of 277 females to 113 males. Taking the cases of hip affection alone, however, 91 per cent were of the male sex. It may be as well to mention
that the proportion of males to females of all cases of rheumatism and allied affections admitted during the year 1893 to the Deventer Hospitaal was as 5 to 1. I think this adds significance to the above facts.

Age—

Rheumatic affections may occur at almost any age. Sir A. Garrod (p. 514) mentions one at the age of 3 years. One case came under my observation in which the disease was said to have commenced at the age of 2 (vide Case 8 at end, p. 132).

A. E. Garrod (p. 240) believes that the disease is essentially one of the early degenerative period and attains its maximum between the ages of 40 and 50. He found that the number of cases commencing at different ages increased until 40 to 50 years in females and then declined. Inamorato found that there were two maxima, one between 30 and 35 and the other between 50 and 55. In the series of
cases of polyarticular disease previously referred to, I found that the males and females followed much the same course in this respect; the maximum number of cases in males commencing between the ages of 30 and 40 and in females between 40 and 50, but I found no second maximum in males as in Paget’s cases. Possibly the difference is due to the fact that in the statistics, cases of the localised variety are included whilst I have dealt with the two forms separately.

In the table form, of the cases under my observation, the maximum number of cases commenced between 30 and 60 and males than 93 per cent after the age of 40. I append the statistics more in detail, and in the case of the polyarticular form, a diagram with curves showing the number of cases commencing at the different ages in males and females.
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<th>Age of commencement</th>
<th>Percentage of cases</th>
<th>Polyarticular</th>
<th>Stiff only</th>
<th>Males</th>
<th>Females</th>
<th>Both sexes</th>
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<td>1</td>
<td>0</td>
<td>1</td>
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<tr>
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<td>10</td>
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<td>0</td>
<td>9</td>
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<tr>
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<td>23</td>
<td>3</td>
<td>19</td>
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<td>4</td>
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<td>18</td>
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<td>46</td>
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<tr>
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<td>8</td>
<td>4</td>
<td>27</td>
<td>12</td>
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</tr>
<tr>
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<td>2</td>
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<table>
<thead>
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<th>Percentage of cases</th>
<th>Age of commencement of disease</th>
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</tr>
<tr>
<td>19</td>
<td>70 and over</td>
</tr>
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</table>

Graph showing Trends of Male and Female Incidence.
It will be observed from the above diagram that in females there is a sudden rise from 10 to 20 to 20-30 and a sudden fall from 40-50 to 50-60. 72 per cent of the cases occurring between the ages of 20 and 50. The rise and fall in the case of the males is more gradual.

Occupation

An analysis of the different occupations of the patients in this series of cases presented no feature of interest. Among the males those leading outdoor and indoor lives were about equal. Of the females, the largest proportion were housewives and 34 per cent. 18 per cent were domestic servants, 9 per cent mill hands and 4 per cent employed in needlework.

Uterine disorders and the menopause

There have been supposed to have a connection with the etiology of rheumatoid arthritis (L. E. Gardner 1924). The
maximum number of cases, as we have already seen, in females originate between the ages of 40 and 50, and so fall near the menopause. But here I think the connection ends. In 57 per cent. of my cases, in females, the disease was contracted before 45. And consider uterine troubles of great importance in the causation of this disease. (British Medical Journal 1884 Vol IT p. 209). I have not found the connection so marked one and I have noticed that when such conditions are associated with developed the disease, they are just as often after its commencement as before. Amenorrhoea is often present in the younger patients, but does not as a rule precede the arthritic condition.

Exposure to cold damp, etc.

These are by far the commonest causes to which the onset of the disease is ascribed by the patients themselves, but mainly, I think, in want of a better
one. By lowering the vitality, cold clamps etc may predispose to rheumatoid arthritis, but in the majority of cases in which this cause was assigned it was impossible to trace the connection. The above causes are mentioned as causes by Didimo (p.8) and Dr. Alfred Garrod (p.816).

Debilitating influences

Rheumatoid arthritis is especially liable to be developed in persons of a debilitating constitution. This is acknowledged by nearly all authorities. Fuller (p.331) says: "It selects as its victims those who are weakly or unhealthy, in whom the natural functions are imperfect or deficient; as also those upon whose bodies, though normally robust, have been subjected to some cause of mental or bodily depression." Still, Garrod (p.499) writes: "... occurs in individuals who have been exposed to the influence of formerly depressing causes either mental or physical but where it is excited by severe cold or acute rheumatism..."
such predisposing causes may not be met with to such a degree." In a large number of the patients I interrogated, the malady was traceable to debilitating influences of this description, the following for example—, nervous and mental anxiety as from missing a rich husband, particularly when accompanied by some lazarstage, insensitivity, blood poisoning, potency, intense fever. In parenchastic cases the disease commenced shortly after an attack of influenza.

Injury.

As Dr. Godard points out (p. 243) the influence of local injury or the causation of rhematoid arthritis is much more marked on the monarticular than on the polyarticular variety. Of the 53 cases of the disease in the hips of percent gave a history of previous injury to the joint. From several cases that I have seen I am inclined to think that injury to joint also predisposes to
affection of that joint where the disease is constitutional. Such joints are usually attached with more severity than others, and in some cases I have found that the disease originated in a joint previously injured and then spread to other parts of the body.

Acute Rheumatism.

Fellows (1887), Adams (1879) and others believed that rheumatoid arthritis might develop as a sequel to acute rheumatism. Hugh Lane (Differentiation of rheumatic disease) denies the connection entirely, between acute rheumatism and rheumatoid arthritis as differentiated from "chronic rheumatic arthritis." He believes (p.25) that there is never a history of acute rheumatism unless it be accidental in the lifetime of the individual. Obtained a history of acute rheumatism in a sufficient number of cases to justify my regarding it as a powerful factor in the production of rheumatoid arthritis.
Of the 335 cases, 14 per cent had suffered from acute rheumatism and in 8 per cent the disease dated from such an attack. In the latter, the history was that of a typical attack of acute rheumatism, from which the patient had never completely recovered, the disease becoming chronic and gradually progressing until exhibiting all the characteristics of rheumatoid arthritis. (See p. 124, c. 126.)

Such influence was not so marked in the five cases, as each of which 9 per cent gave a history of acute rheumatism and in 3 out of the 5 the disease dated from such an attack. The connection between the two may I think be explained as follows.—Acute rheumatism by attacking the sinuses of the joints renders them more vulnerable to some other acute disease; and at the same time it acts as a debilitating influence. The fact that instances occur in rheumatoid arthritis commences, shortly after an attack of acute rheumatism.
from which the patient has apparently recovered, (case D at end, for example) seems also to support this theory.

Such then are the chief points bearing upon the etiology of this disease. But in by far the majority of cases rheumatoid arthritis arises without apparent cause, constitutional or otherwise and often in patients with excellent family histories and none until the onset of the disease has been as far as can be ascertained in perfect health.
The various theories of the pathology of rheumatic arthritis are discussed at some length by A.S. Garell, pp. 283 to 291. I cannot do better than consider them under the same headings.

1. The Rheumatic Fever

It is likely rheumatic arthritis is simply a variety of chronic rheumatism. Todd described the disease under the title of "Chronic Rheumatism of the joints" and regarded it as strictly rheumatic in nature (Gout, Rheumatic Fever, and Chronic Rheumatism of the Joints, 1843, Soman 213, p. 172). Adamo does not express a decided opinion upon the subject. He regarded the affection as a chronic inflammation of the joints, partaking more of a rheumatic nature than of any other with which he was acquainted. (p. 24)

Frederik (p. 332) considered the two diseases distinct from one another and
most modern writers late this view e.g. Sir Agard (Lancet 1892 Vol I p 1033), A E. Garrod (p 284), Duckworth (Treatise on Gout 1890, p 105), Headley (Lancet 1892 Vol I p 974) etc. I find however that, Mitchell Bruce is of the opinion that the disease is strictly rheumatic in nature (Quain's Dictionary of Medicine 1893 ed. 3rd ed. Rheumatic Arthritis p 1352). "Finally" he writes "no line can be drawn between acute and subacute cases of rheumatism, between subacute and chronic cases of rheumatism, or between chronic rheumatism and so-called rheumatoid arthritis, the latter being only a more severe development of the former". The tendency of cases of true rheumatism to develop into rheumatoid arthritis is certainly a point in favour of the above theory and in many cases it is difficult to say where rheumatism ends and rheumatoid arthritis begins. But in the majority of cases rheumatoid
arthritic arvis without a pronounced gouty attack and taken as a whole its present so many points of difference that I think can only be explained by the theory that there are two distinct diseases. The various ways in which the diseases differ from one another I shall discuss more fully under the head of 'Differentiation'.

2. That the disease is a combination of gout and rheumatism in the same individual, hence the term 'rheumatic gout'.

Sir Benjamin Brodie (Diseases of joints 5th ed 1856 pp 236-248) treats of the subject as "chronic disease of the joints connected with gout and rheumatic gout". He refers to the presence of "lithate of soda" in the tumes of the joints in some of his cases (vide case of 'rheumatic gout' LN pp 233-234).

In other cases he describes no such deposit (cases LII + LIII pp 233+234) and hence appears to have included
cases of true gout in his consideration of "rheumatic gout." Adams referring to this (187) says, "We have never met with the gouty concretions mentioned by Sir Benjamin Brodie, nor any white chalky layers of tallow of soda deposited on the articular surfaces in any case that we have considered to have belonged to the class of cases we have called chronic Rheumatic Arthritis." Fuller regarded the disease as distinct in its pathology from both rheumatism and gout, although he preferred to retain the name "Rheumatic Gout" (p. 332). Sir Al-Garfi (p. 249) writes, "for my own part although I am far from denying the possibility of acute rheumatism attacking either an individual predisposed to gout, or one who has already suffered from the excitations of this disorder, or on the other hand of gout supervening where rheumatism has already existed, still I am convinced, after
a long and careful study of the subject, that no combination of the two diseases as indicated by the title is ever seen in nature."

Although this 'rheumatic gout' story is now generally discredited, Major-" alter Hutchinson appears to still adhere to it, and gave it his support in a discussion before the Medical Society of London in 1892 (Tanner 1892 Vol I p 974) and prefers the old name 'Rheumatic-Gout' as expressing a multiple disorder.

I shall consider the distinctions between rheumatic arthritis and gout under Depercutation. But I may state here that although in certain respects the diseases resemble one another, this is far outweighed I think by the many differences. In no example of rheumatic arthritis have I been able to discover uric acid in the blood by Garrod's standard experiment, whereas an increase of uric acid in the urine. I have seen
cases of gout and rheumatism in the same individual; but such cases did not present the usual features of rheumatoid arthritis, and both as regards history and clinical features the two diseases could be separately traced.

3. The third theory mentioned by A. Gomod is that of Lubbock Lane (p. 285) viz. That the articular lesion is the local effect of wear and tear of the joints from the pressure of the articular surfaces upon one another.

Gomod considers this alleges the an inadequate explanation of the phenomena of the disease. The history and progress of the affection in the majority of cases is alleges appear to such a theory; and it is impossible to reconcile both it the fact that joints little used are often severely affected, the occurrence of the disease in the young and its special liability of the
female sex.

4. The Nervous or Psychologic Theory

A E. Garrod (pp. 286 to 291) discusses the various lines of argument in favour of the neuropathic origin of rheumatoid arthritis, whereby an interference with the nutrition of the joints from nervous cause, leads to the resulting changes. Among the more important of these arguments are: the resemblance which rheumatoid arthritis bears to the articular affections found in cases of Gout, or, in cases of Theriogenoma, known as the cat's joint Disease; the fact that joint affections resembling rheumatoid arthritis of a transient nature have been produced by concussion of the spine from falls; the symmetrical distribution of the disease. He is of the opinion that what is known of the etiology is in favour of this theory, and that the treatment, production of joint improvement in this disease, treatment directed to improve the general health, as such as would be likely
to those of most benefit in a nervous disorder.

The nervous theory has received a good deal of support. Duckworth (British Medical Journal 1884 Vol II p 266 to 268) inclines to this view, also Jenner (Jenner 1892 Vol I p 74) and others. And (British Medical Journal 1884 Vol II p 209) discusses the question from the point of view of reflex irritation. Whether the condition be reflex or whether there is some central change beside acceleration as it would I think at least appear that as Ab ganged states (p 229) the neuromuscular theory of rheumatical arthritis affords the best explanation of the peculiarity features of the disease.

