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T H E S I S

A C O N T R I B U T I O N
to the
AETIOLOGY and HAEMATOLOGY
of
RHEUMATIC FEVER.

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WILLIAM BROWN THOMSON.
1903.

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In the following paper are recorded the results of my observations on (i) the Blood Changes in Rheumatic Fever, and (ii) the AETiology of Rheumatic Fever with special reference to the influence of Heredity.

Examinations of the blood were made in thirty-five cases - twenty-one acute and fourteen subacute. The Statistics relating to the aetiology were compiled from seventy cases. All the patients were under my care while acting as assistant medical officer at the Holborn Union Infirmary, London.

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P A R T I.

BLOOD CHANGES IN RHEUMATIC FEVER



Our knowledge of the condition of the blood in rheumatic fever is very fragmentary. The literature is mainly in German and French. Turk in his monograph on the "Clinical Examination of the Blood in Acute Infectious Diseases," 1898, gives his observations on eight cases. There is a short summary in Cabot's "Clinical Examination of the Blood," 1901; and in Ewing's "Clinical Pathology of the Blood," 1901, and Da Costa's "Clinical Haematology," 1902, references are also made to this subject. Dr. Archibald Garrod in a paper read before the Royal Medical and Chirurgical Society, February 9th., 1892, stated the results of some eighty examinations of the blood in rheumatic patients on the estimation of the haemoglobin and the counts of the erythrocytes and leucocytes. With the exception of Turk's observations, and those of Zappert relating solely to the cosmophiles, I have not been able to find any references to the differential counts in clinical literature.

Technique - In estimating the number of blood cells the haemocytometer of Thoma-Zeiss was used. For the erythrocytes the degree of dilution was 200, and the diluting fluid Toisson's solution which stains the leucocytes and thus

enables them to be distinguished readily from the erythrocytes. Two counts were made, and in each count two sets of one hundred squares were counted. An average was taken, and this multiplied by 8000 gives the number of erythrocytes per cubic millimetre. In counting the leucocytes the special mixing pipette yielding a dilution of blood in the proportion of 1 to 10, and a diluting fluid (3 per cent acetic acid tinged with gentian violet) which dissolves the red cells leaving only the stained leucocytes to be counted, was employed. All the leucocytes in one square millimetre were counted, and the average of two such counts was multiplied by 100 to obtain the number of leucocytes per cubic millimetre. Jenner's stain was used for staining the blood films in the majority of the cases, but in those cases in which the blood-plates were enumerated Leishmann's modification of Romanowsky's stain was preferred. The haemoglobin was estimated with Gower's haemoglobinmeter.

In order to eliminate any discrepancy which might arise from the effects of food the successive countings were performed as nearly as possible at the same hour in each case.

Normal Counts (Vide Appendix).

It is a clinical fact that patients who pass through an attack of rheumatic fever become distinctly anaemic. According

to Hayem¹. the poison of acute rheumatism is a powerful and rapid destroyer of the erythrocytes. The figures given by different observers vary somewhat; but the concensus of opinion is in favour of the view that rheumatism invariably leads to a pronounced deglobulisation. Sørensen² who was the first to supply any data on the condition of the blood in cases of acute articular rheumatism, observed a decided, if not considerable decrease in the number of erythrocytes, averaging in eight cases 4,160,000 per cubic millimetre. Hayem noted that in acute cases these cells lose at least one million of their number, and in cases which drag along and relapse the loss is from 1.5 to 2 millions. Garrod³ and Turk³ also found that during the fever the erythrocytes were markedly diminished, which diminution commenced very early in the attack. The average in Cabot's⁴ cases was 4,400,000 per cubic millimetre, and in Pee's² cases the number always exceeded 4,000,000. In two out of seven of Da Costa's⁵ cases the counts were only 1,242,000 and 1,500,000 per cubic millimetre; but he does not state whether this reduction was solely due to the rheumatic attack, or whether there was at the same time some other diseased condition.

The average of twenty-one counts in the acute cases taken as a rule shortly after admission to this infirmary,

and always before the commencement of treatment was 4,359,000 per cubic millimetre, individual counts varying from 3,144,000 to 5,572,000 per cubic millimetre. In seventeen cases the count exceeded 4,000,000 and in cases Nos. 7,9,12,19, it was less. Of these four cases three had valvular disease, one having in addition erythema papulatum; while the fourth had an eruption of erythema multiforme on admission and developed endocarditis during the attack. In the subacute cases the counts ranged between 2,240,000 and 4,984,000, averaging 4,372,000 per cubic millimetre. The minimum count occurred in a patient who was also suffering from chronic parenchymatous nephritis. The counts in four cases in children averaged 4,167,000 per cubic millimetre, the minimum and maximum counts being respectively 3,990,000 and 4,660,000 per cubic millimetre.

Various factors appear to me to influence the count:-

I. The duration of the attack -

In eleven cases not exceeding one week's duration the counts averaged 4,588,000 per cubic millimetre; in fourteen cases not exceeding two weeks duration 4,569,999 per cubic millimetre; and in seven cases exceeding this period 4,183,000 per cubic millimetre. Judging from these averages it might

be concluded that the loss of erythrocytes was proportional to the duration of the attack, and a study of individual cases confirmed this opinion to a certain extent, though it would seem that the loss was not at a uniform rate. Cabot also found a slight reduction in cases of longer duration. In eight cases which had been sick over twenty days the average count was 4,462,000 per cubic millimetre and in those sick between one and twenty days 4,540,000 per cubic millimetre.

II. Previous attacks of rheumatic fever -

In fourteen cases with previous attacks the counts averaged 4,325,000 per cubic millimetre, and in seven cases with no previous history of rheumatic fever 4,492,000 per cubic millimetre. In two of the cases the reduction of erythrocytes was very marked. One had had five previous attacks, and the other four, the respective counts being 4,164,000 and 3,144,000 per cubic millimetre.

III. The severity of the infection -

This proves a much more powerful factor than either of the two preceding. According to Hayem and Garrod⁴ the blood constitutes as in syphilis a most valuable measure of the intensity of the disease, which is parallel to the

severity of the blood changes rather than to the number of joints affected. The curve of the leucocytes follows very closely the severity of the infection: a high leucocytosis i.e., over 20,000 per cubic millimetre being usually associated with complications in some form or other. The most anaemic cases are invariably those with the highest leucocyte count. The average count in fourteen cases with a leucocytosis below 20,000 per cubic millimetre was 4,482,000 per cubic millimetre, and in seven cases exceeding 20,000 per cubic millimetre 4,189,000 per cubic millimetre. In three of these seven cases the erythrocyte count was less than 4,000,000 per cubic millimetre; in three it varied from 4,164,000 to 4,528,000 per cubic millimetre; whilst in the seventh case, of only five days duration there was an apparent polycythaemia on admission, the number of erythrocytes per cubic millimetre being 5,572,000. On the third day, however, the count dropped to 4,508,000 per cubic millimetre; and on the fifth day there was still a further reduction to 4,320,000 per cubic millimetre.

IV. The presence or absence of endocarditis -

A valvular lesion per se is stated to have no effect on the blood. Most of the changes in rheumatic fever in a

patient with endocarditis are due to the activity of the rheumatic poison, and whilst this poison itself is very destructive to the erythrocytes, it would seem that its influence is greatly aggravated when it is accompanied by valvular disease of the heart and pericarditis. (Trousseau.)⁶ When a cardiac lesion was present on admission I found the diminution slightly greater than when it developed subsequently, and still greater than in the cases unaccompanied by cardiac disease. In nine cases with endocarditis - one having also pericarditis on admission, the counts averaged 4,155,000 per cubic millimetre; and including two other cases in which the valvular lesion developed after admission 4,249,000 per cubic millimetre. The counts of the remaining ten cases with no cardiac disease averaged 4,525,000 per cubic millimetre. Similarly in three subacute cases with valvular disease the average of the counts was 4,086,000 per cubic millimetre, and in eleven cases with no such affection 4,487,000 per cubic millimetre.

While destruction of the erythrocytes occurs during the acute stages of the attack, regeneration of these cells takes place with greater or less rapidity when this period is passed. When the fever only lasted a few days the

erythrocytes in some cases reached their minimum when the temperature became normal, whilst in others they showed an increase corresponding to this period. In the following eight cases Nos. 2, 3, 4, 5, 6, 13, 20 and 21, the temperature was normal on the third day. The counts for the first three days averaged respectively 4,799,000, 4,564,000 and 4,669,000 per cubic millimetre, and a week later 4,830,000 per cubic millimetre. With the exception of case No. 6, which showed a steady diminution during the first five days from 5,572,000 to 4,320,000 per cubic millimetre, the erythrocytes increased during the post-febrile period. When the temperature remained febrile for a longer period there was not a progressive diminution in the count as one might have expected. The diminution went on steadily for the first three or four days, and was followed by an increase during defervescence. In one case, however, in which the fever was obstinate, instead of this increase the numbers remained at a more or less uniform level which as in one of Garrod's cases was very low. In five cases Nos. 7, 10, 12, 16 and 19, the temperature remained febrile for about a week. With the exception of case No. 16, the rheumatic manifestations showed an improvement after the commencement of treatment.

