ON THE VARIOUS FORMS OF RHEUMATISM:
ESPECIALLY IN REFERENCE TO AGE AND SEX.

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Inflammation of Serous Membranes.—Endocarditis and pericarditis are in the adult most frequently seen in connection with articular rheumatism, but in children they often occur with chorea, exudative erythema, or rheumatic nodules, or as single events, with such slight arthritis as to pass almost or quite unnoticed. The after-history of such cases is sometimes more important than the antecedent, or even the concurrent phenomena in establishing their rheumatic nature.

Endocarditis.—It is admitted that other causes than rheumatism occasion endocarditis, and that, however caused, there is nothing in the valvulitis itself to distinguish rheumatic from non-rheumatic. The causes, however, other than rheumatism, only account for quite a minority of valvular diseases. The specific fevers, pyaemia (and septicæmia?) and Bright's disease, are the chief ones, but anything which sets up pericarditis may lead by extension to endocarditis. I have seen a case of hydatid of the liver in which suppuration followed aspiration; the inflammation extended through the diaphragm to the right pleura, thence to the pericardium, and finally to the endocardium. This course of events was watched during life and verified post-mortem, when the mitral valves presented beaded vegetations, precisely similar to what is met with in rheumatism. Still these various causes account for quite an insignificant number of cases of endocarditis, and their nature is, as a rule, easily ascertained. Rheumatism is the great cause of endocarditis. Age greatly influences the occurrence of endocarditis, and it is especially frequent in childhood. It occurs with all the various phases of rheumatism—acute and subacute, rheumatic arthritis, chorea, exudative erythema, purpura. In acute rheumatism all statistics agree that it occurs in about from 50 to 60 per cent., independent of the number of attacks and age. Repeated attacks increase the liability of the heart to suffer, or, in other words, those who escape endocarditis in one attack are likely to be affected in subsequent ones. Thus, in 116 cases of acute and subacute rheumatism in the London Hospital, of all ages, in first attacks the percentage of endocarditis was 58.1; of fifty-two in second attacks, 63.46 per cent.; of twenty-eight in third attacks, 71.46; of five in fourth attacks, 80; of two in fifth and two in sixth attacks, 100 per cent., or all, had heart disease. These figures are somewhat exceptional, in that none
that had suffered from more than four attacks escaped. Tables given by Church and Samuel West support the statement that the proportion of heart disease increases in successive attacks, but show that a certain number escape heart disease after fourth and later attacks. The influence of age in determining endocarditis in acute rheumatism is well shown by Church. In the first decade the numbers were eighty-five; second, sixty-nine; third, fifty-one; fourth, thirty; fifth, twenty-one. In the adult the frequency of endocarditis bears some relation to the severity of the attack as regards the joints, as Sibson's careful figures show; but in children the heart is prone to be affected with the most trivial arthritis, and even without any. Endocarditis is present in a considerable proportion of cases of chorea. It has now been demonstrated by Osler and myself, and other observers, that the results of post-mortem examinations and examination of patients subsequent to the attack, indicate that the murmur heard in chorea is in the great majority of cases due to organic changes in the valves. Of 172 cases investigated by me, the proportion of heart affection was 54.26 per cent. Dr. Dickinson found in eighty cases valvular murmurs in forty-two. The endocarditis may precede or accompany the chorea. The stronger the evidence of rheumatism in such cases, whether as to antecedent history, family tendency to rheumatism, or concomitant signs of rheumatism, the higher is the proportion of endocarditis in chorea. In cases of endocarditis found accidentally in young persons, in whom no previous history of rheumatism or chorea is to be traced, it is usually ascribed to rheumatism, which, as we have seen, is often so slight in children as to escape detection. The occurrence of chorea in such a case greatly strengthens the evidence of its rheumatic nature. Herringham's observation of the occurrence of small beads and vegetations in the mitral valves in tetanus and other convulsive diseases undoubtedly necessitate caution in drawing this conclusion.

Pericarditis may occur in connection with rheumatic fever, with chorea, and as a single event. It owns many other causes; but in many cases the evidence is strong that it is in itself a manifestation of rheumatism. In rheumatic fever the proportion of pericarditis, according to numerous statistics, a summary of which is given by Archibald Garrod, is 15.19. All observers agree that it is much more frequent in childhood than in adult life. The statistics of Church and Whiphm are very valuable on this point. According to the figures of Latham, Fuller, Church, S. West, and Whiphm, the incidence for all ages is about equal in the two sexes; but Hilton Fagge and Pye-Smith state that pericarditis seems to be three times as frequent in men above 25 as in women of a corresponding age. Pericarditis, as pointed out by Cheadle, may appear at any point in the procession of

1 St. Barth. Hosp. Rep., London, vol. xxiii. p. 273.
2 Quoted by Garrod.
3 "A Treatise on Rheumatism," London, 1890.
rheumatic events. Most usually it follows endocarditis, but it may precede it. Whilst in children it may occur in an acute form, it more commonly is met with in a subacute progressive form, often accompanied by subcutaneous nodules, and is one of the most serious and fatal manifestations of rheumatism.