A theory of the nervous origin of rheumatic arthritis has lately been put forward by Russell F. F. Cook (Dissertation on osteoarthritis 1893). It is briefly as follows (pp 51 to 62). He regards the exciting cause as anaemia, and presupposing that in patients liable to the disease, the vasomotor centre is unstable, the deficiency of oxygen
will lead to a disturbance of this centre, and possibly also of a centre for the nutrition of joints in intimate relation with it. Such a state of affairs would, by interference with nutrition lead to the changes in the joints. There are, however, several objections to such a theory. In the first place, anaemia, although a very common accompaniment of rheumatoid arthritis is not a constant one, nor does it in the majority of cases precede the development of articular affection. And granting a disturbance of the vasomotor centre, why should the joints be specially affected? Even if we accept the hypothesis of a centre for the nutrition of joints in connection with the vasomotor centre, it is difficult to see why this centre in particular should be disturbed by a deficiency of oxygen.
Medicid Anatomy

As I have previously stated, I have had no opportunity of studying practically the medical anatomy of rheumatical arthritis. P. Adams in his work on "Rheumatic Gout," previously referred to, gives a very full description of the various changes found post mortem, and the companion paper "Illustrations of the effects of rheumatical gout" contains a beautiful series of illustrative plates.

The changes vary with the duration and severity of the disease, but briefly may be said to be as follows—

The synovial membrane is injected and thickened and vascular vascular tufts and fringes are formed. In these may be formed small masses of cartilage, which by becoming detached may form loose bodies. The synovial fluid is at first increased in amount, but later it becomes absorbed. The cartilages become fibrosed and are gradually worn away in the centre. This in time leads to ulceration of the heads.
of the bones, from the grinding of the two articular surfaces upon one another. New bone is formed at the edges leading to the production of osteophytes and bipping of the edges. The ligaments become loosened and may be absorbed, tendons in the neighborhood may be displaced or ruptured, and complete disorganization of the joint may be ultimately produced. Dysfunction is extremely rare. In addition to the changes in the joints themselves, bursae in the neighborhood may become enlarged, and in some cases contain loose bodies.

There is a difference of opinion as to the order in which the different structures become affected. Brodie (p. 332) states "In this disease inflammation of the synovial membrane is the first of a series of changes which the joint undergoes." Adams agrees with Brodie (p. 313). A. G. and I. think that fibillation of the cartilages is the primary event and the synovitis secondary, and Barwell that the forms
are first affected (A Treatise on Diseases of joints 2nd ed 1881, p388). Judging from clinical experience I am inclined to think that the first changes occur in the synovial membrane, at all events clinical evidence of this is usually obtained before that of implication of the cartilage or bone. This is especially seen in the more acute forms of the disease as usually occurring in the young. In more chronic cases, however, in older subjects more especially, evidence of affection of the cartilage or bones may be present when there is little or no synovial thickening or effusion.
Clinical Features

Acute Rheumatoid Arthritis

Fulcher (p384) calls attention to an acute form of the disease which may be confused with acute rheumatism, but which is less migratory and more circumscribed. Sir R. Jones also describes an acute form (p3499) accompanied by moderate elevation of temperature, and differing from acute rheumatism in the absence of profuse sweating, of tendency to affect the heart, and of tendency to wander from joint to joint.

I have not seen a case of this description arising in a patient previously unaffected by the disease. But I have seen exacerbations occur in chronic cases, with increased pain and swelling in joints previously affected, accompanied by slight rise in temperature. Patients have sometimes described the disease as commencing with symptoms of such a description, but from the history
alone it is impossible to draw a distinct
line between an attack of this kind and
one of acute and subacute rheumatism.
Clinical Features of Chronic Rheumatoid Arthritis in its Polyarticular Form

Early Symptoms.
Kurt Sander of Bath has given prominence to the following symptoms in the early history of this disease, and which he thinks usually precede the development of the arthritis condition. (The early symptoms and early treatment of osteoarthritis 1889)

1. (p. 6) Increased velocity and tension of the heart action, as indicated by a rapid, hard pulse.
2. (p. 8) Disturbance of the chromatogenic function of the skin visible. The occurrence of patches of pigment of various hues, sometimes large resembling that seen in Addison's Disease, and at other times like small bruises. As regards the pigmentation, commonly called freckles, he thinks that there is no point so diagnostic and that they are present in two-thirds of the cases.
3. (p17) Vasomotor disturbances.
   (a) Sweating, sometimes local and limited to the hands and feet, at other times occurring over larger areas.
   (b) Trophic changes such as local congestions, transient flushing etc.

4. (p19) Neural symptoms e.g. Pain in the muscles of the ball of the thumb and inner side of the wrist, also sensations of numbness and tingling in parts about to become affected.

   The first of these early symptoms I have found to be a very constant one, i.e. the rapid high tension pulse, the rate often rising to 100, 120 or 130. In one patient, a man aged twenty-two, the pulse had a constant rate of 140 beats per minute.

   This feature according to Sansom indicates an alteration of the relation between the Vagus and Sympathetic and resembles the exaggerated reflexes seen in cases in which parts of the nervous system are cut off from the control of the higher centres. (Lancet 1892 Vol. I p 975)
It seems Dr. Henderson has laid too much stress upon the so-called early symptoms. The pigmented changes, although present in a certain proportion of cases are, I believe, equally common in people not suffering from rheumatoid arthritis, and do not appear to bear any direct relation to this disease. I cannot bear out Dr. Henderson's statements in connection with the early symptoms.

Although I have not had the opportunity of observing the actual commencement of the disease, I have seen many cases in the earliest stages, and have been to some trouble in trying to obtain a history of such symptoms from patients, but nearly always with a negative result. The pain, as a rule, I have found accompanying the articular swelling or preceded it only by a very slight internal and is localized to the joints. And I have not found local aching, numbness, and tingling, or pigmentation present; in fact, I obtained a history of such in a sufficient number of cases to warrant my regarding them as
Points of diagnostic importance in rheumatoid arthritis.

Usual onset and course of the disease.

In certain cases the patient has an attack of acute rheumatism and the joints return to their normal condition, the pain, swelling and stiffness remain and imperceptibly the disease changes from rheumatism to rheumatoid arthritis. In other cases there is a start internal after an attack of rheumatism in which there are no arthritis symptoms before the disease manifests itself.

More frequently the affection commences insidiously without a previous attack of rheumatism. The patient may or may not have been in bad health previous to the onset, when in one or more joints usually those of the fingers swelling appears accompanied by pain. This condition when confined to one joint is apt to be overlooked and assigned to a sprain. The smaller joints are usually first affected.
and the disease may be confined to them. In certain cases the pain and swelling disappear and the joints return to their normal condition for a time, only to return again. Generally, however, the disease is a progressive one, and joint after joint becomes affected in a symmetrical manner, until in the severe cases almost every joint in the body is implicated. Sparse or later evidence of affection of the cartilages is obtained, at first cracking can be felt on passive movement and later when erosion has taken place, grit of the bony surfaces. Bony outgrowths can be felt through the tissues and all sorts of deformities are produced, the patients in the severe cases becoming completely crippled. In addition to the local arthritis symptoms, there is often marked constitutional disturbance, the patient becoming emaciated and anaemic. I have already referred to the circulatory disturbance, and in many cases the disease is accompanied by muscular wasting, and occasionally by spasmatic contraction.
of muscles, exaggerated tendon reflex and other symptoms.

The various clinical features present many differences both in degree and variety. The constitutional symptoms in some cases are marked, in others absent. The articular changes may be exceedingly slow in their progress or on the other hand progress with great rapidity. As a general rule the older the patient the more chronic the disease and the less marked the accompanying constitutional symptoms. They appear in fact to be two main clinical types of the disease which I will refer to later.

I now propose to consider these different clinical features more in detail.

Distribution of the joint affection

An analysis of the 335 cases of poly-articular rheumatoid arthritis previously referred to gives the following result.
as to the distribution of the affection.

<table>
<thead>
<tr>
<th>Joint</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands</td>
<td>87%</td>
</tr>
<tr>
<td>Wrists</td>
<td>76%</td>
</tr>
<tr>
<td>Elbows</td>
<td>49%</td>
</tr>
<tr>
<td>Shoulders</td>
<td>54%</td>
</tr>
<tr>
<td>Feet</td>
<td>45%</td>
</tr>
<tr>
<td>Ankles</td>
<td>58%</td>
</tr>
<tr>
<td>Knees</td>
<td>72%</td>
</tr>
<tr>
<td>Stipes</td>
<td>19%</td>
</tr>
<tr>
<td>Temporomandibular joint</td>
<td>31%</td>
</tr>
<tr>
<td>Occipital region</td>
<td>31%</td>
</tr>
</tbody>
</table>

These are the principal joints concerned.

It will be seen from the above table that the hands and wrists are the most frequently affected, the knees coming next. The percentage of cases in which the temporomandibular joint was implicated at 31 would appear somewhat low considering the well-known liability of this joint to be affected. But in the above table only the joints implicated at the time the patient were under observation are included.
The temporomaxillary joint is one early affected but is one of those joints which most frequently recovers. Sir Alfred Garrod, referring to this point (p. 52), states that the jaw and neck are specially liable to be attacked but that in the majority of cases the resulting stiffness pans off.

In only 19 per cent were the hips affected. Although in the table I have only mentioned the principal joints which suffer, there are few joints in the body which are not liable to the disease. The scapulo-clavicular region articulation, for instance, is affected in a certain proportion of cases, but generally only temporarily, and the spinal column. Of the latter the most frequent seat of the disease is the cervical region. It will be seen that 31 per cent of the cases had this lesion, the symptoms being pain and stiffness in the back of the neck. The exostosis is difficult to determine but is probably that of the atlas and axis vertebrae.

Sir Alfred Garrod (pp. 249-250) quotes
Statistics of the distribution of the lesion which differ from those that I have drawn up. I place the two lists (my own and Dr. Garrod's) side by side, placing the joints in their comparative order of frequency of affection.

<table>
<thead>
<tr>
<th>Dr. Garrod's cases</th>
<th>Devonshire Hospital cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hands</td>
<td>86 p.c.</td>
</tr>
<tr>
<td>2. Knees</td>
<td>60 &quot;</td>
</tr>
<tr>
<td>3. Feet</td>
<td>34 &quot;</td>
</tr>
<tr>
<td>4. Ankles</td>
<td>27 &quot;</td>
</tr>
<tr>
<td>5. Wrist</td>
<td>26 &quot;</td>
</tr>
<tr>
<td>6. Shoulder</td>
<td>25 &quot;</td>
</tr>
<tr>
<td>7. Elbow</td>
<td>25 &quot;</td>
</tr>
<tr>
<td>8. Temp. max.</td>
<td>25 &quot;</td>
</tr>
<tr>
<td>9. Hip</td>
<td>14 &quot;</td>
</tr>
<tr>
<td></td>
<td>1. Hands 87 p.c.</td>
</tr>
<tr>
<td></td>
<td>2. Wrist 76 &quot;</td>
</tr>
<tr>
<td></td>
<td>3. Knees 72 &quot;</td>
</tr>
<tr>
<td></td>
<td>4. Ankles 58 &quot;</td>
</tr>
<tr>
<td></td>
<td>5. Shoulder 54 &quot;</td>
</tr>
<tr>
<td></td>
<td>6. Elbow 49 &quot;</td>
</tr>
<tr>
<td></td>
<td>7. Feet 45 &quot;</td>
</tr>
<tr>
<td></td>
<td>8. Temp. max. 31 &quot;</td>
</tr>
<tr>
<td></td>
<td>9. Hip 19 &quot;</td>
</tr>
</tbody>
</table>

Relatively speaking the principal difference between the two lists is the position occupied by the wrists and feet. In Dr. Garrod's cases the wrists take 1st place whilst in the latter series they rank second; and the feet which in Dr. Garrod's cases are placed 3rd on the list, take the 1st
In fact comparing my list with his it would appear that these two joints very nearly change places. Comparing the two lists, it will also be seen that in my cases the distribution must have been more general than in Dr Garrod's i.e. in an individual case more joints were affected.

(Doverstraetiebel)

Taking the above cases and comparing males with females, a slight difference will be found.

<table>
<thead>
<tr>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands</td>
<td>88%</td>
<td>Hands</td>
<td>86%</td>
</tr>
<tr>
<td>Knees</td>
<td>74%</td>
<td>Wrists</td>
<td>77%</td>
</tr>
<tr>
<td>Wrists</td>
<td>70%</td>
<td>Knees</td>
<td>71%</td>
</tr>
<tr>
<td>Shoulders</td>
<td>53%</td>
<td>Ankles</td>
<td>60%</td>
</tr>
<tr>
<td>Ankles</td>
<td>44%</td>
<td>Shoulders</td>
<td>58%</td>
</tr>
<tr>
<td>Feet</td>
<td>42%</td>
<td>Elbows</td>
<td>50%</td>
</tr>
<tr>
<td>Elbows</td>
<td>40%</td>
<td>Feet</td>
<td>45%</td>
</tr>
<tr>
<td>Temp. max.</td>
<td>23</td>
<td>Temp. max.</td>
<td>32</td>
</tr>
<tr>
<td>Berrielegiun</td>
<td>21</td>
<td>Berrielegiun</td>
<td>36</td>
</tr>
<tr>
<td>Kips</td>
<td>26</td>
<td>Kips</td>
<td>15</td>
</tr>
</tbody>
</table>
Judging from these cases, it appears that the ankles and elbows are more frequently the seat of the disease in females than in males.