The counts of these cases for the first four days averaged respectively 3,959,000, 3,912,000, 3,779,000 and 3,643,000 per cubic millimetre; on the fifth, seventh and ninth days 4,001,000, 4,032,000 and 4,186,000 per cubic millimetre; and on the fifteenth day 4,384,000 per cubic millimetre. Turk observed a similar result in six out of eight cases. In case No. 9 the fever lasted one month. During that period eleven observations were made, the individual counts varying from 3,394,000 to 4,100,000 per cubic millimetre. Eleven days later the count was 4,654,000 per cubic millimetre; and in the next four observations extending over a period of two months the counts ranged between 4,566,000 and 4,800,000 per cubic millimetre.

In some cases, particularly in children, the process of regeneration is very rapid. In one case (No.20) the normal number was reached on the third day, and in another (No.18) on the sixteenth day. In cases Nos. 30 and 24, both subacute, the normal count was observed on the third and fourth days respectively. Garrod observed that within as short a period as ten or eleven days a million corpuscles may be lost and gained. The corpuscular loss frequently persists for a considerable time, giving rise to a condition

approaching chronic anaemia in patients who have suffered previously from rheumatic fever and who have contracted endocarditis - e.g., cases Nos. 3 and 7. The regenerative period may be interrupted by a relapse or by a series of relapses. A relapse was accompanied by a fall in the number of erythrocytes, the degree of diminution varying according to its severity, When very slight these cells showed no appreciable change in number, and when of moderate severity the diminution as a rule did not exceed 200,000 per cubic millimetre. In cases with a severe relapse the loss was usually much greater, and in one case (No.11), it exceeded half a million per cubic millimetre.

The qualitative modifications of the erythrocytes in rheumatic fever have never proved considerable. In cases of well marked anaemia striking differences of size and colour were often observed, but the presence of erythroblasts in this disease apparently occurs only as a rarity, Turk observed nucleated erythrocytes in two of his cases and that only on one occasion in each case.

As regards the haemoglobin observers are quite unanimous that it suffers more severely and more constantly than the erythrocytes. In Cabot's cases the average percentage was

63; and in Turk's cases it ranged between 60 per cent, and 80 per cent. In my acute cases the haemoglobin percentage varied from a minimum of 50 per cent to a maximum of 90 per cent with a mean average of 68.2 per cent; and in the subacute cases from 36 to 96 with an average of 76 per cent.

The factors which influence the erythrocyte count also appear to influence the percentage of haemoglobin:-

I. The duration of the attack -

(a) not exceeding 1 week's duration:	11 cases :	70 per cent
(b) " " 2 weeks " :	14 " :	68.5 " "
(c) exceeding " " " :	7 " :	64 " "

II. Previous attacks of rheumatic fever -

(a) previous attacks:	14 cases :	66 per cent
(b) no " " :	7 " :	70 " "

III. The severity of the infection

(a) under 20,000 leucocytes p.c.m.	14 cases :	69 per cent
(b) over " " " 7 " :		64 " "

IV. The presence or absence of endocarditis -

"A" acute attacks:

(a) present on admission	: 9 cases :	64.5 per cent
(b) present on and after admission	: 11 " :	66 " "
(c) absent	: 10 " :	69.8 " "

"B" subacute attacks:

(a) present on admission	: 5 cases :	72 per cent
(b) absent	: 9 " :	78 " "

There is no direct correspondence between the number of erythrocytes and the percentage of hæmoglobin. A diminished percentage of hæmoglobin is usually associated with a diminished count of erythrocytes, but during the post-febrile period regeneration of the hæmoglobin is very much slower than that of the erythrocytes. In eight cases in which the temperature was normal on the third day, the hæmoglobin estimates for the first three days averaged 75.5, 75.1, and 73 per cent, respectively; and a week later though the erythrocytes showed a decided increase the average was only 72.6 per cent. This decrease was particularly marked in cases Nos. 6, 13 and 21. The average estimates in five cases in which the fever lasted about a week, were for the first four days 59, 56.8, 56.5, and 53 per cent. respectively; on the fifth, seventh and ninth days 55, 52, and 53.6 per cent; and on the fifteenth day 56 per cent. When the duration of the fever was more protracted, the hæmoglobin in one case (No.8) remained low throughout never rising above 70 per cent, whilst the erythrocytes on four occasions exceeded 5,000,000 per cubic millimetre. In another case (No.9) though the erythrocytes after the first three days only varied between 3,394,000 and 4,100,000 per cubic millimetre, the hæmoglobin during that period showed an increase from

54 per cent to 66 per cent. Garrod observed the same thing in one or two of his cases, Leichtenstein² found in cases of protracted illness a considerable diminution in the percentage of the hæmoglobin, and he also noticed that the prompt use of salicylates prevented the loss of hæmoglobin in one case. In cases Nos. 27 and 24 it would seem as if the same thing occurred. In the former the hæmoglobin in twelve observations varied from 90 to 95 per cent, and in the latter in six observations from 87 to 95 per cent.

In a disease like rheumatic fever in which the hæmoglobin loss is relatively more excessive than the corpuscular decrease subnormal colour indices are the rule. This diminution is in most cases merely transitory. In Cabot's series the average colour index was .76, and in Turk's generally between .65 and .80. In the acute cases it averaged .77, and in the subacute .84, varying in individual cases from .55 to .90 in the former, and from .76 to .90 in the latter. Though the erythrocytes increase slowly during convalescence the hæmoglobin worth of the individual corpuscle does not increase correspondingly, but remains low. The average colour indices in eight cases of short febrile duration were for the first three days .78, .82 and .78 respectively, and a week later .75. Similarly

when the fever lasted about a week the colour indices for the first four days averaged .74, .71, .74 and .73; on the fifth, seventh and ninth days .67, .64 and .65; and on the fifteenth day .65. When the fever was of longer duration the colour index generally remained low for a considerable time as in cases Nos. 8, 9 and 11. During convalescence the value of the colour index increases, so that the last observation is as a rule higher in value than the first. In case No. 8 the difference between the first and the last observation made five weeks after the temperature became normal was only .02; but in case No. 7 the diminution was very conspicuous being .78 at the beginning and .65 at the end of the examinations. This however is very exceptional.

The amount of fibrin is markedly increased especially during the most acute stages of the illness, and this has been noticed by many observers, Holla, Hayem, Berggrum, Turk⁷ Coagulation of the blood takes place within the normal time limit, or it may be delayed considerably.

The anaemia of rheumatic fever in the acute phases of the attack is an oligocythaemia (i.e., a diminution in the number of erythrocytes below the normal standard.) This

requires no special treatment, and is followed after the cessation of the febrile period by a more obstinate anaemia of a "chlorotic" type (post-rheumatic anaemia.) In the majority of the cases this post-rheumatic anaemia is haematologically a chlorosis, and occasionally in mild cases a pseudo-chlorosis (i.e., though the external symptoms of chlorosis are present, the haemoglobin and the number of erythrocytes are nearly normal.) In two cases Nos.10 and 17, both of which were complicated, there was a well marked oligocythaemia at the termination of the observations.

The following table gives the results of my observations on this point:-

	<u>Acute</u>	<u>Subacute</u>	<u>Total</u>						
Chlorosis	14 cases	9 cases	33 cases	or	69.6	per cent.			
Pseudo-Chlorosis	3 "	5 "	8 "	"	24.2	"	"		
Oligocythaemia	2 "	nil	2 "	"	6.0	"	"		

These conclusions agree in the main with those of Turk, who holds that post-rheumatic anaemia is generally a pure chlorosis and in severe relapsing attacks of long duration becomes a pronounced "chloro-anaemia." Garrod believes it to be a pseudo-chlorosis. Whatever be the nature of post-rheumatic anaemia, whether a chlorosis or a pseudo-chlorosis,

one thing is certain that all patients who pass through an attack of rheumatic fever, even when they enjoyed before a healthy complexion are afterwards characterized by extreme pallor which usually persists a long time.

Amongst the various drugs recommended for the treatment of post-rheumatic anaemia iron holds a very prominent place. When given very soon after the acute stage is passed it seems to produce a recurrence of arthritis and fever. In cases Nos. 2,3 and 4, iron in the form of citrate was administered on the fifth day, and in case No. 3, on the sixth day after the temperature became normal. In the two former it was given alternately with salicylate of soda three times a day, whilst in the last case it was given alone. In the first case there was a recurrence of pain and temperature on the fifth day, and in the other two cases on the fourth day. I could not attribute these recurrences to anything else than the administration of iron. Haviland Hall⁸ also observed a return of pain and temperature when iron was given too soon; and he states that it should not be administered until at least three weeks after the subsidence of the acute symptoms.