Pleurisy may occur with acute rheumatism, as a late result in connection with heart disease, and much more rarely as an early and independent affection. Of 253 cases of rheumatism in the London Hospital, pleurisy was present in thirteen. Lange found that in 124 cases of rheumatic pleurisy there were forty-nine in which the left pleura and only fifteen in which the right was alone attacked; also amongst sixty cases in which both pleura were involved, the left was first attacked in eighteen, the right in four, and both simultaneously in thirty-eight. My own experience confirms this. In the thirteen cases I have mentioned the left side was alone affected in ten. It must, however, be stated that in pleurisy, apart from rheumatism, the left side suffers more than the right. Thus, of thirty-nine cases I have collected, the left side was affected alone in twenty-three, the right in eleven, both sides in three, and in two the facts were indefinite. In rheumatic fever, the fact that the left side suffers most and first is probably to be explained by extension, as it most frequently occurs when endopericarditis is present, the left lung being in closer relation to the pericardium than the right. That pleurisy may occur as a primary event in rheumatism is supported by two instructive cases, detailed by Cheadle.

Meningitis and peritonitis have in rare cases been proved to be rheumatic, but their rarity is so great as a symptom of rheumatism in comparison with other causes that they only need mention.

Chorea.—The relationship of chorea to rheumatism has been firmly established in recent years. First, the occasional association of chorea with rheumatic fever was noticed, then theories were advanced to show how the endocarditis of rheumatism led to chorea (embolic theory). Now it is boldly maintained that chorea is a direct manifestation of rheumatism, whether it occurs with or without arthritis as an antecedent or accompaniment. The evidence is based not only on its observed concurrence or sequence with acute rheumatic arthritis, but on its frequency in the rheumatic sequence of events, and the family history of rheumatism in cases of chorea. Numerous statistical inquiries have established the frequency with which chorea is associated with rheumatism. Archibald Garrod has collected the statistics of a number of observers (Angel Money, Hughes, Syers, Stephen Mackenzie, Herringham, Sturges, Pye-Smith, and A. E. Garrod), from which I collate the following results:

1 Quoted by Garrod.  
2 "Rheumatic State in Childhood," p. 76.
Total number of cases of chorea . . . . 1167
Number, with personal history of rheumatic fever 154, or 13 p.c.
Number, with personal history of rheumatism . 190, or 16 .

Doubtful cases . . . . . . . . 57. 29 p.c.

In my report to the Collective Investigation Committee of the British Medical Association,¹ not included in the above figures on 439 cases, contributed by a number of independent observers from all parts of the country, antecedent rheumatism occurred in 26 per cent., rheumatic pains in 14 per cent., and concurrent rheumatism in 15 per cent. In twenty-six cases of concurrent rheumatism with chorea, the arthritis was noticed for the first time during the attack of chorea. These figures support very strongly the claim of chorea to be regarded as rheumatic. A certain deduction must be made for the incidence of rheumatism apart from chorea, or any admittedly rheumatic disease, which has been shown in inquiries into other diseases. This may be taken as 15 per cent. Deducting this, we still have nearly 15 per cent. of rheumatism. On the other hand, these figures greatly understate the evidence of rheumatism, as they are mainly based on the occurrence of well-marked rheumatism, which is frequently absent or overlooked in patients at the age at which chorea occurs, and which may follow, and not precede or accompany, the chorea. The valuable series of events given by Cheadle in his book so frequently quoted, however, illustrates far better than any figures the close association of chorea with rheumatism. The occurrence of subcutaneous nodules in chorea, both in cases with and without arthritis, is a most convincing piece of evidence of the rheumatic nature of chorea. In Barlow and Warner's series of twenty-seven cases of rheumatic nodules, chorea occurred under observation in ten cases, and another had suffered from it after a previous attack of rheumatic fever. The evidence, in my opinion, is so strong that chorea is rheumatic, without nodules, or without endocarditis, that I have long maintained, with others, that it is in itself a manifestation of rheumatism. I entirely agree with the statement of Archibald Garrod: "If chorea with endocarditis may constitute the whole of a rheumatic attack, it must also be granted that in some instances chorea may be the sole manifestation of rheumatism, and that cases of rheumatic chorea probably occur in which even endocarditis is absent." The influence of age and sex in predisposing to chorea is very marked; the greatest number of cases occur in the second decade, next to that in the first decade. The largest number of cases occur in the third hemidecade (11 to 15), next in the hemidecade 6 to 10; a great falling off occurs in the hemidecade 16 to 20. The number in the other hemidecades is small. Chorea is about three times as frequent in

¹ "Collective Investigation Record," 1887, vol. iii.
the female as compared with the male sex. Dr. Osler's figures and American statistics are in general agreement with these statements.