Order of invasion of joints.
According to Harcourt the articular affection tends to advance in a centripetal manner extending from the periphery of the limbs towards the trunk. (A.E. Garrod p.249), and A.E. Garrod commenting upon this, states that this centripetal order is broken in the case of the joints which are usually the first joints invaded in the lower extremities.

It is rather a difficult matter to obtain from patients an exact description of the order of invasion especially when the disease has lasted for some time.

Still, although in some instances the history obtained showed the invasion to be of this centripetal type, in the majority of cases it appeared to have been more or less irregular.

The joints of the hands are certainly
The most frequent site for the commencement of the disease but otherwise I have not found any rule or regular order observed.

It is not without interest to ascertain the relative frequency with which different joints are the first to be affected in rheumatoid arthritis. I have constructed the following table for this purpose, taken from 335 cases.

(Note. I have excluded doubtful cases and so the percentages are calculated on the whole 335 cases, a certain percentage is unaccounted for.)

<table>
<thead>
<tr>
<th>Joint first invaded</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands</td>
<td>20%</td>
<td>38%</td>
</tr>
<tr>
<td>Wrists</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Elbows</td>
<td>0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Shoulders</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>Feet</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Ankles</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Knees</td>
<td>28%</td>
<td>11%</td>
</tr>
<tr>
<td>Stipes</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Taking both males and females together, the joints of the hands were by far the most common situation for the disease to first show itself. The actual joint is usually the proximal phalangeal joint of the first or second fingers. Less frequently it is the metacarpophalangeal joint of the corresponding fingers which is first affected.

Comparing males with females in the above table it will be seen that in the females there is a greater tendency for the larger joints to be first affected. Thus in 28% of the males the knees were invaded first compared with 11% of the females, and the shoulders in 16% of the males compared with 3% of the females. This points to the fact that the joints which suffer earliest are the ones which have been subject to most strain. If this be the case we should expect in females the hands to be early affected whilst in men who use the shoulders and triceps to a larger extent, there
true joints would be more liable to early affection. I am speaking now only of the labouring classes. It would be interesting to know whether the disease as it affects those following adventitious occupations conforms in this respect with that in the lower classes. I doubt whether in the former would be the same liability to early affection of the larger joints.

Characters of the articular affection.
The principal features presented by the joints are — pain, enlargement, abnormally of movement, grating and cracking on movement, and distortion. These signs vary with the type, duration and severity of the disease.

Pain. This is always more pronounced in the early stages and in cases in which the disease progresses rapidly.
In some cases it is entirely absent throughout the whole course of the disease and in others is almost constantly present. It is usually of a dull character but sometimes so acute as to render manipulation of the joints impossible. It is aggravated by movement and is usually felt more strongly when the patient gets warm in bed. In the later stages of the disease very little pain is complained of as a rule.

Enlargement - Enlargement of the joints may be due to swelling of the soft parts or enlargement of the ends of the bones.

Swelling - This is one of the earliest signs and is more marked in the more acute cases. It may be confined to the synovial membrane of the joint or more diffuse and accompanied by oedema of the neighbouring parts. When the fingers are affected the phalangeal joints present
a flaccid appearance; this is also often seen in the wrists. In the early stages this swelling may be accompanied by some heat. On palpation a boggy sensation may be felt or in the later and distinct fluctuation pointing to the presence of fluid in the joint. This is especially well marked in the knees in some cases. In one of the cases I withdrew some of the fluid from the knee with an aspirator. Found it the semisolid and in consistence, of a pale yellow colour, alkaline in reaction, and acid in albumin. An examination for the presence of the tubercle bacillus yielded a negative result. The fluid holoprotein likewise absorbed in the latter stages of the disease and synovial swelling may also disappear. In the addition to the articular swelling these may be instances of tumor in the neighborhood of the joints, as described by Adams. Small tumors on the back of the wrist and carpus as described by Sem (p. 446) I has found very common. And less frequently I
have observed them in connection with other joints, and as that of the olecranon mentioned by Adam (p. 177) and that of the semimembranosus (p. 190) which appears as a tumour in the popliteal space, becoming tense and hard when the knee is extended and disappearing when it is fully flexed.

**Bony enlargement.**

This is usually a late sign, but in very chronic cases sometimes appears to be present from the commencement. When present it can be readily made out in the more superficial joints, such as the phalangeal joints of the fingers, and sometimes of the proximal phalangeal joints also. The ends of the bones may appear to be enlarged as a whole or irregular osteophytic outgrowths may be felt.

**Heberden Nodes.** These are small, firm tumours growing usually from the dorsal surfaces of the distal phalangeal joints of the fingers, and sometimes of the proximal phalangeal joints also. They may be accompanied by a little pain in the early stages, but
do not as a rule give rise to much inconvenience. They always occur in advanced life. They are very commonly seen in rheumatoid arthritis, but opinions differ as to whether they ought to be classified under the head of this disease. Sir A. Garrod (13, 503) regards them as of the nature of rheumatoid arthritis. A. E. Garrod (p. 263) thinks that they may be regarded as the very slightest chronic manifestation of the disease. Sir Dyce Duckworth (Medico on Gout, p. 72) is of the opinion that they are sometimes gouty in nature. I have observed them in cases of rheumatoid arthritis, in cases of true rheumatism, in gout, and also in cases in which they were the only articular lesion present. I should be inclined to give them a separate classification and to regard them as an affection more likely to develop when there is some other articular disease present.

Abnormality of Movement.

In rheumatoid arthritis movement of
the joints is as a rule, limited, but in some cases more rarely it is abnormally free. Adams (p. 338 et seq.) describes cases of the latter kind. In one case underlying observation both shoulder joints could be dislocated in almost any direction. Such cases are found in the late stages of the affection with much disorganisation of the joint. For more common however is abnormal rigidity, and this is present even in the earliest stages. It varies from slight stiffness to absolute rigidity. disability to close the fngers on the palm is a frequent early sign. In most joints, however, limited power of extension is the more frequent result. It is, I think, partially due to, and greatly increased by want of use, and tends to pass off if movement of the joint be permitted in, and is always less marked in the joints most used. For example, stiffness in the temporomaxillary joint soon passes off, or if I have no doubt to the fact that despite the temporary inconvenience, movement of the joint
is still carried on. The phalangeal
and metacarpophalangeal joints about an
fairly free movement, whilst the wrist,
at which joints movement is not so
inexpansible to the patient soon
become rigid. Rigidity is more marked
in the lower extremities than the upper
owing to patients ceasing to use the former
and taking to a chair whilst still
continuing to use the latter in needlework,
at meals, etc.

Breaking and grating of the articular surfaces
These signs are often described by the
patients themselves as being present
in the joints, and they may be elicited
by passive movement. If, for example,
we examine the knee in the manner
described by Adams (p. 358) i.e. by laying
one hand on the joint so as to grasp
its anterior surface and then flexing
and extending the leg with the other
hand; we may feel a cracking sensation
suggestive of the rubbing of roughened
cartilaginous surfaces when one antedotes,
in, on the other hand, distinct grating produced by two demineralized bony surfaces coming in contact. As A.F. Ganea points out (p. 253) this sign is one of the most valuable diagnostic features in the more deeply seated joints which do not so readily lend themselves to external examination in other ways. He points out that it must be distinguished from the ordinary cracking met with in other articulare affectations. This latter form is felt to be more superficial and is finer in character. It appears to be due to changes in the fibrous tissue and synovial membrane rather than to alterations in the cartilage or bony structures, and is often present in rheumatoid arthritis and may be present before cracking or grating can be elicited.

**Distortion**

There are few diseases capable of producing so much deformity as rheumatoid arthritis. If pain in
degree from slight contraction to complete dislocation of a joint.

The distortions occurring in the hands have been studied and clamped by Blancot. (A.E. Garrod p255). There are two main types 1 flexion 2 extension, with subvarieties. The cause of such distortion is no doubt the action of muscles upon joints of which the ligaments are weakened, and the type of deformity produced will depend upon the relative strength of different muscles.

A.E. Garrod (p258) regards the interossei as important factors in the production of deformity. "When the interossei are strong he states "their spasmodic contraction will tend to produce deformities of the type of extension, whereas if they are weak, they will be overpowered by the other muscles and extension of the phalanges upon the metacarpals and flexion of the middle joint will result." Now the interossei are small muscles, and are nearly always wasted in chronic alcoholism.
arthritic and deformities of the type of extension are frequently seen in cases in which there is much muscular wasting and emaciation. I think it more probable that the larger muscles, viz. the flexors and extensors, favour to do with the production of deformity, which varies as different muscles react.

Radial deflection is a very common deformity seen in the hands, the fingers being bent upon the metacarpus to the ulnar side. It is agreed as of the opinion that this is not due to muscular action, but to weakening of the support given by the ligaments whereby the fingers fall to the ulnar side if 252, 253. The points out that in a normal hand, radial deflection can be produced by pressure, whilst no similar deflection to the radial side is possible. If 253, 253.

It is difficult to understand how such distortion could be produced without muscular action. The long flexors arising from the internal condyle
acting upon weakened joints would tend to produce a deformity of this description and I have found that it is always more pronounced in cases in which the patient has used the flexor muscles in grasping sticks or canes.

Although a large proportion of cases can be classified as corresponding to a certain type of deformity, there are a great number of cases which cannot be so classified, and the deformity is not always symmetrical. For instance, in one patient, a joiner by trade, the left hand showed flexion of the terminal phalanges with hyper-extension of the second phalanges, whilst exactly the opposite condition was exhibited in the right hand. Any common deformity is contraction of the last two fingers only upon the palm. Dislocation of the finger joints may take place and this usually occurs at the metacarpophalangeal joints. In one case a woman aged seventy, the whole of the fingers of both hands
new elicitated forwards on to the metacarpal bones. This was accompanied by marked ulnar deviation, the tip of the fifth finger of both hands being in the position normally occupied by the little finger, and there was consequently considerable overlapping of the fingers.

Dislocation in the thumb usually takes the form of hyperextension and it is not uncommon in long standing cases to find the second phalanx bent nearly to a right angle to the radial side.

This deformity is probably due to the combined action of the flexor longus pollicis and extensor secondii interð digitalis pollicis. I found an exactly similar displacement present in a case of compound fracture of the thumb into its phalangeal joint under treatment a short time ago, and which could only with difficulty be retained in its natural position by splints.

Of the other joints of the body contracture is the most marked deformity and is frequently seen in the elbow and
knees. In the latter it is greatly in-
creased by the persistent use of a chair.
Occasionally as Adams describes (p 189)
in the knee there is rotation of the bones
of the leg outwards so that the foot becomes
excited; and the patella may occupy
an abnormal position. Very little distorsion
is as a rule produced at the wrists.
Various deformities of the toes are present,
but less in degree than those found in the
hands.
In discussing limited movement in
joints I tried to point out how much
this was influenced by the amount of use
to which they were subjected. The same
applies to distortion which is always less
marked in those cases in which the
limbs are subjected to more use. A
striking example of this fact occurred in
a patient admitted to the Devonshire
Hospital last year. The patient was a
female aged 63 who had suffered
from rheumatoid arthritis for sixteen
years. She was crippled and had
not walked for 7 years. She was confined
toes, and the knees were contracted to a right angle. The condition of the upper extremities was most interesting. All the fingers of the right hand were partially dislocated forwards on to the metacarpals. The fingers of the left hand were in much the same condition with the exception of the middle one which was in its normal position, fully movable and could be fully extended. The left elbow was enlarged, contracted and immovable whereas the right elbow was freely movable.

The patient informed me that he spent most of his time in bed in bed, and explained that the middle finger of the left hand was the one used in hooking up the thread in this work, whereas the right hand was used in drawing up the thread from the back on the floor and so necessitated movement at the elbow joint.

Other symptoms.
Neuralgic pains in various parts of the body resembling stone of...
So called muscular clausuraion are sometimes complained of.
A.H. Garrett mentions massive muscular atrophy, muscular spasm and excessive tendon reflex as typical features of the disease (pp. 254, 255, 256).
Muscular atrophy is often extreme especially in young subjects. A.H. Garrett points out that this is not merely the result of disease, but is probably reflex from peripheral irritation in the joints as shown by Garre. (Diseases of the Nervous System 2nd ed Vol III p 498)

Excessive tendon reflex. - A.H. Garrett considers that this condition although not invariable is present in the majority of cases (p. 255). I have found exaggeration of reflex only present in a small proportion of cases, and in these in which muscular wasting was most marked.