It has been suggested that the blood changes in rheumatic fever may be determined to some extent by the salicylates

administered in the treatment of the disease. So far as I can make out from these observations there is no evidence to show that the salicylates increase these changes more than any of the other drugs which are sometimes employed. Hayem after comparing the results obtained by treating the disease with sulphate of quinine with those obtained by treating it with salicylic acid came to the conclusion that the changes were not due to the salicylic treatment, being equally well marked when no such treatment was adopted. The majority of my own cases were treated with sodium salicylate. For the sake of comparison some were treated with salicine and others with alkalies. The blood changes were found to be equally well marked in each group of cases. Further, in cases Nos. 7, 24 and 27, the sodium salicylate was given in full doses every hour and toxic symptoms such as giddiness and deafness etc. were produced, and instead of a regular diminution of erythrocytes which one would expect were the drug productive of anaemia, there was a slight increase in the counts in two of these cases. The diminution which is noticed after the commencement of treatment is not to be explained by the effect of one or other drug, but coincides with a drop in temperature, and an abatement of the rheumatic manifestations. Maragliano and others have

demonstrated a contraction of arterioles during the height of the febrile process followed by dilatation during defervescence. It is held that this contraction of the vessels has a concentrating effect on the blood increasing the number of blood cells per cubic millimetre. This concentration is still further augmented by the profuse sweating associated with the acute attacks, and possibly also by local vaso-motor phenomena. During the febrile period many corpuscles are destroyed, and the loss is covered up by this concentration. Under treatment the sweating ceases, the temperature falls, and the anaemia becomes apparent. A sharp fall is observed in the number of erythrocytes per cubic millimetre, due partly to the destruction of corpuscles (hitherto masked by concentration), and partly to the dilution of the blood which is the result of the post-febrile dilatation of the peripheral vessels above mentioned.

The figures given by different observers relative to the number of leucocytes are more at variance than those relating to the number of erythrocytes. Hayem¹ found an increase in very acute and severe attacks, and even in the cerebral forms he observed a leucocytosis amounting to 25,000 per cubic millimetre. In cases of average acuteness the number was from 17,000 to 18,000, and in subacute cases not more than

from 7,000 to 8,000. Halla² describes a regular condition as: a more or less considerable increase of leucocytes both with the normal and with the febrile temperatures. Koblanck² observed a normal number of leucocytes, and Limbeck⁹ and Reinert² a leucocytosis generally of a moderate extent. Rieder⁹ noted a moderate leucocytosis only in quite recent cases, and Pee⁹ only when the infection was severe and the swelling of the joints very acute. Saddler² reported once severe and once quite moderate leucocytosis during the febrile period. Jaksch in one case counted 8,400; and Zappert² in one of four cases 20,000 to the cubic millimetre, the increase in the other three being moderate. Maragliano and Castellino maintained that the leucocytosis was only apparent, the number of erythrocytes being much diminished. The grade of leucocytosis in Turk's cases varied from 10,000 to 15,000 in attacks of ordinary severity; in complicated cases the increase was greater reaching in one case 20,600 per cubic millimetre. The highest number cited by Garrod¹⁰ was nearly 20,000 per cubic millimetre, and a leucocytosis of 16,800 represents the average in Cabot's cases.

The counts in twenty-one acute cases averaged 17,240 per cubic millimetre, individual counts varying from 7,000 to 31,750. In nine cases the counts were less than 15,000

per cubic millimetre; in five they ranged between 15,000 and 20,000 per cubic millimetre; and in seven this maximum was exceeded. In four of the cases which occurred in children the leucocyte counts varied from 11,500 to 15,600 averaging 13,610 per cubic millimetre. The average of the counts in fourteen subacute cases was 8,560 per cubic millimetre, the minimum and maximum counts being respectively 5,150 and 14,000. The counts in eleven cases with endocarditis (acute and chronic), including three cases in which it developed after admission, averaged 20,550 per cubic millimetre; in two cases in which a murmur developed but disappeared again during convalescence 17,400 per cubic millimetre; and in eight cases with no valvular disease 12,300 per cubic millimetre. Endocarditis was only present in two of nine cases in which the leucocytosis was less than 15,000. When the leucocyte count ranged between 15,000 and 20,000 this lesion was found in two on admission, one having in addition bronchitis; in a third it developed with pericarditis during the attack; and in the other two the murmur was temporary and disappeared during convalescence. When the count exceeded 20,000 endocarditis was observed in five out of seven cases on admission, and in the remaining two after admission. In one there was in addition pericarditis with effusion; in two

others erythema; while in a fourth case physical signs of pneumonia developed on the third day. Thus it would appear that in a patient with endocarditis whether acute or chronic, and whether alone or associated with some complications as pericarditis, bronchitis or pneumonia, or erythema, the leucocytosis usually reaches a high degree (about 20,000 per cubic millimetre), and that when the endocarditis is only temporary the degree of leucocytosis is less than when it is permanent. This might support the statement that these temporary murmurs belong to a different category and are haemic in origin.

In uncomplicated cases the number of leucocytes was regularly very small (under 15,000).

Turk insists that complications (pneumonia, pericarditis, pleurisy) are present whenever the count rises above 20,000. In this he is supported by Ewing⁷ who found from the examination of forty cases that signs of pneumonia, or pericarditis, or hyperpyrexia, were present whenever the number of leucocytes exceeded 20,000 per cubic millimetre. Hayem also counted as high as 25,000 leucocytes but only in extremely severe and cerebral types of the disease. Cabot on the other hand observed a count ranging between 21,000 and 31,000 in six cases, but in only one was the attack complicated and then by acute endocarditis.

There does not seem to be any definite relation between the number of joints affected and the degree of the leucocytosis. In five of the acute cases with two or less than two joints affected the leucocyte counts averaged 17,280 per cubic millimetre; and in sixteen cases with more than two joints affected 16,240 per cubic millimetre. These averages are corroborated by the examination of individual cases - e.g., in case No. 13 the joints affected on admission were the knees, ankles, wrists, and left shoulder, the count being 13,600; in case No. 8 with both knee joints affected the count was 18,850; and in case No. 16 as the following results show:-

(a) on admission :	left elbow	: 15950 leucocytes	
			p.c.m.
(b) second day :	left elbow and shoulder	: 11750	" "
(c) third "	left shoulder, knees and ankles.	: 15800	" "
(d) fourth "	all large joints.	: 15200	" "

The leucocyte chart follows very closely the temperature chart. Generally speaking the leucocytosis was at its maximum during the febrile period and in proportion as the temperature fell the leucocytosis disappeared and gave way to a normal standard, which, when the fever lasted a week or more was at first above the average. The greatest drop

in the count was usually noticed on the day after the commencement of treatment, and in some cases particularly Nos. 5, 6, 7, 8 and 9, this diminution was very pronounced varying from 7,550 to 14,800 per cubic millimetre. The average leucocyte counts in eight cases in which the temperature was normal on the third day were for the first three days 15,650, 11,200 and 9,400; and a week later 8,650, the number in four of the cases ranging between 6,000 and 7,900 at this time. The average counts for the first five days in five cases in which the fever lasted about a week were 20,140, 14,490, 15,660, 12,780 and 10,060 respectively; and on the seventh, ninth and fifteenth days 8,400, 14,625 and 12,100 per cubic millimetre. When the fever was more protracted the condition was exactly similar as in cases No. 8 and 9. In four cases in children the count when the temperature became normal varied from 8,200 to 10,700, and this high standard was maintained for a much longer time than in adults. The lowest count in twenty observations was 7,900, but generally it ranged between 8,000 and 10,000 per cubic millimetre.

Sodium salicylate, and particularly if pushed for the first twelve hours, seems to have a more rapid effect in reducing the number of leucocytes than has treatment by either Salicine or Alkalies (Vide Charts I, II, III and IV.) With the Sodium Salicylate the average lowest count in the week was 6350 per cubic millimetre; with salicine 8125 per cubic millimetre; and with Alkalies 9,000 per cubic millimetre.

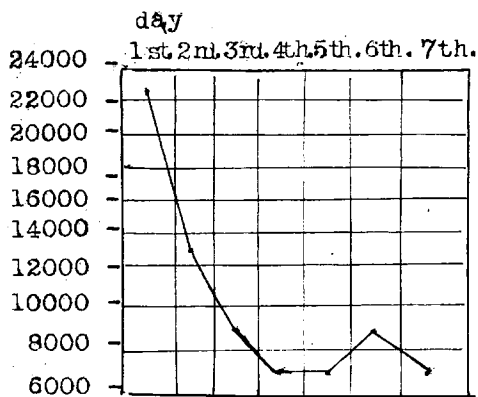


Chart I. Sodium Salicylate
(hourly at first) - 3 cases

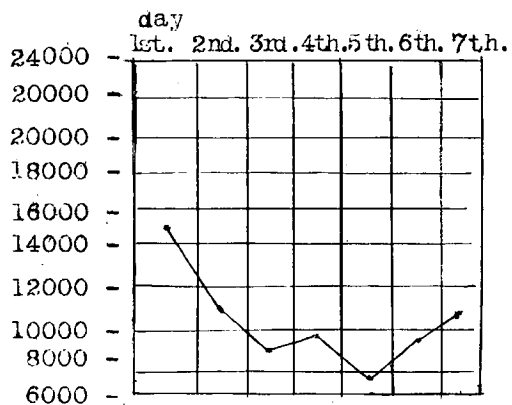


Chart II. Sodium Salicylate
(two or four hourly) - 8 cases.