**Exudative Erythema**—The various forms of erythema multiforme exudativum are met with in association with rheumatic fever. They may occur, moreover, in persons who have had arthritic rheumatism previously without any arthritis during the attack. They may further occur in those who have never suffered from arthritis, and be the sole or first event in the rheumatic series of events. Erythema nodosum stands somewhat apart from the other forms of exudative erythema, and is by some regarded as a distinct disease. Some years ago I published an analysis of 108 cases of erythema nodosum, and showed there was evidence of rheumatism in thirty-four cases, or in 31.4 per cent. In four cases endocarditis developed in the attack, in two there was associated acute rheumatic arthritis, whilst in the remaining two there was no arthritis.

At the recent International Congress of Dermatology, held in London, August 1896, I gave an analysis of 167 cases of erythema, from the records of the London Hospital, of which I give a tabular statement showing the varieties, and the age, and sex incidence. The latter agree closely with that of rheumatism.

**Table of Cases of Erythema.**

| Erythema Nodosum— | 1 to 10 yrs. | 11 to 20 yrs. | 21 to 30 yrs. | 31 to 40 yrs. | 41 to 50 yrs. | Over 50 yrs. | Totals |
|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------|
| Males             | 4           | 11          | 1           | 0           | 1           | 0           | 17     |
| Females           | 13          | 33          | 29          | 9           | 10          | 4           | 98     | 115   |
| Erythema Marginatum— | 1           | 2           | 0           | 0           | 0           | 0           | 0      | 3     |
| Males             | 0           | 3           | 0           | 0           | 0           | 0           | 0      | 3     |
| Females           | 0           | 1           | 0           | 1           | 0           | 1           | 1      | 5     |
| Erythema Papulatum— | 0           | 0           | 1           | 1           | 0           | 0           | 2      | 5     |
| Males             | 0           | 1           | 0           | 1           | 0           | 1           | 3      | 3     |
| Females           | 0           | 0           | 0           | 0           | 0           | 0           | 0      | 3     |
| Erythema Tuberculatum— | 3           | 0           | 0           | 0           | 0           | 0           | 3      | 3     |
| Males             | 0           | 3           | 0           | 0           | 0           | 0           | 0      | 3     |
| Females           | 0           | 0           | 0           | 0           | 0           | 0           | 0      | 3     |
| Erythema Multiforme— | 2           | 3           | 3           | 2           | 0           | 2           | 12     | 33    |
| Males             | 2           | 5           | 8           | 3           | 1           | 2           | 21     | 33    |
| Females           | 0           | 0           | 2           | 0           | 0           | 0           | 2      | 5     |
| Erythema Fugax— | 0           | 0           | 1           | 1           | 1           | 0           | 2      | 5     |
| Males             | 0           | 0           | 1           | 1           | 1           | 0           | 2      | 5     |
| Females           | 0           | 0           | 1           | 1           | 1           | 0           | 2      | 5     |
| Totals            | 22          | 61          | 45          | 17          | 13          | 9           | 167    |

1 "Chorea and Choreiform Affections." 2 Trans. Clinical Soc., London, vol. xix.
In erythema nodosum there was definite rheumatism in twenty-six out of 115, or in 22 per cent., and valvular disease of the heart was present in nine cases. Of the remaining cases of erythema there was evidence of rheumatism in nineteen out of fifty-four cases, or at the rate of 35 per cent., and in four cases there was valvular disease, one of which was fatal, in which endo-pericarditis was found. Of the five cases of erythema fugax, which is a congestive, and not an inflammatory, form of erythema, there were three cases associated with definite acute rheumatism. In these cases no account is taken of the family history, which, had it been procurable, would doubtless have strengthened the evidence in favour of rheumatism. Still, as the figures stand, they are a strong piece of evidence in favour of rheumatism being a common cause of exudative erythema and erythema fugax, whilst the occurrence of the endocarditis occurring with the eruption may be held to be conclusive in the cases in which it happened. Moreover, in Barlow and Warner's series of twenty-seven cases of rheumatic nodules, in eight cases there was erythema papulatum and erythema marginatum, in one of which there was also urticaria, and in another purpura. Though other causes may give rise to exudative erythema, I think the conclusions are justified that erythema multiforme may be the sole expression of rheumatism, and forms one of the events in the rheumatic series. The exudative erythema occur, it will be observed, in the second and third decades, but more occur in the first decade than in purpura rheumatica. The female sex is more prone to these affections than others, more particularly in the multiforme and nodose varieties.