Muscular spasm. - This also I have found to be by no means a constant feature, although present in many cases. Cramps in the legs is frequently complained
of, and at times the whole limb is drawn up, the condition being accompanied by intense pain. At other times jerking of the limbs or twitching of the muscles occur.

General Symptoms

Although in many cases the arthritic affection is the only prominent feature, in the majority of cases it is accompanied by more or less constitutional disturbance. Loss of appetite and depression are very common. The patient becomes emaciated and other signs of debility such as ulcerating sores show themselves.

Anaemia is such a constant feature that it deserves special attention. In a number of cases in which I examined the blood, I found that almost invariably the deficiency was in the amount of haemoglobin rather than in the number of the corpuscles. In some cases I found the amount of haemoglobin to be as low as 4.5 percent, but in no example did the corpuscles fall below 3,000,000.
Disturbance of the urinary functions, generally in the form of albuminuria is common now especially in young subjects as would be expected in a debilitating disease of this kind.

Condition of the urine

My experience of the state of the urine in rheumatoid arthritis has been that in most cases, the quantity is diminished, it is pale in colour and of low-specific gravity, and the amount of uric acid is diminished. I have found no tendency to albuminuria or glycosuria.

Complications.

Fulcher (p. 384) mentions chlorpromazine as a complication as also does Sir A. Ganod (p. 577). This I have found to be very common and is no doubt due as Fulcher points out to impaction of the uric acid of the ear. Among vesicular forms of the disease Sir A. Ganod (p. 577) includes eye affections such as sclerotic, iritis and conjunctivitis. Fulcher also (p. 383)
mentions inflammation of the eye as a complication. But in the note at the foot of the page Fuller states that he doubts whether this condition is as common as he thought when he wrote his first edition, and whether some if not all of the cases, from which he formed his opinion, may not have been cases of obscure gout or general rheumatism. I have noticed no special liability to such affections in this disease. Sir A. Garrod (1859) has observed cases of aphonia and difficulty in swallowing which he attributes to implication of the arytenoid cartilages. He mentions also hemorhoids, prurigo, and eczema as complications, but I have observed no special tendency to such affections in rheumatic arthritis.

Visceral Lesions.

In a disease which presents so many points in common with rheumatism, it is interesting to enquire whether there is any tendency to implication of the heart, pericardium, and pleura as in
the latter disease. Fuller (p. 383) in the original text regarded pleurisy as an important complication, but in the note to the 3rd edition (p. 382) he states that since the publication of the first edition, he has had reason to doubt this. He says here "I have never met with a case in point, and after carefully reconsidereing the recorded cases, my impression is that they are all cases of true gout or true rheumatism." He states (p. 333) that rheumatic gout may attacks the heart membranes. Sir A. Garrod says (p. 524) "I have never met with an instance in which I can trace the occurrence of pericarditis or endocarditis to rheumatic arthritis disease." A. Garrod writes (p. 262) "Undoubtedly signs of valvular disease are not very uncommonly met with in patients suffering from rheumatic arthritis, but when such are present there is usually a history of a previous attack of rheumatic fever, and it must not be forgotten that rheum-
acute arthritis may follow less severe rheumatic attacks.

Of my 335 cases 17 had valvular heart disease. Five of these had distinct histories of rheumatic fever and may therefore be excluded. This leaves 12 cases of heart affection as a percentage of 3.6 nearly, which is a very small one compared with that of a series of cases of true rheumatism. An analysis of 1000 cases of the latter disease admitted to the Deaconess Hospital 1893 showed the percentage of heart complication to be 28.

I think that when affection of the heart is found to be present in rheumatoid arthritis, the patient has previously suffered from acute rheumatism although perhaps ignorant of the fact. And it must be borne in mind that, as Beadle pointed out (Rheumatic Heart in Childhood, Narrative Crabit 1888 p.72) the articular disease is only one of the rheumatic manifestations, and the heart may be affected.
When the articular inflammation is so slight as to be overlooked.

Clinical Types of Polyarticular Rheumatoid Arthritis.

In a disease presenting so many different characters it is impossible to draw any hard and fast line of distinction between different types. Widely speaking, however, I think that polyarticular rheumatoid arthritis may be said to manifest itself in two main forms, the characteristics of which I will briefly describe.

Type I. A type in which the disease commences early in life, i.e. before 30 as a rule, and often in an already debilitated subject. It is rapidly progressive, quickly attacking joint after joint, so that within a few months or even weeks, nearly every joint in the body may be affected and
the patient soon becomes crippled. The articular affection is accompanied by a good deal of pain, it is marked swelling of the joints in the early stages and fluid is frequently present. Implication of the cartilages soon becomes manifest and later enlargement of the ends of the bones takes place. Much distention frequently results. In this type the constitutional symptoms are present to a greater degree, ita being anaemia, muscular wasting and muscle emaciation.

**Type II.** A type commencing at any age but more frequently after 30. The course of the disease is more chronic and is chiefly characterized by slow enlargement of the joints with limitation of movement and crumbling on movement. Fluid as a rule is absent and the enlargement occurs. In the earlier stages appears to be of the character of fibrous tissue or long enlargement rather than of distended
synovial membrane. It is apt to result in great rigidity of the articulations but less distortion than in the type previously described, and is comparatively painless. The articular affection is less general or at least slower in its progress from joint to joint. The constitutional symptoms are comparatively slight or absent.

Clinical features of localized pleuritic arthritis

In the foregoing account of the clinical features of pleuritic arthritis, I have referred only to the disease in its polyarticular or constitutional form. I now wish to deal shortly with the localized variety.

Distribution.
By far the commonest seat of this
disease is the hip joint, Malarus Coxeae, as it was called by Adams (p.47). I have seen a few examples of the disease occurring locally in the knee, shoulder and ankle, but nearly all the cases admitted to the Devonshire Hospital were examples of the disease as it affects the hip, and I have made a separate analysis of those. Sometimes both hips are affected but more usually it is unilateral. Of 56 cases 36 had the disease on the right side, 22 on the left side, and 7 cases on both sides were affected.

Symptoms

Pain and stiffness are the earliest symptoms complained of, and there is usually referred as well as local pain. It is very commonly felt in the line of the sciatic nerve, also in the groin, the part and outer side of the thigh and below the knee. The pain is aggravated by movement, but as Adams points out (p.49), pressure on the articular surfaces together does not
increase it. Movement of the joint becomes limited and in advanced cases little or no movement may be obtained. The patients will often themselves call attention to the cracking which is present on movement in the joint and in at all advanced cases this can be felt on examination. The best way of eliciting it is to have the patient recumbent, and to grasp the external surface of the joint with one hand whilst with the other the thigh is flexed and extended upon the abdomen. As the disease progresses deformity results, shortening and eversion of the tendo taking place. The actual amount of shortening, as Adams has shown (1844), can only be made out by careful measurement; as the apparent shortening is in part due to obesity of the pelvis. In most cases, in which the affection has lasted for any length of time, enlargement of the joint can be made out. The joint is too deeply fixed for its previous character to be made out. But the great trochanter
appears to be fuller and broader than natural, and in some cases fulness can be seen and felt in front of the joint. The articular effusion may be accompanied by muscular atrophy. The thigh is wasted and thin. In the earliest stages some flattening of the mallei on the affected side is present. In some cases the knee-jerk is exaggerated. No constitutional symptoms accompany this form of the disease.

Before proceeding to the differentiation of rheumatomatous arthritis from other forms of articular disease, it will be convenient here to mention some of the points of difference between the localized and polyarticular varieties. There does not appear, from Adams' description, to be any difference in the morbid anatomical features, but so greatly do the two terms differ in other respects that it would almost appear that they
were separate and distinct affections. The main points in which localized rheumatoid arthritis differs from polyarticular are I think the following—
1. It is a disease to which the male sex are especially liable, whilst polyarticular rheumatoid arthritis is more common in females than males.
2. It is a disease of advanced life, rarely occurring before 40, whilst the constitutional form is as equally common before as after that age, and may be seen in young children.
3. Its distribution. It is localized and attacks the larger joints more especially the hip, a joint rarely the seat of the polyarticular form which on the other hand shows a preference for the smaller joints. It is exceedingly difficult to explain how a joint such as the hip, located in the one case to be particularly liable to suffer, and in the other case particularly immune from a disease, presenting the same anatomical characters.
4. There is an absence in the localized
variety of the constitutional symptoms
to common in the other, even when a
few joints only are affected.
Differentiation.

Rheumatoid Arthritis and Chronic Rheumatic Arthritis of Hugh Lane—Hugh Lane has classified the rheumatic diseases so called as follows:
Chronic Rheumatism,
Chronic Rheumatic Arthritis.
Chronic Rheumatoid Arthritis.
(Differentiation of Rheumatic Diseases so called, 2nd ed. 1892, p. 21)

It is to be regretted that the last two names, which are so widely used to indicate one and the same disease should have been chosen by him to indicate two separate affections.

He defines Chronic Rheumatism (p. 22) "cases in which the joints are painful but not swollen, or in which there is arthralgia associated with myalgia or a pain from it, or in which there is a general neuralgic condition supervening on an attack of acute rheumatism. In short words, it might be said that as regards the arthritic condition, pain
only is complained of, and structural change is absent.

"Chronic rheumatic arthritis" as described by Hugh Lane (pp. 23–25) is an arthritis in which rheumatism plays an important part and which follows an attack of acute or subacute rheum-
atism. The patient recovers more or less from this attack and after a time with-
out any particular exacerbation, swelling in the joints begins to show itself. 
These swellings have not the thickening of the capsule to the same extent as rheum-
atic arthritis and there is no effusion except of rheumatic synovitis. Adhesions 
may form leading to ankylosis. As in rheumatoid arthritis the patients are 
pale and anaemic emaciated but the anaemic condition is not so persistently 
present. The configuration of the swelling appears as an exaggeration of the articular 
ends of the bones. From this descrip-
tion it appears that "Chronic rheumatic 
arthritis" differs from rheumatoid arth-
itis "chronic rheumatism" as described by
High Jane on the presence of structural change in the joints. How does it differ from rheumatoid arthritis?

She has drawn up a table of differences (p. 45). Most of the distinctions are features which are not constant ones in rheumatoid arthritis such as the constitutional symptoms, anaemia, muscular atrophy, condition of the esplens, etc. She states that in "chronic rheumatic arthritis" the articular enlargement differs in character from that of rheumatoid arthritis and that the disease does not go on to disorganization of the joints as in the latter affection. Now, cases which are undoubtedly examples of rheumatoid arthritis vary so much in the configuration of the articular swelling and in degree that it is impossible to draw any hard and fast line of distinction of this kind, and De Jane's statements are not based upon pathological observation which would be necessary to
prove the distinction. After a careful perusal of Dr Lane's work I have felt how forced to conclude that the only real point of difference between the diseases he calls "chronic rheumatic arthritis" and rheumatoid arthritis is, that in the former, there is always a history of true rheumatism. Cases which have the usual character of rheumatoid arthritis with commencing with rheumatism must should I think be included under that term. Sir A. Garrod (Lancet 1892 Vol II p 1037) referring to this matter said "I quite think that true rheumatism in the form of rheumatic fever, may be one of the many causes which lead to the production of rheumatoid arthritis, but if the induced disease have the characteristics of rheumatoid arthritis I do not think that this name (i.e. 'chronic rheumatic arthritis') is appropriate. The disease is the same whatever the causes which may have
give rise to it."

In a supplementary statistical report drawn up and added to the usual medical report of cases admitted to the Devonshire Hospital, 1893, by my colleague Dr. Gunter and myself, we classified rheumatism as follows:

1. Chronic non-articular rheumatism
2. Chronic articular rheumatism.

In the former group were included cases of rheumatism in which structures other than those of the joints were affected: such as lumbago, rheumatic affections of the fibrous tissue, etc.

In the latter group viz. chronic articular rheumatism were included all cases of rheumatism of a chronic nature in which the symptoms were referable to the joints. It might be only pain that was complained of or pain accompanied by slight stiffness, or in the other hand in which there was chronic synovitis or perhaps marked fibrous adhesions and deformity. In this group however no cases were included.
in which there was enlargement of the ends of the bones or implication of the cartilages, the latter being classified as rheumatoid arthritis independently of a rheumatic history. Many cases which we call chronic articular rheumatism would I have no doubt be termed by Hugh Lane 'chronic rheumatic arthritis, and cases included by us as examples of rheumatoid arthritis would also probably come under the same heading. I cannot see the necessity for the introduction of this third group intermediate as it lies between chronic rheumatism and rheumatoid arthritis, which only adds a fresh complication to a distinction already none too clear, and I should rather be content with separating rheumatoid arthritis from chronic rheumatism, or chronic articular rheumatism as indicating more especially an affection of the joints.
from chronic articular rheumatism.