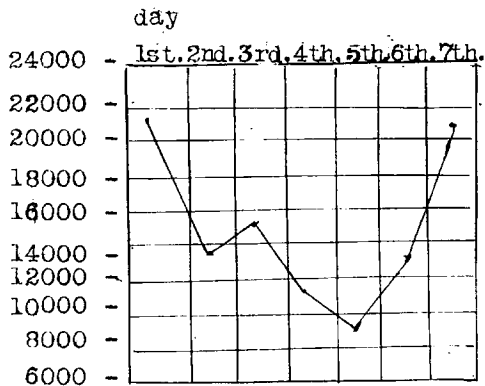


Chart III. Salicine - 3 cases.

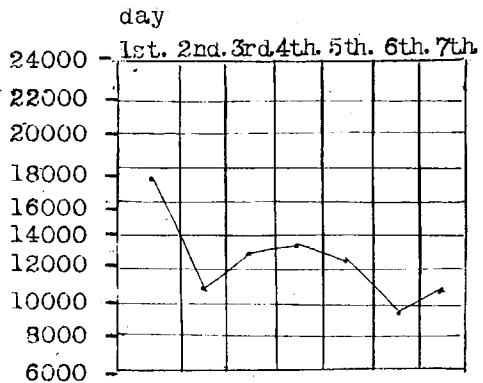


Chart IV. Alkalies - 5 cases.

Relapses are associated with an increase in the leucocyte count. This increase is seldom very important and in none of the cases could it be termed a leucocytosis. The highest figure observed was 13,250 per cubic millimetre in case No. 12, although the count in the post-febrile period varied from 9,000 to 11,550. In subacute cases even when the local manifestations were severe the increase was only moderate reaching a maximum of 11,650 per cubic millimetre. Complications on the other hand cause a distinct increase amounting in some to a leucocytosis of high degree. (Vide Charts V, VI, and VII.)

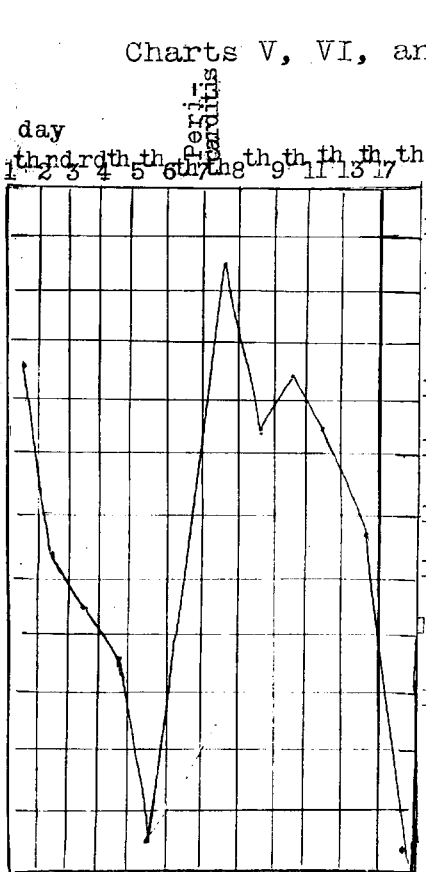


Chart V. Pericarditis - Case No. 1

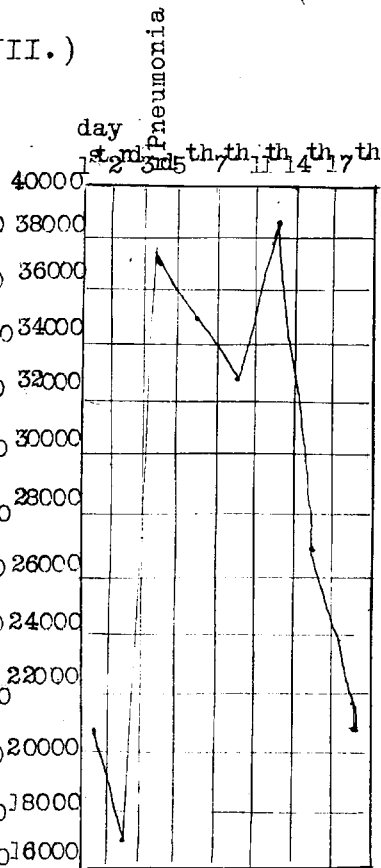


Chart VI. Pneumonia - Case No. 15

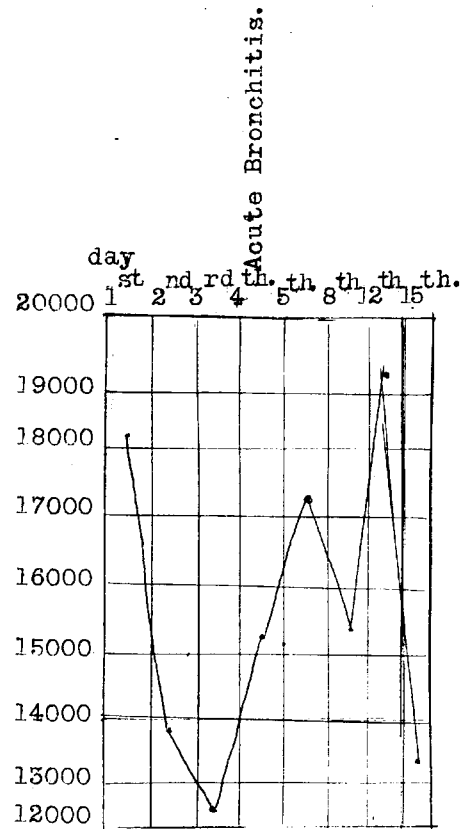


Chart VII. Acute Bronchitis - Case No. 10

The increase of leucocytes in acute rheumatism is interesting in its bearing on the question whether the disease were infectious or constitutional. If it were the former, the increase of leucocytes was to be expected, for such increase was usually directly proportional to the intensity of the infective process. (Hunter¹⁰) Rheumatic fever is an acute disease in which there are pain and swelling of the joints accompanied by increased temperature, profuse sweating, and a tendency to inflammation of the pericardium, endocardium, and pleura, with sometimes cutaneous manifestations, and yielding rapidly to treatment by salicylates which exert almost a specific effect on the disease. There is also a leucocytosis directly corresponding to the severity of the infection as is the case in pneumonia, diphtheria and scarlet fever. This increased cellular activity represents nature's attempt to rid the blood and the system of bacteria and their toxins. In this endeavour it is probable that Metchnikoff's hypothesis hold true, and that the immense number of phagocytic leucocytes which crowd the blood stream mechanically engulf and destroy many of the invading micro-organisms. The view expressed by Von Limbeck that the height of the leucocytosis in infectious diseases is dependent upon

the extent of the inflammatory exudate is no more tenable in the case of acute rheumatism than it is in the others. For, processes characterized by insignificant exudate are capable of causing as great or a greater increase than those in which this out-pouring is extensive, and in rheumatic fever there is no relation between the number of joints involved and the leucocyte curve. The essential factor in determining the degree of increase is the intensity of the infection, and the strength of the individual's resisting powers in reacting against it. An intense infection occurring in a person whose resisting powers are normally developed will produce a decided increase; but in a person whose resisting powers are crippled the presence of an infection of like intensity will fail to cause a leucocytosis. Taking the two extreme counts of leucocytes in the acute attacks on admission - namely 7,000 and 31,750 per cubic millimetre a striking contrast is presented. The former count occurred in a patient, who, during the eight months he was under observation, had three relapses. The minimum and maximum of the forty-seven counts performed were respectively 3,550 and 10,150. On only three occasions did the count exceed 8,000, each

increase being associated with a severe relapse. In this case though the temperature was febrile and the rheumatic manifestations severe the leucocyte count generally varied between 5,000 and 6,000. In the latter case the counts for the first four days were respectively 31,750, 16,950, 9,300 and 7,900 per cubic millimetre. There was a slight recurrence of pain on the fifth day. On the seventh day the temperature was normal, the pains gone, and the leucocyte count 6,350 per cubic millimetre. In one of Cabot's cases in which the count was only 5,500, the patient had had a fourth relapse. Clinically while these facts may be of little value alone, they may be of some value when taken as corroborative of other rheumatic manifestations.

The differential changes observed in the leucocytes in rheumatic fever involve a relative increase of polymorphonuclear neutrophiles with a consequent diminution of lymphocytes. The percentages of the small lymphocytes in the acute cases averaged 15.79, varying from a minimum of 5.15 to a maximum of 20.67. In the subacute cases the average was 24.50 per cent. The leucocytes in seven cases in which the percentage was less than 15 averaged 19,000 per cubic millimetre, and in twelve cases exceeding 15 per cent., 16,900 per cubic millimetre. In cases of high leucocytosis Turk found that the number was

usually small, and in the less acute cases when the leucocyte count was moderate the percentage was greater and approached in some cases to near the normal. With defervescence and in the early stage of convalescence the counts increased to usually between 30 per cent. and 40 per cent. In three cases this maximum was exceeded reaching in one (No.5) 47.66 per cent. This lymphocytosis was also noted though in a less degree in the later stages of convalescence.