**Purpura.**—In a recent lecture, given at the Hunterian Society, on the Nature and Treatment of Purpura (not yet published), I gave an analysis of two hundred cases of purpura from the records of the London Hospital, occurring consecutively between 1880 and the middle of 1896. They occurred amongst 63,824 cases in the medical wards during this period. I found, somewhat unexpectedly, that the numerical importance of rheumatism as a cause of purpura stood out pre-eminently.

Purpura was associated with, or regarded as caused by, rheumatism in sixty-one cases (thirty-three males, twenty-eight females), or in 30.5 per cent. Of these sixty-one cases, five occurred in the first decade, twenty-three in the second, eighteen in the third, eight in the fourth, five in the fifth, and two in the sixth decade. Besides these, there were ten other cases (seven males, three females) in which the purpura was probably rheumatic. Of forty-two cases of purpura rheumatica under my care, not included in the above, twenty-four were males and twenty females. Their ages in decades were—first, 1; second, 12; third, 9; fourth, 11; fifth, 4; sixth, 4; seventh, 1. Combining these cases we have—first decade, 6; second, 35; third, 27; fourth, 19; fifth, 9; sixth, 6; seventh, 1.

Purpura rheumatica, Schönlein's peliosis rheumatica, has not,
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until recently, been generally recognised. It sometimes occurs, though rarely, with acute rheumatism. More often it is met with in those who have previously suffered with rheumatism or one of the other rheumatic events. It is prone, like the other rheumatic manifestations, to recur. It has a symmetrical distribution, and, except in severe cases, is limited to the extremities. The haemorrhages come out in successive crops at intervals, and generally in the evening. It is accompanied by more or less swelling of the joints, not confined to the neighbourhood of the haemorrhages, though usually the ankles are puffy. It is closely allied to exudative erythema. As a rheumatic event, its incidence corresponds with rheumatic fever, occurring chiefly in the second and third decades, with a fair number in the fourth, and is later in its occurrence than chorea.

Of other cutaneous diseases, urticaria is generally mentioned as occurring in connection with rheumatism. In my experience, the association is not close. Whipham, however, in his report on rheumatism, found eleven cases in 655 of acute rheumatism, and two after. Patients have been known to have urticaria with successive attacks of rheumatic fever. It also occurs with exudative erythema in association with rheumatic fever, and with purpura—purpura urticans—in chorea (Osler). The cutaneous manifestations of rheumatism, I think, support the view of there being some toxic agent in the blood, as, apart from rheumatism, such a cause is in most cases demonstrable.

RHEUMATIC SUBCUTANEOUS NODULES.—First described by Hillier in one case in 1886, later by Meynet, we owe to Barlow and Warner the most full description concerning their occurrence and significance. These nodules, varying in size from a hemp-seed to an almond, are attached to tendons, deep fasciae, and the pericranium, generally over bony prominences, and consist of vascular fibrous growth. They are one of the most characteristic of the rheumatic phenomena. They are met with almost exclusively in children and young adults, and occur with several of the rheumatic series, rheumatic fever, chorea, endocarditis and pericarditis, exudative erythema and purpura. They are so characteristic of rheumatism that they are a connecting link in the chain of rheumatic events. Moreover, they are especially associated with the graver forms of endocarditis and pericarditis, and are thus not only of diagnostic, but of prognostic, significance. When found with any one of the phenomena claimed as rheumatic, they clinch the diagnosis.

Periosteal nodes, though rare, appear to be occasionally of rheumatic origin, occurring with acute rheumatism and disappearing with the administration of salicylates.

TONSILLITIS AND PHARYNGITIS.—Tonsillitis and pharyngitis frequently usher in an attack of rheumatic fever, and persons who
have other manifestations of rheumatism are very liable to attacks of tonsillitis. Most frequently the tonsillitis or pharyngitis precedes for a short time the arthritic symptoms. Kingston Fowler is of opinion that 80 per cent. would not be too high to put tonsillitis as a premonitory symptom of rheumatic fever.\(^1\) It sometimes occurs after the arthritic symptoms are fully developed. The inflammation may be confined to the tonsils, or affect the pharynx generally. It is most common in young adults, and occurs with nearly equal frequency in both sexes. Though owning other causes, tonsillitis should always awaken suspicion of the rheumatic tendencies of the patient. It occurs frequently with exudative erythema, and some other manifestations of rheumatism besides rheumatic fever.