Disregarding the "chronic rheumatic arthritis" of Hugh Lane I wish to indicate a few points of distinction between rheumatoid arthritis and chronic articular rheumatism. No hard and fast line can be drawn between the two, and cases of chronic rheumatism sometimes appear to shift imperceptibly into the rheumatoid condition. But speaking generally I think they may be said to present the following differences.

1. History and course. — In chronic articular rheumatism there is usually always a history of acute or sub-
acute rheumatism, and this is found only in a small proportion of cases of rheumatoid arthritis. In chronic articular rheumatism the course of the disease is marked by attacks of acute or subacute rheuma-
tisms, the joints in the intervals remaining pretty much in the same state, whilst rheumatoid arthritis is
as a rule a gradual progressive disease, and unaccompanied by acute attacks.

1. Distribution and character of the articular affection. In chronic articular rheumatism, the disease is less symmetrical and less general, fewer joints being implicated than in rheumatoid arthritis, and it is the larger rather than the smaller joints which suffer most. This is illustrated by the following table taken from Devonshire Hospital cases, the joints as in the previous tables being placed in relative order of frequency of affection.

<table>
<thead>
<tr>
<th>Rheumatoid Arthritis (from 335 cases)</th>
<th>Chronic Arthritis (from 650 cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hands 87%</td>
<td>1. Shoulders 48%</td>
</tr>
<tr>
<td>2. Wrists 76%</td>
<td>2. Knees 47%</td>
</tr>
<tr>
<td>3. Knees 72%</td>
<td>3. Hands 39%</td>
</tr>
<tr>
<td>4. Ankles 58%</td>
<td>4. Ankles 35%</td>
</tr>
<tr>
<td>5. Shoulders 54%</td>
<td>5. Feet 25%</td>
</tr>
<tr>
<td>6. Elbows 49%</td>
<td>6. Wrists 17%</td>
</tr>
<tr>
<td>7. Feet 45%</td>
<td>7. Elbows 11%</td>
</tr>
<tr>
<td>8. Stipes 19%</td>
<td>8. Stipes 12%</td>
</tr>
</tbody>
</table>
In chronic articular rhematism the temporomaxillary joint and spinal column are rarely affected. There may be general swelling present in the joints, and fibros adhesions may form and some effusion to present on movement, but there is no enlargement of the ends of the bones, and the fingers do not present a low affected that fibrous appearance characteristic of rheumatoid arthritis. Breaking or grating of the joints on movement is never present.

3. General symptoms. In rheumatoid arthritis these are more marked and anaemia and emaciation are usually present. When constitutional symptoms are found in chronic articular rhematism, they are only so to such a degree as would be expected from deprivation of fruits and exercise.

4. Visceral affections—so common in chronic articular rhematomas are rarely present in rheumatoid arthritis, and seldom found in the latter, there is usually a history of acute rheumatism.
The differentiation of rheumatoid arthritis from gonococcal rheumatism often presents great difficulty as this disease is so often accompanied by marked anaemia and emaciation similar to that seen in rheumatoid arthritis.

The history of the case and the absence of long enlargement and grating will be the chief guides. But it must be borne in mind that gonococcal rheumatism like simple rheumatism may develop into rheumatoid arthritis. I have seen several cases in which the history strongly pointed to this.

Differentiation from gout.

In a postgraduate lecture which I have previously referred to, "The great practical importance of separating rheumatoid arthritis from gout" (Lancet 1892 Vol. II p. 1033 et seq.) Sir Alfred Garrod laid special stress upon separating these two diseases, from the point of view of treatment. Patients, he said, had come under his care, suffering
from rheumatoid arthritis who had previously been treated for gout on lowering principles, said the result that the progress of the disease had been considerably favoured. He proceeded to describe many points of difference between the two affections. The following are I think the most important points in differentiation:

1. Secondary tendency so marked in gout has little influence in rheumatoid arthritis, and whilst gout is a disease of advanced life and of the male sex chiefly, rheumatoid arthritis frequently attacks the young and is more common in the female sex.

2. Rheumatoid arthritis unlike gout is not influenced by diet, malnutrition better than high living predisposing to its development, and it is unaffected by alcoholic beverages.

3. The distribution of the disease, in two, differs. Gout usually commences in the feet and affects only a few joints, whilst rheumatoid arthritis commences
in the hands and has a more general and symmetrical distribution, and the jaw and back of the neck, which seldom suffer in gout are frequently affected.

4. The parent constitutional symptoms, previously described, so common in rheumatoid arthritis are not connected with gout, which on the other hand is more commonly accompanied by changes in the liver, kidneys and digestive organs.

5. In rheumatoid arthritis there is an absence of uric acid in the blood or of deposition of crystals of soda in the tissues.

It is only in chronic cases that a difficulty in diagnosis presents itself. In some cases the condition of the joints in gout is indistinguishable from rheumatoid arthritis. The history of the onset is often a great help in diagnosis, previous sudden attacks of pain and swelling in the
great too pointing to joint. A careful examination for lumps in the ears and other parts will often reveal the real nature of otherwise doubtful cases. The examination of the urine is an important point and in doubtful cases its blood may be examined by Garrod's thread experiment for the presence or absence of uric acid.

Charcot's Joint Disease.
It is as yet a disputed question whether this affection of the joints occurring in connection with locomotor ataxia, and described by Charcot as a separate disease, is really such, or is identical with rheumatoid arthritis. A long discussion upon the subject took place before the Colonial Society of London Nov. Dec., and Jan 1884-5. (Report of British Medical Journal 1884 Vol II pp 1015-1016, 1135-1139, 1240-1249 and 1885 Vol I pp 19-23, 71-74.)

Widely different views were expressed...
in the debate which followed Mr. Morrant Baker's paper upon the subject. The following were some of the more important points brought out. Mr. Morrant Baker and those who supported him regarded the two diseases as identical. Sir Joseph Paget expressed the opinion that rheumatoid disease was rheumatoid arthritis modified by the accompanying nervous disease. Dr. Broadbent regarded the two as distinct but related to each other in so far as they had a like causation, i.e., alteration of nutrition owing to nervous affection; thus, in the case of rheumatoid arthritis being reflex and in rheumatoid disease due to persistent irritation of the spinal cord. Differences in the muscular anatomy were discussed. Mr. Barwell stated that in rheumatoid disease there was more wearing away and demineralization of new bone than in rheumatoid arthritis, the bones presenting a
warm Eaton appearances from wearing away of the arcuate systems, and that the surfaces were roughened and did not present that particoloured appearance seen in the latter disease; false bodies, he said, were rare, and no fibrous changes took place in the cartilages. Other authorities however held with Mr. Baker that there was no essential difference in the morbid anatomy, and that although in Ehlers-Danlos disease the chief change was severe without repair, long crepitation and erosion did take place and fibrous changes occurred in the cartilages. As regards the clinical features it was pointed out by Mr. Bumell that the large joints were affected in Ehlers-Danlos disease, that there was an absence of pain, and that abnormal and free movement was the rule rather than rigidity as seen in rheumatoid arthritis. It was also said that the changes in the joints
took place more rapidly in Blaetz's joint disease than in rheumatoid arthritis.

Consulting other authorities, I find that Howard Mask (Diseases of Joints, p. 94) states that although the two diseases resemble one another, there is a wide pathological difference. Yourself also regards the affection as distinct. (Diseases of the Nervous System Vol II, p. 1411).

From the description of cases I have read (Howard Mask, p. 83 et seq.) and others reported from time to time in the medical journals, I do not think that the examples of Blaetz's disease can be said to present the usual character of rheumatoid arthritis. The larger joints are more frequently attacked and the disease is more localised. The changes take place more rapidly and there is greater disorganisation of the joint, and more roughness of the articular surfaces. There is an
absence of pain and there is abnormal mobility of the joint rather than rigidity.
I have only met with one case of Blanche's disease in my own experience, but it presented all the characteristics above described.
The patient was a male aged 37.
The family history was unimportant and there was no history of syphilis.
He had suffered from ataxic symptoms for six years and had had an affect of the left knee for seven months. The patient presented the usual features of locomotor ataxia. The left knee was the only joint affected. It was much swollen and gave a boggy feeling to the touch. Movement of the joint was abnormally free and the patient stated that it gave way under him when he tried to walk. Very coarse grating of the surfaces of the bones upon one another could be obtained on passive movement of the joint.
No pain was complained of.

I do not think that there are any other affections of the joints at which it would be difficult to differentiate from polyarticular rheumatoid arthritis. The local characteristic, history and clinical features of tuberculous and syphilitic disease are sufficiently distinct.

In its earliest commencement rheumatoid arthritis has been mistaken for a simple sprain of a joint, more especially when commencing the wrist or ankle. Such symptoms arising without apparent cause should be regarded with suspicion. Several patients have described to me, the disease as commencing in this way, being told by their medical attendant that the condition was due to a sprain for which they were treated, whilst the appearance of the disease in other joints showed the real nature of the case.
In rheumatoid arthritis of the hip, there are some special points in differential diagnosis to be considered.

The diagnosis from tubercular disease of the hip is not difficult. The age of the patient is an important point; rheumatoid arthritis of the hip being much more in patients under the age of 30. And as Adams points out (p. 59), in rheumatoid arthritis, puerperal of the articular surfaces together give rise to little or no pain in rheumatoid arthritis whilst in tuberculous disease the pain is much increased.

The diagnosis between rheumatoid arthritis of the hip and arthritis is sometimes exceedingly difficult. This is not the case in advanced cases of joint disease in which there is much deminution of movement, distortion etc., but in the earliest stages when the pain is felt sometimes in the line of the sciatic nerve.
Adams mentions the following points of distinction (p. 60-61). In sciatica the pain is localized to the sciatic nerve and its branches. In rheumatoid arthritis rest gives great relief and on careful examination slight limitation of movement may be made out whilst it is quite free in sciatica. The seat of the pain, the absence or presence of limitation of movement and grating are the chief guides.
Progress

The progress as regards life in rheumatoid arthritis is good, but the delirial condition of the patient predisposes to intercurrent affection. Only two deaths in patients suffering from this disease have occurred in my experience. One was a man aged 57; it was due to pneumonia. The other was a severe case in a female aged 24, who was completely crippled and much emaciated, and an attack of superficial erysipelas was sufficient to cause death.

As regards a cure the progress is bad. It is only in the earliest stages that such a possibility can be entertained. Much improvement may, however, follow appropriate treatment. The progress of the disease may at any time cease and the condition remain stationary or improve to a certain extent. Many patients have told me how much better they were at the present time.
than at some previous date. As inE.
gained states (p. 264) even in ad-
vanced cases with much crippling,
after destruction of the cartilages has
taken place and the disease becomes
stationary, the patient may go
through the remainder of life with
some degree of comfort, and a certain
amount of mobility may return to
the joints.
The earlier in life the disease com-
menes, the worse the prognosis,
the greater is all probability will
be the extension and the severity the
general symptoms. In cases
occurring in young children the
prognosis is extremely bad.
Treatment.

General indications.

The clothing should be warm without being too heavy. I have noticed that patients of the lower classes have a tendency to overdo this. It is not uncommon, for instance, to find two heavy under-vests worn at the same time and sweating consequently produced on the least exertion.

Exercise. In the more acute stages of the disease accompanied my much pain, rest is of course necessary. But in more chronic cases in which it can be carried out, the more exercise the better so long as it does not involve fatigue. As well as improving the general health it prevents crippling. There is a tendency among sufferers from this disease to resign themselves to their fate and to make no effort on their own part to help themselves, and the difficulty in advanced cases as regards crippling, in those who have persisted and those who...
have not, is most marked. I think therefore that it should be our duty to encourage exercise of the joints that of producing much pain or inducing fatigue. Adams writing on this subject (p. 286) says "A moderate amount of exercise is not only not injurious but beneficial, as it tends to prevent a rigid state of the articulations. The amount of movement must in all cases be regulated by the effect produced. It should always be short of causing pain or tenderness lasting beyond the day on which it is employed."