The large lymphocytes with the transitory forms in many of the cases (complicated and uncomplicated) showed in a striking manner a decided increase in number. This seemed to be more frequently associated with low than with high counts, and with attacks of short than with attacks of long duration, although no hard and fast rule can be laid down regarding this point. The percentages in the acute cases averaged 6.86, and in the subacute 7.67, varying in individual cases from 2.35 to 16.46 per cent. in the former, and from 3.06 to 12.71 per cent in the latter. In seven acute cases the percentage was under 5; in ten it varied between 5 and 10; and in two it was more than 10. In six of the twelve cases exceeding 5 per cent, including the two maximum counts the duration was less than one week. In some cases the increase was maintained throughout, whilst in others it was only observed at the beginning and at the end of the observations.

In one case No. 6, the number on admission was 16.46 per cent. The temperature was normal on the third day. The percentage dropped steadily to 5.11, and then again increased until twelve days later when the last observation was made it was 15.93. In a few cases however the number remained within normal limits. Turk also observed in an entirely fresh case a relative and absolute increase; and in another case the increase was manifested once at the beginning and once towards the end of the observations.

So long as a high degree of leucocytosis existed the percentage of polymorphonuclear neutrophiles was generally raised. If, however, the leucocyte count was moderate - between 10,000 and 15,000, such relative increase was often absent and the number normal. In the acute cases they varied from 68.23 to 88.07 per cent. Turk found them to vary between about 79 and 92 per cent. In the post-febrile period they became diminished and sometimes reached a very low figure - e.g., in case No. 6, during convalescence the percentage dropped to 39.62, the corresponding count of the small lymphocytes being 47.66.

The circumstances attending the eosinophiles proved more interesting and more variable. Zappert² in two out of four cases observed a considerable diminution during the

fever, followed by an increase above the normal when the temperature became afebrile. Turk's observations confirm approximately Zappert's data. The percentages in the acute cases averaged .75. In five cases this average was exceeded, the maximum being 3.60, whilst in another case they were absent on admission. In the subacute cases the percentages averaged 3.03 varying in individual cases from 1.88 to 10.75. Whenever the acute manifestations showed signs of abating I found these cells increasing in number notwithstanding that the fever and articular lesions had not entirely disappeared; and with a normal temperature the increase was generally very decided. In two cases this was rapid and sudden. In one the respective counts for the first six days were .19, 1.12, 7.60, 11.41, 8.66, and 8.49, per cent. In the other on the fourth day the percentage was .58, and on the fifth and sixth days 4.92, and 6.00. This re-appearance of eosinophiles in the blood in increased numbers may be regarded as in pneumonia as a sign of the probable approach of the crisis. In severe attacks and particularly in complicated cases as in Nos. 9, 10 and 15, the eosinophiles remained very low during the febrile period. In case No. 9 during the fever the highest percentage was 1.28; in case No. 10, 1.50; and in case No. 15, .92.

The eosinophiles follow very closely the leucocyte chart, a diminution of the former being associated with an increase of the latter and vice-versa. (Vide Chart VIII.)

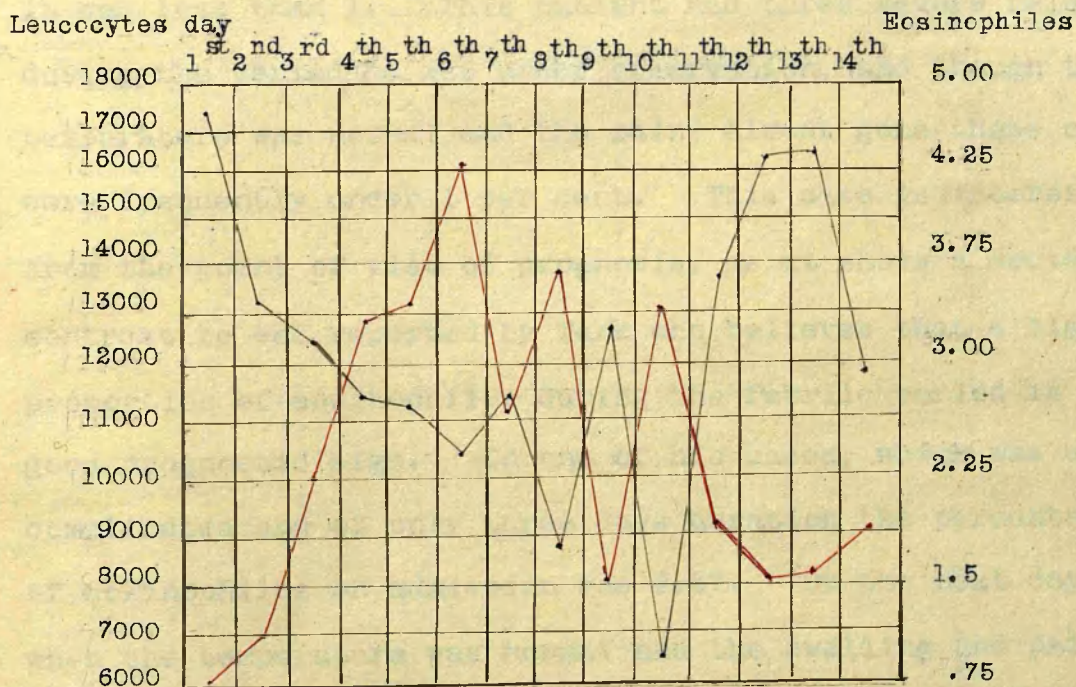


Chart VIII. Leucocytes - black
Eosinophiles - red

Case No. 11 assumes quite an exceptional aspect. Of the forty-seven observations made during a period of eight months the eosinophiles only once exceeded 3 per cent, and once were between 2 and 3 per cent. In seventeen counts the percentages varied between 1 and 2, and in twenty-eight counts it was less than 1. This patient had three severe relapses during the period he was under observation, and though the temperature was normal and the pains almost gone these cells were frequently under 1 per cent. This case is interesting from the point of view of prognosis, as it shows a decided contrast to one reported by Turk who believes that a high proportion of eosinophiles during the febrile period is a good prognostic sign. In one of his cases, which was uncomplicated and of only three days duration the percentage of eosinophiles on admission was 9.57. On the next day when the temperature was normal and the swelling and pain in the joints had disappeared, the percentage rose still higher and reached 13.83. The nearest approach to Turk's case from the point of numbers was seen in case No. 31. On admission the eosinophile count was 10.57 per cent; and on the following day with freedom from pain and fever 13.57 per cent. Thirteen days later this patient developed a follicular tonsillitis. The temperature was 102.2, and the eosinophiles .18 per cent.

At the end of six days when the temperature was afebrile, and the throat condition better, the percentage again rose to 10.01.

Most cells were seldom noticed in the acute stages of the attack. I observed them in only six of the acute cases on admission, and in numbers varying between .19 and .47 per cent. In the subacute cases on the other hand they were found in ten of the fourteen cases on admission, varying in individual cases between .18 and 1.22 per cent. With defervescence they showed a decided increase. They were counted in 154 out of 219 observations or 61 per cent in the acute cases, and in 74 out of 100 observations or 74 per cent in the subacute cases. In a few severe cases however they were almost constantly present as for example in case No. 4, in each of the fifteen observations; in case No. 6, in ten out of eleven observations; in case No. 9, in fourteen out of sixteen observations, exceeding on one occasion the percentage of eosinophiles; and in case No. 7 they were present in all the nine observations excepting the first.

Myelocytes in small numbers ranging from .16 to .86 per cent. were found during the attack in five cases. I observed them in twenty-one film preparations - fifteen times during

the fever, and six times when the temperature was normal. The cases in which they occurred were amongst the most severe. In four the leucocytes exceeded on admission 20,000 per cubic millimetre, and in the fifth case which relapsed three times they were present in seven out of forty-seven observations. Turk noted their presence during the fever in one of his eight cases.

With regard to the blood-plates the examination of fresh preparations in the acute stages showed them to be greatly increased. Cabot and Garrod¹⁰ noted an increase during the fever; Halla and Turk often a very great increase both when the temperature was febrile and afebrile. As far as I am aware none of these observers have made any attempt to enumerate these bodies. In normal blood they may be said to vary between 200,000 and 300,000 per cubic millimetre. The counts of two cases made during the febrile period were respectively 1,295,000 and 845,000 per cubic millimetre. In the former the patient was perspiring very freely at the time of observation, but in the latter perspiration was less profuse. During convalescence the counts in these two cases were respectively 397,000 and 319,000 per cubic millimetre, and in a third case 342,000 per cubic millimetre. The

enumeration of the blood-plates may afford a means of diagnosing acute rheumatism from other infectious diseases as pneumonia or typhoid fever in the early stages. Cabot mentions two cases which at first were supposed to be rheumatic fever but which eventually turned out to be pneumonia and typhoid fever. In both of these diseases the number is said to be normal or at most to show a slight increase.