**Pneumonia.** — Whether acute lobar pneumonia should be included in the rheumatic series is somewhat doubtful. Its occurrence in connection with rheumatic fever is, of course, universally recognised. In my experience, it is much more common in rheumatic fever than is stated by Sturges and Coupland.\(^2\) Statistics on the subject are hopelessly at variance, and suggest that some unknown factor is in operation. Of 253 cases of rheumatic fever in the London Hospital, pneumonia occurred in thirteen, or over 5 per cent. Osier\(^3\) states: “Pneumonia and pleurisy are not uncommon, and frequently accompany endo-pericarditis. According to Howard’s analysis of a large number of cases, there were pulmonary complications in only 10·5 per cent. of rheumatic endocarditis, in 58 per cent. of cases of pericarditis, and in 71 per cent. of endo-pericarditis.” It will be observed that pneumonia and pleurisy are grouped together; but, even with this allowance, the figures are much higher than any statistics on the subject in this country. The combined statistics of Fuller, Latham, Wunderlich, Pye-Smith, Lange, and the Collective Investigation, given by Archibald Garrod, only bring up pneumonia and pleurisy in 3433 cases of rheumatic fever to 9·94 per cent. All observers are agreed that pneumonia is especially apt to occur in cases in which there is pericarditis. In my thirteen cases of pneumonia in connection with rheumatic fever, in six the left lung was alone affected, in two the right lung, and in five both. No such difference is observed in pneumonia independently of rheumatism. Indeed, the right lung is much more frequently attacked than the left. Thus, in 143 cases examined post-mortem at the Middlesex Hospital, the right lung was affected in no fewer than eighty, the left in forty-seven, whilst in sixteen both lungs were involved.\(^4\) In thirty-nine cases of pneumonia in the London Hospital, independently of rheumatism, I

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1 *Lancet*, London, 1880, vol. ii. p. 938.
2 Sturges and Coupland, “Pneumonia,” 2nd edition, p. 210.
3 “Principles and Practice of Medicine,” 2nd edition, p. 296.
4 Sturges and Coupland, *op. cit.*
found the right side affected in twenty-seven, the left in seven, or nearly in the ratio of four right to one left. Wilson Fox wrote: "On the whole, pneumonia is more frequent on the right side than on the left." I am, therefore, led to the conclusion that pneumonia cannot be claimed as directly a rheumatic event, but that, indirectly, pneumonia may be induced through the agency of pericarditis.

**Hyperpyrexia.**—Hyperpyrexia must be included amongst the phenomena of rheumatism, though it is rather to be regarded as a complication than as a distinct event. According to the Report of the Committee of the Clinical Society, it is nearly twice as frequent in men as in women, and chiefly occurs between twenty and thirty years. It is most common in first attacks.

*Scarlatinal arthritis* must be regarded as true rheumatism in the great majority of cases. Scarlet fever, to use Sir WilliamBroadbent's phrase, "opens the door" to rheumatism. This view is based on the fact that all the series of manifestations claimed as rheumatic are liable to occur in connection with scarlet fever. I cannot attack the whole question, but Mr. A. Gooding has kindly furnished me with some recent particulars. Amongst 2715 cases admitted into the North-Western Fever Hospital in London, during the end of last year and the present year, there were ninety-one cases of rheumatism, five cases of chorea, one each of erythema iris and erythema multiforme, and two cases of erythema nodosum.

I have not included in the series orchitis, cystitis, nephritis, haemoglobinuria, acute thyroiditis, and a few other affections, which have occasionally appeared traceable to rheumatism, on account of their great rarity.

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**STRABISMUS.**

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*(A Lecture delivered before the Royal College of Surgeons, Edinburgh.)*

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We may, besides measuring the latent position for near (say at \(\frac{1}{4}\) metre), and for distance, also determine it for intermediate distances. The relation existing throughout may be exhibited in a graphic manner, as shown in the accompanying figures. In these figures the squares are formed by vertical lines, which represent the same distances of fixation from 5 metres to \(\frac{1}{4}\) metre, crossed by horizontal lines, representing the same degrees of convergence, from 0.2 to 4 metre-angles. The diagonal line is, therefore, in the case of emmetropia, the line of equal accommodation and convergence.