Diet. A liberal and nutritious diet gives the best results, so long as it is assimilated and stimulants may sometimes be added with advantage. As Sir W. Garrod has shown, (Lancet Vol II 1892 p 1034 et seq.) the treatment in this respect is the reverse of that of gout. Fuller was of the opinion that sugar and sweets should be avoided (p 374), and Adams that vegetables should be used only in small quantity (p 376), but I have
not found either in moderation to act injuriously. The best results in the treatment of rheumatoid arthritis, are obtained by improving the general health and raising the tone of the patient, and in this a liberal diet is an all important feature. I have seen very rapid improvement take place in weakly and illnourished patients, who, from these circumstances, have been unable to procure suitable articles of diet, when allowed plenty of milk, beef tea and other articles of nourishing food.

Medicinal treatment.

There are few classes of disease in which the use of a greater variety of drugs has been recommended than in those of the so-called 'rheumatic' class. I can only mention the more important of those used in the treatment of rheumatoid arthritis.

Arsenic was regarded by Fehille to be a valuable drug (5362), but a good (5362).
Barwell (p. 397), A. G. Garned (p. 394) and others also recommend it. The results obtained with arsenic have in my experience been disappointing. This, I have no doubt is due to the fact that its use has not been extended over sufficiently long periods. I have seen good results follow its administration in conjunction with iron, but it is difficult to say how much these have been due to the latter drug.

Iron is a remedy highly spoken of by nearly all writers, and is especially useful when anaemia is one of the features of the of the disease. The oxide of iron is I think the best form, administered either as the syrup or as pill; the ammonium salt of iron is also a useful preparation.

Cod liver oil has been long recommended. Birdie found that it produced good results. (p. 347). Fuller (p. 339) Sci A Garned (p. 332) as well as other modern writers regarded it of the greatest value. I do not
think that its influence has been overestimated, and by far the best results, in the medicinal treatment of rheumatoid arthritis, that I have seen, have been obtained by the administration of cod liver oil together with iron. Fuller recommends the combination of the syrup of iodide of iron with cod liver oil. (P 359) This is as a rule well borne. The addition of Parish's chemical food to the cod liver oil renders it more palatable and this is an excellent way of administering it to children as it combines well with the beneficial effects of small doses of iron.

I have found that some patients can take this mixture who find the pure oil too nauseous. Another excellent combination is codliver oil and extract of malt. In addition to internal administration codliver oil can be used externally. In ulcerated cases especially in children I have found inhalation extremely useful. Brodie treated a case in this way with success. (P 247)
The injection can be combined with massage and passive movement of the joints.

Glucone, nux vomica and other tonics are useful in certain cases.

Iodine has been recommended, generally in the form of potassium iodide. Sir A. Garrod states that it is a valuable remedy but should be combined with some tonic. I have had few opportunities of watching the effects of this drug when administered over extended periods and am therefore not in a position to judge of its usefulness. But extended over periods of from three to twelve weeks, I cannot say that I have seen the slightest benefit result from its administration. The beneficial effects of iodide of iron may, however, be in part due to the iodine contained.

Among other drugs Guaiacum is recommended by Sir A. Garrod (p. 532) and Adams speaks well of sulphur and of that combination of sulphur and
guaiacum known as the Chelsea
Pondence' (p. 317).

Sedatives I have found to be of
little use although in some cases
they appear to relieve the pain.
Insomnia is a very common accom-
paniment of the disease, and of the
various hypnotics now in use I
have found Paraldehyde in 2-
doses gave the best results.

Treatment by mineral waters, baths, etc.
The value of mineral waters, bathing,
douching etc in rheumatic affections
was recognised by the earliest writers
upon the subject. For instance
Tredanore, (A treatise on the nature
and cure of gout and rhematism) 3rd ed
1819 (p82) mentions the use of the warm
bath and the Burton waters in the
treatment of such conditions.

Hydrotherapeutic measures are no doubt
best carried out in some resting place,
where there are special appliances for the
purpose, but this does not prevent
such a form of treatment being adopted to a certain extent at the patient's own home where a warm bath with spongeing and doucheing of the joints can generally be carried out. The number of health resorts recommended in the treatment of rheumatoid arthritis is large. Fuller (p. 379) mentions Bath, Harrogate, Buxton, Woodhall and Mortimer in this country, and Axte Confere, Wiesbaden, Wiltbad, Baden-Baden, Sarzbad, Tepu and Vichy on the continent. Sir A. Garred quotes Axte Bavis the best (p. 536) and also speaks favorably of Buxton (p. 537). To what is the improvement that takes place under treatment at such places due? It has been supposed by some that the reactive passers constitute of special therapeutic value. But when we compare the analyses of the different springs we find that they present great differences both in the quantity and variety of their various mineral and gaseous constituents, and
the one constituent which they may be
david to have in common is water alone.
(See analyses of the waters of the
principal British and continental
springs are given in St. Agur's
work pp. 564-575 and in Fuller's work
pp. 396-400.) In certain cases the
purgative and diuretic properties of water
rich in sulphate of soda, magnesia,
and such salts, such as that of balsam,
may be beneficial. And the stimulating
and astringent action of waters containing
an excess of chloride of sodium, such as
that of Stratford, may be equally
suitable in some cases. It is also
possible that the sulphur springs may
owe their therapeutic effect in part to
that constituent and the same may
be said of the bismuth and iodine
in the Woodhill waters, these substances
having been found useful when adminis-
tered in other ways. The simple
thermal waters, however, such as
those of Bath and Buxton,
appear to be equally beneficial in the
majority of cases, and I think it probable that the good results which follow such treatment are due to the whole method of treatment rather than to any special constituent contained in the water. We must also take into account that residence at a health resort, baths, or should entail a healthy climate, rest, change, more regular habits & all of which have their influence as pointed out by Fuller (p 378). To whatever cause it is due, one thing is certain, i.e. that such improvement does take place and in cases which both have resisted every kind of treatment adopted.

Now propose to deal more particularly with the Buxton mineral waters and the manner in which they are used, in the treatment of rheumatoid arthritis by the patients of the Dispensary Hospital. Buxton as a health resort possesses many advantages. The greater part of the town lies 1000 ft above the level of the
sea and the air uncontaminated as it is by smoke and other sources of pollution from manufactures is particularly pure and bracing. Such a situation, however, must involve some disadvantages. It is somewhat cold and there is an excessive amount of moisture. The supply of mineral water appears to be inexhaustible. It rises from the ground at a temperature of 82°F. It is bright and clear in appearance, of a faintly blue color when viewed in bulk, colorless and tasteless. When freshly obtained it is seen to contain bubbles of gas; this is the nitrogen with which gas the water is highly charged.

I append in full the latest analysis of the water, that of Dr. Heath in 1882. (Robertson, A Guide to the Use of the Buxton Mineral Waters, 2nd ed. p. 40)
<table>
<thead>
<tr>
<th>Substance</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicarbonate of calcium</td>
<td>14.01</td>
</tr>
<tr>
<td>&quot; Magnesium</td>
<td>6.02</td>
</tr>
<tr>
<td>&quot; Iron</td>
<td>0.03</td>
</tr>
<tr>
<td>&quot; Manganese</td>
<td>0.03</td>
</tr>
<tr>
<td>Sulphate of Barium</td>
<td>0.05</td>
</tr>
<tr>
<td>&quot; Calcium</td>
<td>0.26</td>
</tr>
<tr>
<td>&quot; Potassium</td>
<td>0.62</td>
</tr>
<tr>
<td>&quot; Sodium</td>
<td>0.84</td>
</tr>
<tr>
<td>Nitrate of Sodium</td>
<td>0.03</td>
</tr>
<tr>
<td>Chloride of calcium</td>
<td>0.02</td>
</tr>
<tr>
<td>&quot; Sodium</td>
<td>3.10</td>
</tr>
<tr>
<td>&quot; Ammonium</td>
<td>Trace</td>
</tr>
<tr>
<td>&quot; Magnesium</td>
<td>0.95</td>
</tr>
<tr>
<td>Silice acid</td>
<td>0.95</td>
</tr>
<tr>
<td>Organic matter</td>
<td>0.02</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>0.20</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>0.19</td>
</tr>
<tr>
<td>Lithium, thoriun, lead</td>
<td>Trace</td>
</tr>
<tr>
<td>Acid and phosphoric acid</td>
<td>Trace</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27.32</strong></td>
</tr>
</tbody>
</table>

The most noteworthy feature is the presence of an excess of nitrogen gas.
At the moment of its issue from the spring it has been calculated by Sir Lyon Playfair that the amount of nitrogen contained in 206 cubic inches per gallon (Robertson p. 34), of which is given off when pressure is removed. To the presence of this gas the medicinal value of the water has been ascribed and it has been argued that the liberated gas in a gaseous state may produce effects unattainable by the use of the same agent in any other condition. (Robertson p. 34). It is difficult to understand how an inanimate gas such as nitrogen could exert any special influence and I should prefer to regard the Brenton water as a simple thermal water and not attribute its beneficial results which follow its use to any particular constituent which it contains.

Herman Weber thus describes the action of such a water (Stain's Dictionary of Medicine, 1873 ed. Article, Mineral
Taken internally, the salve is worked out, the reactions promoted increased, tissue change augmented and removal of effete material from the blood promoted.

Used locally as baths: 1. They soften and purify the skin. 2. They equalize and diminish the loss of heat. 3. The circulation of the skin is accelerated. 4. The organic functions and tissue change are slightly stimulated or facilitated without any strong reaction on the part of the organism. 5. The nervous system and muscular irritability are calmed. 6. The absorption of exudations is promoted.

That such a therapeutic agent, combined with improved hygienic conditions, is likely to prove of service in rheumatoid arthritis is obvious, and I do not think that we need look further for and explanation.
Mode of using the water

1. Internal administration. Patients are ordered to drink one, two or three glasses of the water daily as the physician thinks desirable. In those of a constipated habit, a glass before breakfast is taken with advantage.

2. External use. The baths latter are either what is termed a "Natural Bath," i.e. one at the natural temperature of the water 82°F, or what is termed a "Hot Bath," i.e. one in which the temperature of the water has been raised by artificial means. Baths are rarely prescribed above a temperature of 100°F in this disease, and the temperature ordered will vary with the condition of the patient, state of the heart, etc. For instance, in a patient of debilitated constitution or weak circulation a bath of the temperature of 82°F would probably be too cold and sufficient reaction not produced. In such cases a bath of a temperature nearer that of the body is more likely to prove...
of benefit. Baths are also classified as "half-baths," "three-quarter baths," and "full baths" according to the depth to which the body is immersed. A bath in which only the lower part of the body is allowed to be submerged may be used with safety in cases of organic heart disease in which full immersion might prove dangerous.

The duration of the bath is from five to twelve minutes and it is used on alternate days or every day according to the state of the patient and effect produced.

Movement of the joints whilst bathing is encouraged and friction with the hands is also of service.

Soaking of the joints in addition to the bath is usually ordered.

In some cases in which the state of the patient does not admit of the use of the bath, warm douching and spraying of the joints can still be carried out.

The duration of the treatment will depend upon the severity of the case. Except in very
slight cases a course of at least six weeks is desirable and often a stay of twelve weeks is necessary before any marked improvement results.

After the first week or two there is often some exaggeration of the symptoms and increased stiffness is generally complained of. This however is usually a good sign and rapidly subsides, improvement following. In favorable cases the improvement is both local and general. The tone of the patient is raised, the appetite improved, and secretions promoted. Locally the pain is lessened, the swelling diminishes, and greater mobility returns to the joints.

The best results are obtained in the early cases, the less advanced the disease, the greater the benefit obtained.

In far advanced cases with much crippling and distortion, a disorganization of the joints little can be done, though perhaps some alleviation may be obtained.
Other means of local treatment
When the inflammation is at all acute a lead and opium compress is useful and in some cases I have found great relief given by a lotion consisting of Lig. Potass. fi. Tinct. Opii fi.
Aqua ad xxx.
Quercitron is of service in more chronic cases, especially to the larger joints.
Small blisters placed on either side of the knee may be used with advantage, and a blister behind the great trochanter in hip joint affection often relieves the pain. I have also seen good results follow painting with liniment of iodine. When this is done it is well to apply a wet compress afterwards and to cover with oiled silk or marcellin so as to encourage absorption. The linimentum Iodii of the Pharmacopoea is apt in some cases in which the skin is tender to produce too much irritation. In such cases I have found equal parts of the linament and tincture better...
The tincture alone is too weak.

The use of some stimulating liniment by rubbing is often followed by good results in chronic cases. The largely used at the Devnshri Hospital consists of Acidi Aetis fort 3f, Lig. Ammon. fort 3f, Tinct. Thui 3f, Linum Saponis 3f. In some painful cases I have found relief obtained by the use of the liniment consisting of equal parts of tinct. Aconiti, tinct. Belladonae and tinct. Belladonae, when other means failed.

In chronically enlarged joints, mixture of Linimentum Vitrii Solidi with eau de Thaïone or Unguentum Plumbi Solidi, is useful.