Rheumatic fever is sometimes confounded with acute gout, and for the purposes of diagnosis clinical haematology may be of some value in distinguishing the two diseases. With this object in view I examined the blood in six cases of acute gout of recent standing. The results showed no characteristic alterations. In long standing cases on the other hand an ordinary secondary anaemia may develop. The erythrocytes and the haemoglobin manifested little change, whilst the increase in the leucocyte count was only moderate - the highest number being 10,550 per cubic millimetre. The erythrocytes and the leucocytes on admission averaged respectively 4,951,000 per cubic millimetre and 8690 per cubic millimetre. The haemoglobin estimates averaged 85 per cent.

The differential counts showed as little variation. The small lymphocytes averaged 25.50 per cent; the large lymphocytes 3.37 per cent; the neutrophiles 69.06 per cent; the eosinophiles 1.62 per cent; and the mast cells .48 per cent.

C O N C L U S I O N S.

Erythrocytes - An attack of rheumatic fever is always attended by a diminution in the number of erythrocytes, varying in the acute cases from half a million to about two millions per cubic millimetre. In the subacute cases the loss is less. This diminution is influenced by various factors - e.g., the duration of the attack - greater in attacks of longer duration; previous attacks - greater in cases with previous attacks; the severity of the infection - the severer the infection the greater the loss; presence or absence of endocarditis - greater in cases with endocarditis. When the fever disappears regeneration takes place. In children the process of repair is more rapid than in adults.

The development of fresh rheumatic manifestations during convalescence is accompanied by a fall up to about half a million per cubic millimetre according to the severity of the relapse. Erythroblasts occur only as a rarity.

Haemoglobin - The percentage is diminished. The loss is proportionately greater than that of the erythrocytes, and like them it is influenced by (1) the duration of the attack; (2) previous attacks; (3) the severity of the infection; (4) presence or absence of endocarditis. A diminished

percentage of haemoglobin accompanies a fall of erythrocytes, but on the other hand the rate of increase of the former is very much slower than that of the latter. The prompt use of salicylates sometimes prevents the loss of haemoglobin.

Haemoglobin Index - As a rule it is considerably less than 1. When the temperature falls the colour index becomes less, and this fall may be continued into the period of convalescence.

The anaemia of rheumatic fever in the acute stages of the attack is an oligocythaemia. Post-rheumatic anaemia is in the majority of the cases a chlorosis; in mild cases it is generally a pseudo-chlorosis.

Iron whether administered alone or with sodium salicylate causes a recurrence of arthritis and fever when given too soon after the subsidence of the acute symptoms. The blood changes in rheumatic fever are not due to the salicylate of soda as they are equally well marked when salicine and alkalies are given.

Leucocytes - Leucocytosis of varying degree accompanies the acute attack. In mild cases it is moderate - under 15,000 per cubic millimetre. In severe cases it exceeds 15,000 per cubic millimetre. In subacute attacks the number is just above the normal. The count is greater when endocarditis is present than when it is absent, and in cases

complicated by pneumonia, pericarditis, and erythema, it is above 20,000 per cubic millimetre. The count is not influenced by the number of joints affected. When the rheumatic manifestations abate the leucocytosis disappears and gives place to a normal standard which when the fever lasts some time is above the average. Sodium salicylate has a more powerful influence in reducing the number of leucocytes than has either salicine or alkalies. Relapses cause only a moderate increase never amounting to a leucocytosis. There is a close relationship between the leucocytosis of rheumatic fever and the leucocytosis of other infectious diseases - e.g., pneumonia and diphtheria.

The small lymphocytes are reduced relatively and often also absolutely. The reduction is generally greater in cases of high than in cases of low degrees of leucocytosis. In the subacute cases the number is about normal. In the post-febrile period there is usually a lymphocytosis.

The percentage of large lymphocytes varies considerably, being sometimes normal and sometimes increased. This increase is more frequently associated with attacks of short than with attacks of long duration.

The polymorphonuclear neutrophiles are increased in the acute stages. This increase does not appear so constant

when the leucocyte count is moderate. In the post-febrile period the number is generally subnormal, and may reach a lower figure than the small lymphocytes.

The eosinophiles are diminished in the acute attacks. In the subacute cases they are within normal limits. With the subsidence of the acute symptoms they show an increase in number which is sometimes very rapid and sudden. The curve of the eosinophiles varies inversely as the curve of the leucocytes. A low percentage in the post-febrile period as well as in the acute stages may be interpreted as an unfavourable sign prognostically.

Mast cells are seldom present during the height of the fever. At other times they are almost constantly present.

Myelocytes in small numbers are sometimes found in the severe cases chiefly during the fever, but sometimes also when the temperature is normal.

The blood-plates are greatly increased during the fever. The increase is greatest when perspiration is profuse. The number in the convalescent period is normal or at most shows a slight increase.

The blood counts in acute gout unlike that in acute rheumatism show no characteristic alterations.

R E F E R E N C E S.

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3. Lancet Feb. 13th., 1892.
4. Cabot Clin. Exam. of the Blood, 1901.
5. Da Costa Clin. Haem. 1902.
6. Trousseau Clin. Med. Vol. IV.
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P A R T I I.

The AETIOLOGY of RHEUMATIC FEVER with special

reference to the influence of Heredity.

Heredity is one of the many factors mentioned in text books of medicine as a predisposing cause of rheumatic fever. All individuals are not equally liable to suffer from this disease when placed under conditions favourable to its development, and the exposure to chill which may be the exciting cause of an attack in one person may in another give rise to some disease of an entirely different nature as pneumonia or pleurisy. It is on this account that rheumatism is classed among the diathetic maladies, and in this sense the existence of a rheumatic diathesis cannot be disputed. (Garrod)¹, Hutchinson² speaks of this diathesis as universal and as shared to some extent by all. But, according to Duckworth³ it is probable that some persons never could have rheumatism; it was only predisposed persons, who, under certain conditions of lowered vitality, became the prey to some micro-organism which germinates in the blood developing its toxins therein. Whatever constitutes this diathesis seems to be transmitted from generation to generation, from parent to child, and the influence of family predisposition comes out very clearly in studying individual cases.

In the following synopsis (vide Appendix), the cases have been divided into four classes:- Class A - "all cases in which rheumatic manifestations could be traced in blood relatives of the first degree (i.e., father, mother, brothers or sisters); Class B - all cases in which rheumatic manifestations could be traced in relatives of the second degree (i.e., grandfather, grandmother, uncles, aunts, or cousins); Class C - all cases in which the history of rheumatism was doubtful; Class D - all cases in which no history of any kind could be found.

The following tables give the hereditary and age incidence of the cases: in Tables I and II as admitted to the infirmary; and in Tables III and IV based on the age at the first attack. As many of them have had previous attacks of rheumatic fever and therefore do not figure any longer at those ages the information derived from Tables I and II has only a limited value. Yet while it does not alter the fact of heredity in cases in which such a history is obtained, it vitiates statistics bearing on its influence in predisposing to this disease at particular ages. Accordingly Tables III and IV have been constructed to remedy this discrepancy. In Tables I and III the family history obtained includes rheumatism and rheumatic fever; and in Tables II and IV rheumatic fever only.

TABLE I.-family history of rheumatism and rheumatic fever - present attack.

	Age	No. of Cases	Class A	Class B	Classes A and B	Total	Class C	Class D
under	15	4	2	"	1	3	"	1
	15 to 20	6	2	1	1	4	1	1
	20 to 30	23	9	"	3	12	1	10
	30 to 40	15	4	"	2	6	1	8
	40 to 50	17	6	"	"	6	"	11
	50 to 60	3	"	"	1	1	"	2
	over 60	2	"	"	"	"	"	2
<hr/>								
Total		70	23	1	8	32	3	35

(a) under 15 years 1 in 1.3 gave a history in relatives of the 1st. degree.
 " 20 " 1 " 1.6 " " " "
 " 30 " 1 " 1.8 " " " "
 over 30 " 1 " 2.8 " " " "

(b) under 15 years 1 in 1.3 gave a history in relatives of the 1st. and 2nd. degrees.
 " 20 " 1 " 1.4 " " " "
 " 30 " 1 " 1.7 " " " "
 over 30 " 1 " 2.8 " " " "

TABLE II.- family history of rheumatic fever - present attack.