When the joints are enlarged, there being synovial swelling or fluid present, firm strapping is very successful, and greatly diminishes the swelling.

Much can be done to remedy and prevent distension. Manage and passive movement.
are useful in this respect, and patients with encouragement can do a good deal for themselves. Great assistance in working is given by the so-called coiled apparatus which possesses the advantages of encouraging free movement of the joints than the ordinary crutches whilst at the same time it can be used with more confidence, as placed in this contrivance it is almost impossible for the patient to fall if the arms are still useless.

In cases of contraction of the knee joint extension by the weight and pulley may be applied. Such contraction is generally the result of the continued use of a chair, and in the less severe cases, an excellent method of obtaining gradual extension and one largely in use at the Devonshire Hospital is the following: A flat board is attached to the chair on the same level as a very slightly below the level of the seat, and projects out in front. Upon this when seated in the chair the patient's legs
or rather feels not, the weight of the limb producing gradual extension. Sometimes the application of splints is necessary to prevent contraction and for this I have found moulded pros- plastic or silicate casts the most appropriate and comfortable form to use.

Of the treatment of deformities by surgical interference I have had but little experience. But I have seen cases of subcutaneous division of tendons and forcible extension followed by good results in a few cases, and I think that much could be done by the surgeon in suitable cases.

The treatment of rheumatoid arthritis by electricity has not in my experience proved satisfactory. The use of the constant current has in some cases followed by slight improve- ment but in the majority no marked benefit followed its use. Dawson Turner, however, is of the opinion
that some alleviation is usually obtained if the treatment is per-
ceived with. (Manual of Practical
Electricity p 283), and L. E. Garrett
(p 297) speaks well of the use of
the electric bath.
Illustrative Cases.

Polyarticular Rheumatoid Arthritis Type I.

Case I.

J. S., male, 23, single, clerk.

Family History unimportant.

History enjoyed good health until nine months ago when without apparent cause the proximal phalangeal joint of the little finger of the left hand became swollen and painful. This soon extended to the back of the hand, but gradually disappeared again the enlargement of the phalangeal joints remaining. He has since had pain and swelling in the toes.

Present State. There is enlargement of the proximal phalangeal joint of the third and fourth fingers of the left hand and the corresponding interossei muscles are wasted. Movement at these joints is limited and the fingers cannot be closed upon the palm. The metatarsophalangeal joint of the great toe on
both sides is swollen, and these
joints crack on movement. Neither
joints are affected.
The patient is somewhat emaciated
but his general health is fairly good.
The pulse is 120 of high tension.
The urine is pale, clear, of acid
reaction. t/t 90 90, no abnormal
constituents.

Case 2.
A.G. 16, Single, Domestic Servant.
Family History. Mother suffered
from 'chronic rheumatism', nothing
otherwise of interest.
History. Four months previously,
up to which date patient had been
in pretty good health, the feet
and knees became swollen and
painful and she was confined to
bed for a fortnight. The disease has
run a chronic course since. He has
had pain in the temporomaxillary
and sternoclavicular joints and the
hands and wrists have been affected.
and her general health much improved.
Present State. There is swelling of
the metacarpophalangeal joint of the
first finger of the left hand and this
joint is painful. The joints of the
hands are otherwise normal. Both
joints are limited in movement
and present synovial enlargement.
the purplish swelling of the joints
being well marked when viewed from
the dorsal aspect. There is a little
fullness of the right knee but the
joint can be freely moved. The right
patella grates slightly on movement.
The left ankle is enlarged, movement
of the joint is limited and grating
can be elicited. The other joints
are normal.
The patient is very anaemic but
there is little emaciation.

Pulse 130. Reflexes normal.
Vessels very pale, clear, and
26 G. 1008.
Case 3.

C.W. Female, 23, single

Family History Father died of phthisis.

History: Was quite well until eight months ago, when she suffered from pain in the shoulders. The wrists and proximal phalangeal joints of the fingers were next affected becoming painful and swollen. This was followed by pain and swelling in the feet which confined her to bed for five weeks, and three months later the jaws and back of the neck were affected. The disease has run a chronic course since the patient gradually losing strength and getting thinner.

Present State: There is four joint enlargement of the phalangeal joints unaccompanied by pain, and movement of these joints is limited; the fourth finger of both hands is contracted. The joints are enlarged but no grating
can be made out. The left elbow is painful and stodgy but has pretty free movement; the condition of the other elbow is natural. Pain is sometimes felt in the shoulders, but nothing abnormal can be made out in these joints on examination.

On awaking in the morning some stiffness is generally felt in the back of the neck. The ankles are slightly stodgy but the other joints are all normal, as far as can be made out, although pain is felt in some of them from time to time. Patient walks with a slight limp owing to the condition of the ankle.

There is anaemia and emaciation, muscular atrophy being well seen in the case of the intersossei. The reflexes are normal. Pulse 92. Nothing abnormal in the urine. Sp. gr. 1028.

Case 4

No. 32 female Married.
Family History: Father suffered from
chronic rheumatism.

History. The patient has never been very strong. She had an attack of acute rheumatism when eight years old. She has had three attacks at intervals of a few years since then. The joints in the intervals being unaffected. The last attack of acute rheumatism was three months ago, and some of the joints have not returned to their normal state the chronic becoming chronic.

Present State. Does not have much pain. There is enlargement of the phalangeal and metacarpophalangeal joints of both hands and the fingers are slightly deformed to the ulnar side. Movement of these joints is free but grating can be felt in them. Patient complains of pain on passive movement of the shoulders and the left shoulder is limited in movement. There is a little synovial enlargement in the left knee, but movement here is free.
and no crepitation or grating can be elicited in this joint. No other joints are affected. There is a good deal of muscular wasting and a marked loss of high tension.

Urine, pale, clear, and SG 1010.

Case 5
K.B. Female, 24, single.

Family History: Father died of tuberculosis.

History: Was in good health until three years ago when she had an attack of acute rheumatism. The articular condition has existed since that time and she has had two attacks of acute rheumatism since, one two years ago and another twelve months ago. She became very weak and emaciated but her general health has much improved of late.

Present State: The hands and feet are painful at night and the joints feel stiff in the mornings.
Both hands exhibit intra-articular deflection. There is synovial enlargement of the proximal phalangeal and metacarpophalangeal joints and to some of these grating can be felt. Patient cannot close the fingers of either hand upon the palm. The left wrist is limited in movement and there is enlargement of the ends of the bones. The right wrist is slightly contracted, enlarged and quite rigid. Neither of the elbows can be fully extended. The shoulders are limited in movement and grating can be felt in the right one. The left knee is enlarged, distinct lumping of the bones can be felt, the patella is broader than normal, and grating can be felt in the joint. The opposite knee is not affected. Patient complains of pain and stiffness in the temporomaxillary joints and in the back of the neck. Other articulations are now normal.
Patient is somewhat emaciated but except for the articular condition is in fairly good health. The pulse is 88. Vomits every morning.

Case 6

L. G. Female, 15, single. Family and family history: Father had rheumatism in one. Nothing of interest.

History. Was in good health until two years ago when she noticed pain and swelling in the right ankle. This condition became chronic, and was soon followed by pain and swelling in the right hand and wrist, and the disease has gradually extended to other joints since. She has got much weaker and thinner but has never been confined to bed with it.

Present state. Most of the proximal phalangeal joints present frequent enlargement and creaking on movement.
The second phalanges are flexed upon the proximal phalanges and the terminal phalanges are hyperextended upon the second row. The metacarpophalangeal joints are enlarged and grate on movement. There is hardly any movement in the wrists which are also enlarged more especially the left one. Some bony enlargement can be made out in both elbow joints and the right one is contracted and almost immovable. Extension is much limited in the left. The shoulders have been a little painful but are now normal. Both knees present synovial enlargement and are limited in movement. The left is very painful. Slight creaking can be elicited in the right one. The ankles are also slightly swollen. The other joints are normal.

Patient can get about with the aid of a stick, but progression is slow and painful.
There is marked anaemia and
emaciation. Pulse 108, high tension.
Nothing abnormal on the serous
and organs otherwise healthy.

Case 7.
R.S. Male, 28, greaser maker.
Family History: unimportant.
History: Had acute rheumatism
at 14. Twelve months ago, up to
which time he had been in good
health, he suffered from pain and
stiffness in the right shoulder
for a short time. He recovered from
this, but six months ago the pain
in the shoulder returned. Shortly
afterwards the hands became
painful and strengthened, and since
that time the disease has been chronic
and gradually extending. He has
lately been confined to bed for twelve
weeks owing to the pain in the
joints. The temporomaxillary joints
and cervical region became affected
about a week ago.
Patient was exposed a good deal to
changes of temperature whilst at work but can otherwise think of no cause which can have given rise to his condition.

Present State. Suffers from pain in nearly all the joints. It is always worse at night when he gets warm in bed, and sometimes has painful twitchings of the legs at night. There is marked synovial thickening of the metacarpophalangeal and proximal phalangeal joints, but the ends of the bones do not appear to be enlarged. Breaking is felt in some of these joints, and movement is limited, patient being unable to close the fist. There is palmar deflection but no other distortion. The wrists are enlarged and grate on movement. The elbows and shoulders are limited in movement but the cartilages do not appear to be affected and there is no enlargement. The feet are
muck swollen and also the ankles, there being considerable oedema of these parts. The knees present marked synovial swelling and there is an enlarged bursa in each popliteal space. Pain is complained of in the hips and the left one is slightly limited in movement, but no enlargement of the joint can be made out. The temporomandibular joints are stiff and painful and the cervical region is also affected. Patient can get about with great difficulty with the help of crutches. There is great disability and emaciation. Pulse 90. Urine Sp. gr. 1010 acid. No albumen or sugar.

Case 8

Mr. C. Female aged 10.

Family history. Grandfather had "Rheumatism." No history of gout or phtisis in the family.

History. Was a healthy child up to the age of two, when the marked noticed
what she described as 'general swelling of the body,' which included the face and joints, and the child appeared to be in pain. The swelling afterwards became localized to the joints and the disease has run a chronic course since.

**Present State.** There is heavy enlargement of the phalangeal joints with limitation of movement and grating, but very little pain is complained of in them. There is no distention of the hands. The bones of the wrists are enlarged especially on the dorsal aspect, and movement of these joints is much limited. The elbows cannot be fully extended and grating can be felt in them. There is also some stiffness of the shoulders. The knees are enlarged, but do not grate and the normal amount of movement is present although not very free. Patient complains of pain in the hip joints, but on examination they are found to be freely movable and nothing otherwise abnormal can be detected. The other joints are normal. Patient is
very lame but can walk without
assistance. The pulse is 98. She
is anaemic and emaciated but
otherwise healthy.

Case 9.

A. T. Female age 6

Family History: Grandfather died
of phthisis. No history of gout
or rheumatic disease in the family.

History: Had measles when four
years old. Twelve months subsequently
she had an attack of acute rheumatism
from which she recovered and was able
to attend school for nine weeks, when
swelling appeared in the joints accom-
ppanied by pain, commencing in the
mother thumb in the feet. The
disease has gradually progressed since.

Present State: The child is intelli-
gent but ill-nourished and very anaemic.

She can use the upper extremities fairly
well but is unable to walk or stand.
The state of the joints is as follows. The
shallow arch joints present no form en-
talgement; movement is pretty free but slight grating can be felt in some of them; the metacarpophalangeal joints are also swollen. The wrists are enlarged especially on the dorsal surface and contain fluid; passive movement causes pain and grating can be felt. The right elbow is enlarged and painful, movement of the joint is limited and extension to an angle of about 135° only can be obtained. The left elbow is also affected but there is little interference with the movement of the joint. The fenes are much swollen and fluctuate; passive movement causes pain, and grating can be elicited; extension of these joints is also limited to an angle of about 135°. The ankles are also affected. The shoulders, hips and other joints including the temporomaxillary articulation are normal and no pain is complained of in the back of the neck. A soft systolic murmur is audible in
the aorta area, the pulse is 130. The reflexes are not exaggerated; there is nothing abnormal in the urine and the patient is otherwise healthy.

Case 10.
C. M. Female age 44.
Family History. Father and grandfather suffered from rheumatism.
History. Patient was quite strong until twelve months ago, when the ankles became painful and swollen; the left joint was attacked immediately afterwards and then the handy the disease gradually extending to other joints. She has been unable to walk for some time and has got much weaker and thinner.

Present State. Patient complains of pain in nearly all the joints, which is intermittent in character. She is much crippled being unable to walk and when up is confined to a chair. The proximal phalangeal joints of the first and second fingers
of the right hand are enlarged. The fingers of the left hand are irregularly distended, and there is slight ulnar deflection in both hands. Some enlargement is present in the elbows, but movement is fairly free. Both wrists are enlarged and rigid. The ankles are also enlarged and have very little movement; there is bunched fascia on the right side. Both knees are much swollen and fluctuate; they are contracted and with difficulty can be extended to an angle of 135 degrees, grating can be elicited on passive movement. The shoulders are painful and crepitate slightly when moved. Pain is from time to time complained of in the hips and also in the temporomaxillary joints. Patient is anaemic, an examination of the blood showing the corpuscles to be 4,000,000 and haemoglobin 60%. There is a good deal of muscular wasting and the knee joints are exaggerated. The pulse is 116.
Case 11

S.B. Female, 39, married.

Family History: Father and mother both died of phthisis. No history of genitourinary disease.

History: Patient has never been very strong, but enjoyed fairly good health until five years ago when the hands became painful and began to swell. The forces were soon attacked and the disease has gradually extended. She has been unable to work for twelve months.

Present State: There is scarcely any enlargement of the phalangeal joints but the hands are distorted; in most fingers the terminal phalanx is flexed upon the second and the second hyperextended upon the first. The metacarpoophalangeal joints and the wrists are enlarged and grate on movement. The elbows are contracted and the shoulders are greatly limited in movement. The ankles and feet are much swollen and there is
considerable oedema of the legs. The knees are much enlarged and quite unmovable, although, however, is fairly free. Both hip joints are limited in movement. Patient is entirely helpless, she can feed herself but cannot do any little work by herself.

The lower extremities are quite useless and she is unable to move in bed. The complaint of feeling chilly during the day and hot at night after going to bed. She has a good deal of pain at night. Patient is somewhat emaciated but her general health is pretty good.

Case 12.
E.F. Female 53, Housewife.

Family History. Nothing of interest.

History. Patient was healthy up to the age of 23 when the affection, which she attributes to working in a damp place, began. The joints of the thumbs were the first to become painful and swollen, the fingers soon after.
woods affected and the disease gradually extended to nearly every joint in the body, including the small distal phalangeal joints. The disease has existed for the last thirty years the symptoms varying in severity, but the patient is now much better and the synovial swelling has disappeared.

Present State: The hands show ulnar deviation and in most of the fingers the distal phalangeal joint is contracted, and the proximal hyperextended; and the proximal phalanges are flexed on the metacarpals. There is a little bony enlargement of some of these joints. The proximal end of the second phalanx of the thumb on each side is much enlarged and the joints are hyperextended. The joints are practically ankylosed. Both elbows and shoulders are limited in movement and there is a good deal of enlargement of the bones of the left elbow which joint produces hardly any movement. The ankles are
absent but the knees and other joints except for some stiffness at times are now normal. The pulse rate is 80. Urine t.g. 10:10 and contains nothing abnormal. Except for the arthritic condition the patient enjoys good health.

Case 13.
E.P. 445 Female, Single, Schoolmistress. Family History Grandfather had rheumatoid arthritis. History Six years ago patient met with an accident, falling some distance through a trap door. She was much frightened and shaken at the time but otherwise did not sustain much injury. She has never been well since that time, however, and seemed to lose energy and desire for work. Two years after the accident the hands became painful and swollen, and this was followed by similar affection of other joints gradually extending and patient
became very weak and anaemic. Three years ago she had an attack of Acute Rheumatism which confined her to bed for five weeks. She was unable to walk for more than twelve months after this and had to be cared for. She remained in much the same condition for a time and then began to improve. The synovial swelling gradually disappeared and movement of the joints was partially regained. Her condition has improved a good deal during the last six months.

Present State. There is a fixed deflection of both hands and the fingers are flexed to a right angle with the metacarpus. The second phalanges being extended upon the first, and the terminal flexed on the second row. These joints do not exhibit enlargement but are much limited in movement. The second phalanx of the thumb is hypercalcerotic. There is enlarge-
ment of the bones of the wrists and the joints grate. Shoulders are contracted and the shoulders are limited in movement and grate. There is synovial enlargement and a little bony enlargement of the bones but movement in these joints is pretty free; grating is also present here. The ankles suffer but to a lesser degree.

The patient, who states that she is now rapidly putting on flesh and gaining strength, is still rather anaemic and emaciated. She gets about well and can do most things for herself.

A systolic murmur can be heard in the aortal area, propagated to the axilla, the pulse is 80, regular.

**Remarks**

The above are, I think, fairly good examples of polyarticular rheumatoid arthritis corresponding to that class of cases which I have described as
Type I (p. 68) Case 1 is a slight case in which very few joints are affected. Cases 2 to 7 are more advanced and cases 4, 5, and 5 are examples of the disease commencing with an attack of acute abdominal. Cases 9 to 11 show the disease in its acute form with much crippling. Cases 8, 9, and 10, are also good examples of the affection in children. Case 9 is the youngest child in which I have seen the disease but it will be noticed that, in the case immediately preceding this, which was one of longer standing, the disease was said to have commenced at the age of two years. Cases 12 and 13 are long standing ones in which the affection has been severe, but has since become quiescent and allowed considerable improvement to take place.

The following are brief notes of cases which I give as examples of
Case 14

M.T. Female, 47, Married.

Family History: Nothing of interest. Has five children, all healthy.

History: Patient has always enjoyed good bodily health, menstruation still continues. Eighteen months ago she began to feel pain in the right knee which has become enlarged. The hands and other parts have since been gradually attacked including the temporomaxillary joints and cervical region. Her general health has remained unimpaired.

Present State: She has very little pain in any of the joints. There is slight ulnar deflection of the fingers and patient is unable to close them upon the palm. There is a little bony enlargement of the phalangeal and metacarpophalangeal joints and some of them grate on movement. The wrists are slightly limited in movement.
The right elbow cannot be fully extended but is not enlarged and the left shoulder is much limited in movement. The right elbow and left shoulder are normal. Stiffness is complained of in the jaws and back of the neck. Bony outgrowths can be felt in the right knee and the joint grates; the left knee is unaffected; there is slight stiffness of the ankles. Other joints normal.

Patient's general health is very good. Pulse 92, regular normal. Urine 5g. 1020 acid, no albumin or sugar.

Case 15

O.H. Female, 45, married.

Family History grandmother suffered from rheumatoid arthritis. Has two children, both healthy. History Has twice suffered from acute rheumatism at the age of 16 and 21 respectively. At her last confinement, seven years ago, patient lost a good deal of blood, and shortly
afterwards had an attack of Rheumatism. Soon after this the articulare affection began, commencing with swelling of the phalangeal joints and the disease has been chronic since.

Present State. The fingers of the left hand cannot be closed upon the palm, and the proximal phalangeal joint of the middle finger is enlarged and contracted. Nearly all the phalangeal joints of the right hand show bony enlargement and are contracted. Both joints are enlarged and are almost rigid in a slightly flexed position. The elbows move freely but full extension cannot quite be obtained. The shoulders are limited in movement and grating. There is a little enlargement of the bones of the ankles and some of the toes are hyper-extended. The knees move rather stiffly and the patellae creak. The hips and other joints are unaffected.
Patients general health is good and there is very little muscular wasting. The pulse is 96. Urine, clear acid, Sp. Gr 1028. No albumin or sugar.

Case 16

M.S. Female, 48. Single. Temporaries.

Family History. Father had 'chronic rheumatism'.

History. Twenty years ago patient was confined to bed for some time with what she says her medical attendant called "slow fever". She has never been strong since. Menstruation ceased at 40. The articular affection commenced with pain and swelling in the phalangeal joints seven years ago and has gradually extended.

Present State. Both hands exhibit radial deflection but otherwise very little distortion. There is slight enlargement of the proximal phalangeal joints with stiffness; the metacarpal-
Phalangeal joints are also enlarged and grate. There is bony enlargement of the wrists and grating can be felt on movement which is pretty free. The shoulders are slightly limited in movement and the ankles are also affected. Pain is occasionally felt in some of the other joints, but nothing abnormal can be made out on them on examination.

General health is very good and there is no emaciation. Pulse 64.

Respir Sp. G. 1012 pale, clear, acid, no abnormal constituent.

Case 17

D. D. Female 65 Widow.

Family History Grandfather had Ataractism.

History Has suffered from the disease for 14 years but the symptoms have never been severe, and she has not had much pain. She knows now the first joints attacked and
the hands. He attributes the affection to the amount of washing she has had to do.

Present State: There is bony enlargement of the phalangeal and metacarpophalangeal joints; movement being limited and grating can be felt in some of them; there is no distortion of the fingers. The left knee grates distinctly on movement but no enlargement of the joint can be made out. All the other joints are practically normal. Patient is subject to occasional attacks of bronchitis but otherwise her general health is good. There is no exaggeration of the reflexes. Pulse 88. Urine pale clear acid SP 9 1010, no albumen or sugar.
Cases of Rheumatoid Arthritis of the Hip.

Case 18.
T. T. Male, 43, Coachman.
Family History: Negative.
History: Had acute rheumatism 12 years ago. Three months ago patient first felt slight stiffness in the left hip joint accompanied by pain which was also felt in the lumbar region and down the thigh. The symptoms have been gradually getting worse and the pain on several occasions has been so severe as to compel him to lie up for a time.

Present State: Patient complains of pain in the left hip, down the outer side and back of the thigh and below the knee. The pain is not constant; it is increased by exercise and relieved by complete rest.

On examination the limb lies in a natural position, there is no shortening or rotation. There is slight loss of the gluteal fold on the affected side, but
otherwise no wasting. No enlargement of the joint can be made out on palpation. Passive movement of the joint causes pain and flexion and rotation are found to be slightly limited. No grating can be elicited but the patient says that he has felt cracking in the joint himself on several occasions.

Case 19.

P.V. Male, 56. Chemical worker. Family History Negative. History. For the last six years patient has suffered from pain and stiffness in the right hip joint, gradually getting worse. Present state. Complains of pain in the right hip joint and outer aspect of the thigh, also in the knee and down the front of the leg below it. The pain is worse on exercise and he finds the sitting posture to be the easiest. When recumbent the patient lies with
the knee amputated and the limb contract.
On measurement there is found to be
shortening of the limb to the extent
of 1/4 ins.
On palpation a fulness of the joint
in the neighbourhood of the great
trochanter can be made out— and
glanding can be felt in the joint
when the limb is moved.
The movement of the joint is limited
and the thigh cannot be flexed
beyond a right angle with the
abdomen.
There is flattening of the masses on
the affected side and the muscles
of thigh are wasted.

Case 20.
G. H. Male, 66, Labourer,
Family History - Negative
History Six years ago patient
first noticed pain and stiffness in
the right knee which has remained
since, gradually getting worse. Isolde
after months afterwards the left other hip became affected.

Present State. Patient complains of pain and stiffness in both hips, worse after exercise.

When recumbent, the right limb is found to be crooked, and on measurement is 1 inch shorter than its fellow. Enlargement can be made out in the right hip and both joints are limited in movement and grating can be elicited. Movement is especially limited in the right one. When the patient lies on his face flattening of the malleoli is even more marked on the right side, but there is not much wasting of the muscles of the thighs.

**Case 21.**

J. A. Male 50, Mechanic.

Family History. Negative.

History. 22 years ago patient was run over by a locomotive which ran over his right hip joint. He
did not appear to have sustained serious injury to the part at the time and was able to move the joint pretty well. Ever since that time, however, he has had pain and stiffness at intervals in the right knee and this has gradually got worse.

**Recent State.** Complaints of pain in the right knee and groin, also in the lumbar region on the right side, and occasionally down the line of the sciatic nerve and immediately below the right knee. The pain is always increased by exertion and better after resting.

When recumbent, patient lies with the right limb semiflexed and markedly erect. It appears to be considerably shorter than its fellow but on examination by measurement the extent of the real shortening is found to be a little less than an inch.

Movement of the affected joint is greatly limited. It is impossible to
overcome the resistance, and flexion can only take place in an outward direction, and is hardly permitted beyond an angle of about 130° with the abdomen. Rotation is practically lost.

A good deal of enlargement can be made out about the joint on palpation, and slight 'grating' is felt on movement. There is much wasting of the muscles of the buttock and thigh and the knee jerk is increased on the affected side.

Remarks

Case 18 was a very early case and the signs were somewhat obscure. The patient was sent into hospital as a case of sciatica. Although no enlargement or grating could be felt on examination, the patient had himself noticed crackling in the joint, and the age of the patient, the character and seat of the pain, the
slight limitation of movement, still present, and flattening of the buttock, all I thought pointed to disease of the hip.
The other three cases were more advanced ones. Case 26 being an example of disease of both hips, and Case 21, of one hip while the symptoms dated from an injury to the joint.
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