Age	No. of Cases	Class A	Class B	Classes A. B.	Total	Class C	Class D
under 15	4	1	"	1	2		2
15 to 20	6	1	1	1	3	1	2
20 " 30	23	5	"	2	7	2	14
30 " 40	15	3	2	"	5	1	9
40 " 50	17	3	"	"	3		14
50 " 60	3	"	"	"	"		3
over 60	2	"	"	"	"		2
Total	70	13	3	4	20	4	46

(a) under 15 years 1 in 2 gave a history in relatives of the first degree.
 " 20 " 1 " 2 " " " "
 " 30 " 1 " 3 " " " "
 over 30 " 1 " 6.1 " " " "

(b) under 15 years 1 in 2 gave a history in relatives of the 1st. and 2nd. degrees.
 " 20 " 1 " 2 " " " "
 " 30 " 1 " 2.9 " " " "
 over 30 " 1 " 4.6 " " " "

TABLE III.- family history of rheumatism and rheumatic fever -
First attack.

Age	No. of Cases	Class A	Class B	Classes A. B.	Total	Class C	Class D
under 15	11	5	"	3	8	1	2
15 to 20	12	3	1	2	6	1	5
20 " 30	19	9	"	2	11	1	7
30 " 40	16	3	"	1	4	"	12
40 " 50	9	3	"	"	3	"	6
50 " 60	2	"	"	"	"	"	2
over 60	1	"	"	"	"	"	1
Total	70	23	1	8	32	3	35

(a) under 15 years 1 in 1.3 gave a history in relatives of the
1st. degree
 " 20 " 1 " 1.7 " " " "
 " 30 " 1 " 1.8 " " " "
 over 30 " 1 " 4.6 " " " "

(b) under 15 years 1 in 1.3 gave a history in relatives of the
1st. and 2nd. degrees
 " 20 " 1 " 1.6 " " " "
 " 30 " 1 " 1.6 " " " "
 over 30 " 1 " 4.6 " " " "

TABLE IV.- family history of rheumatic fever - first attack.

	Age	No. of Cases	Class A	Class B	Classes A. B.	Total	Class C	Class D
under	15	11	4	1	1	6	1	4
	15 to 20	12	2	1	2	5	1	6
	20 " 30	19	4	1	1	6	2	11
	30 " 40	16	2	"	"	2	"	14
	40 " 50	9	1	"	"	1	"	8
	50 " 60	2	"	"	"	"	"	2
	over 60	1	"	"	"	"	"	1
Total		70	13	3	4	20	4	46

(a) under 15 years 1 in 1.8 gave a history in relatives of the 1st. degree.
 " 20 " 1 " 2.3 " " " "
 " 30 " 1 " 2.8 " " " "
 over 30 " 1 " 9.3 " " " "

(b) under 15 years 1 in 1.5 gave a history in relatives of the 1st. and 2nd. degrees
 " 20 " 1 " 1.9 " " " "
 " 30 " 1 " 2.3 " " " "
 over 30 " 1 " 9.3 " " " "

The statistics from Tables I and III show that a history of rheumatism and rheumatic fever was obtained in thirty-two cases, or in 45.7 per cent, and on deducting from the total the doubtful cases in 47.7 per cent.

In thirty-one cases	or 44.2 per cent.	there was a history in
		relatives of the 1st. degree.
" eight	" 11.4	" " " 1st. & 2nd. "
" one case	" 1.4	" " " 2nd. "
" three cases	" 4.2	" the history was doubtful.
" thirty-five	" 50	" no history was obtained.

The statistics from Tables II and IV show that in twenty cases, or 28.5 per cent. there was a family history of rheumatic fever, and after deducting the doubtful cases in 30.3 per cent.

In thirteen cases	or 18.5 per cent.	there was a history in
		relatives of the 1st. degree
" four	" 5.7	" " " 1st. and 2nd. "
" three	" 4.2	" " " 2nd. "
" four	" 5.7	" the history was doubtful.
" forty-six	" 65.7	" no history of rheumatic fever.

From the above Tables it will be seen that the hereditary influence is the more marked the younger the subject; that the proportion of rheumatic family histories is highest amongst the youngest patients and steadily decreases with

advancing age; and that those who have a rheumatic history (including rheumatism and rheumatic fever) are three times as liable to suffer from the disease before the age of thirty than over this age, and four times as liable if the history be one of rheumatic fever; 78 per cent. of the cases with a hereditary history of rheumatism and rheumatic fever, and 85 per cent. of those with a hereditary history of rheumatic fever, suffered from the disease before reaching the age of thirty (vide Tables III and IV.)

According to Cheadle⁴ the chance of an individual with a hereditary taint contracting acute articular rheumatism is nearly five times as great as that of an individual with no hereditary tendency.

Fuller's⁵ statistics based on the examination of 346 cases treated at St. George's Hospital between January 1845 and May 1848, show that a history of rheumatic fever in one or other parent was present in 71 cases or 28.8 per cent. Among five hundred patients treated at the Westminster Hospital, Syers¹ obtained a family history of rheumatism in the parents, uncles, aunts, brothers or sisters in 33.4 per cent; and of rheumatic fever in those of 20 per cent. Pye Smith⁶ traced a hereditary tendency (direct and collateral) in 23 per cent of four hundred cases. The Committee of the

Clinical Society¹ in the report on hyperpyrexia stated that of thirteen hundred patients treated in the Middlesex Hospital 27 per cent. gave rheumatic family histories. Bosanquet⁷ estimated it at 22 per cent; Beneke⁸ at 34.6 per cent; Sir A. Garrod⁴ at about 25 per cent; Dr. A. B. Garrod⁹ taking adults and children together at 35 per cent in rheumatic patients; and Goodhart¹⁰ taking children alone at 57 per cent. Cheadle⁴ found a history of rheumatic fever in twenty-three out of thirty-two cases or 71 per cent. occurring in private practice, and if chorea and erythema be taken as sufficient evidence of rheumatism the proportion was raised to thirty-one out of thirty-three cases, or 93 per cent.

Thus, statistics bearing on this subject are exceedingly variable. This is probably due to (1) differences of thoroughness in inquiry, and the nature of the evidence allowed, and (11) the class of patients from whom the evidence is obtained.

As regards the first, in investigating a disease like rheumatic fever, it is not merely a question of tracing a disease with various and multiple manifestations in the ascendants identical with that in the patient, but any manifestation whatsoever provided that it is positively of the nature of the disease investigated as in scrofula

and syphilis. (Homolle.)⁸ Some observers as Fuller have limited their inquiries to a history of rheumatic fever in the parents. The statistics from such limited investigations are necessarily incomplete. From Tables III and IV it will be seen that while a history of rheumatism and rheumatic fever was obtained in the proportion of 1 in 1.6 under the age of thirty, and of 1 in 4.6 over this age, when rheumatic fever was alone investigated the proportion was much less being 1 in 2.3 in the former period, and 1 in 9.3 in the latter. Although acute rheumatism in the parent may be followed by acute rheumatism in the child it does not follow that this is the only form which can transmit a predisposition to acute articular rheumatism. On the contrary you frequently discover in the parents or grandparents some of the manifestations of the disease - lumbago and rheumatic iritis, which belong to "Rhumatisme Abarticulaire" and "Rhumatisme Vague," (Besnier and Homolle.)⁸ In eleven of the cases or 15.7 per cent, one or both parents of the patients suffered from chronic rheumatism ("rheumatics") and of these eight or 11.4 per cent. developed typical attacks of acute articular rheumatism.

Again, while no history may be obtained in the parents, there may be a history in relatives of the 2nd. degree

as in case W. H. (No.1); uncle and aunt (maternal), both suffered from rheumatic fever, though no history was obtained in the parents.

In the case of adults of the lower classes it is much more difficult to obtain any information of the diseases from which the parents suffered than in patients of the better classes. The most satisfactory results are obtained in the case of children as their mothers can nearly always give an account of at least two generations, and statistics bear out this point. The highest figures recorded have been in children, Goodhart putting it at 67 per cent, and Cheadle at between 70 and 93 per cent. depending on the amount of evidence allowed. Much more satisfactory results are obtained in private practice. In hospital or in a public institution the nearest approach to securing equally accurate results is by interviewing the relatives. In these cases this was done as far as possible and an endeavour made to verify statements regarding the diseases with which the patients or their relatives might be credited. In some cases in which one expected to find a family history of rheumatism this was impossible as the patients knew nothing of their parents or relatives - e.g., Case C.A. (No.28), aged 20, who on admission for his third attack of acute rheumatism

had a double mitral murmur.

A negative history does not necessarily exclude an inherited rheumatic tendency as many persons have suffered from rheumatism in childhood, who are quite unaware of the fact having escaped articular lesions entirely or almost entirely. One of these mild cases (L.R. No.67) came under my notice. The patient was admitted with an abscess on the head, which eventually healed up. Some time afterwards she casually mentioned to the nurse that she had pain in her right knee which it seemed she had had for two days. There was no swelling or redness and the temperature was 100.6. On investigation it was found that her mother died from heart disease following rheumatic fever.

It is not so much from the study of figures, as from the examination of individual cases that the most satisfactory evidence of the importance of heredity as a predisposing cause of rheumatism is obtained. Some of the cases show a remarkable family proclivity to the disease - e.g., cases Nos. 58 and 26. In the former, there was a rheumatic strain in both father and mother. The mother had five brothers and two sisters. Six suffered from "rheumatics," and one from rheumatic fever and heart disease. The patient herself had

mitral regurgitation, and had had five previous attacks of rheumatic fever. One sister had chorea. In the case of the latter, the patient's father had rheumatic fever; one brother subacute rheumatism; one sister chorea; one brother escaped.

Garrod¹ quotes the case of a mother and all her children, five in number, who had survived the troubles of infancy, and all of whom had suffered from rheumatic fever. One son had had three attacks, and another five. It might be argued that in this case the disease was endemic, and influenced by local causes, but Garrod points out that the various members of the family were attacked in three different houses in three different towns. Again there is the remarkable case of Steiner^{II}, in which a rheumatic mother had twelve children and eleven of them suffered from rheumatism, and died before they reached the age of twenty. Similar cases have been reported by other observers.

In three of the cases I traced a family history of rheumatism in three generations. (1) A.H., No.15, aged eight has had one previous attack; mother had rheumatic fever; aunt (maternal) rheumatic fever and heart disease; uncle (maternal) rheumatic fever. Grandmother (maternal) suffered from rheumatism and died in confinement. (2) G. D. No. 18, aged twenty has

had no previous attack; mother and grandmother (maternal) had rheumatic fever. (5) H. B. No. 61, aged twenty had one previous attack three years ago; father, grandfather (paternal), and twin brothers, suffered from rheumatic fever.

When the proclivity is inherited from both parents one would expect the tendency to the disease to be greatly intensified, and its severity and persistence likewise increased. In two cases there was a double inheritance. One was the case of E.P. No.38 already quoted; whilst the other was the case of J.V. No.29, aged twenty-eight who had one previous attack of rheumatic fever fourteen years ago. On admission he had mitral regurgitation and obstruction. Mother suffered from rheumatics and lumbago; father and grandfather (paternal) also from rheumatics. Goodhart¹⁰ relates a case in which with a history of rheumatism in both father and mother, five out of six children under fifteen - i.e., all but a baby of fourteen months, had either articular rheumatism or heart disease; a boy of fifteen had rheumatic fever twice, and had mitral regurgitation; the second, a boy of ten the same; the third, a girl of eight, died of mitral disease; the fourth, a girl, had rheumatic fever after scarlatina, followed by mitral disease; the fifth, a boy of four, was laid by all winter with rheumatism. Cheadle⁴

reports the case of a girl who had chorea in its most severe form, followed by repeated attacks of endocarditis, pericarditis, erythema, paresis of limbs, acid sweats, pains in the joints and successive crops of subcutaneous nodules. She died at the end of nine months of cardiac dilatation and failure. The family history was charged with rheumatism on both sides. The father had subacute arthritis and muscular rheumatism; his sister died at eight years old of heart disease following acute rheumatism and chorea; his wife, the patient's mother, had suffered from acute rheumatism, heart disease, and chorea, her nephew a cousin of the patient, had rheumatic fever, and heart disease, and a niece subacute rheumatism. Cheadle found that many of these cases where there was an extraordinary tendency of rheumatism to develop in certain families might be due to some special faults of locality or circumstances, but careful inquiry into a number of cases showed that they arose in very various localities in members of the family when in different places, and under different conditions.

Another point in favour of the hereditary transmission of rheumatism is the fact that the disease sometimes affects sucklings and young children, and it is possible that such

cases are caused by the inherited vulnerability of the tissues. Bosanquet⁹ reports one case at the age of three weeks, and four others between the ages of two and four.

The mode of transmission showed a slight increase through the female. In fifteen cases or 46.8 per cent. it was through this line; in thirteen cases or 40.6 per cent. through the male; and in four cases or 12.5 per cent there was a double inheritance.

The liability to develop endocarditis would seem to be much stronger when a rheumatic tendency was inherited and especially when the history was one of rheumatic fever. Of the thirty-two patients in whom a family history of rheumatism and rheumatic fever was obtained, nineteen gave a history of rheumatic fever in the parents or relatives. Ten of these had endocarditis on admission or developed it during the attack. In the other nine there was no endocarditis. In thirteen cases the family history was simply one of "rheumatics." Of these, four had endocarditis on admission, whilst in the remainder it was absent. Thus of the thirty-two patients with a rheumatic family history, endocarditis was present in fourteen, or 43.9 per cent., and of the remaining thirty-eight cases in which no history, or a doubtful history of rheumatism was obtained, endocarditis was only present in eleven cases or in 28.9 per cent.

C O N C L U S I O N S .

A family history of rheumatism is obtained in a large percentage of cases.

The percentage is highest amongst the youngest patients and steadily decreases with advancing age.

Patients with a hereditary history nearly always suffer from the disease before reaching the age of thirty.

The disease sometimes appears in three successive generations.

Chronic rheumatism in the parents and grandparents is sometimes followed by rheumatic fever in the child.

There is a slight increase in the hereditary transmission through the female line.

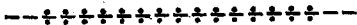
A negative history does not necessarily exclude an inherited rheumatic tendency.

Endocarditis is met with more frequently when a rheumatic tendency is inherited and especially when the history is one of rheumatic fever.

R E F E R E N C E S .

- | | |
|---------------|---|
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| 2. Hutchinson | Trans. Internat. Med. Cong. London, 1881, Vol. II |
| 3. Duckworth | Lancet, Aug. 17th., 1895 |
| 4. Cheadle | Harveian Lectures, 1888. |
| 5. Fuller | Rheumatism etc. 3rd. Edit., 1860 |
| 6. Pye Smith | Guy's Hosp. Reports, 1874, 3rd. Series, XIX. |
| 7. Lancet | June 2nd., 1900. |
| 8. Jaccoud | Diet. de Med. et de Chir. Vol. XXXI, 1882. |
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| 10. Goodhart | Dis. of Children. |
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A P P E N D I X



The counts in normal blood are approximately as follows:-

Erythrocytes - per cubic millimetre 5,000,000 for men
and 4,500,000 for women

Haemoglobin - about 100 per cent.

Leucocytes - 5,000 - 10,000 per cubic millimetre.

Small Lymphocytes - 22 - 25 per cent.

Large Lymphocytes - 2 - 4 " "

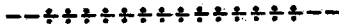
Polynuclear Neutrophiles - 70 - 72 per cent.

Eosinophiles - 2 - 4 " "

Mast Cells - .5 " "

C A S E S.

PART I.



Acute cases.

George Dummer, aged 20, carman, admitted 3rd June 1902

Previous history - no previous attacks, or any other illness excepting the illness common to childhood. The present attack followed on a severe wetting four days before admission. Profuse perspiration
Delirious at times.

Present state Swelling and pain affecting both ankles, wrists and elbows.
profuse perspiration. first sound at apex - soft in character;
no heart murmur. Lungs and abdomen - nil
Temperature 101.6 Pulse 96. Respiration 28

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin Index	Treatment	Remarks and progress of disease.
3.6.1902	4 th day	101.6	4566000	15450	69	75	Sod. Sal. gr. xx two hours	
4.6.	"	101.2	4528000	12300			"	delirious all day, swelling in joints less. Still delirious at times. perspiration profuse
5.6.	"	99.2 100.2		11350			"	"
6.6.	"	99. 100.4		10650			Sod. Sal. gr. xx four hourly	"
7.6.	2	99.4 101.8		7750			"	"
8.6.	"	100.8 102.4		9400			"	no delirium. pains - less signs of pericarditis pain over cardiac region
9.6.	"	101. 103.4		17500			"	"
10.6.	"	102 102		14100			"	slightly delirious no other change
11.6.	"	100.8 102		15350			"	tenderness over heart gone; soft murmur of apex. pains easier
6.	"	100.4 101.2		14400			"	Effusion nearly gone murmur heard more plainly.
5.6.	3 rd	100 101.4		12800			"	murmur blowing in character. conducted towards axilla
4.6.	"	99 100.6		7050			"	"

John Clarke, aged 36, packer, admitted 17th October 1902.

Previous history - first attacks of rheumatism from 15 months ago; since then has had slight attacks of arthritis when serving as a soldier in South Africa.

Present state - anaemic. Pain and swelling in left knee and ankle, and in right wrist and hip.

Heart - nil. Lungs and abdomen - nil. Urine - nil

Date	Pulse	Temp	Erythrocytes	Leucocytes	Hb	Hct	Platelets	Large lymphocytes	Polynuclear	Neutrophils	Eosinophiles	Most cells	Myelocytes	Treatment	Remarks
17.10.02	6 day	101	4672000	12500	82	82	1319	928	7678	77	.	.	.	Sod. Sal. gr. xx two hourly	"
18.10	1 week	Normal	4686000	8450	76	81	2134	748	6981	51	11	.	.	"	pains much better
14.10	2 "	.	4556000	8750	74	81	3383	666	5819	66	50	.	.	gr xx four hourly	free from pains
21.10	.	.	4621000	7900	70	75	3615	805	5177	77	34	.	.	"	"
23.10	.	.	4502000	8300	70	77	3568	562	5168	70	20	.	.	"	"

No 3

Elizabeth Parry, aged 37, housewife, admitted 5th November 1902.

Previous history - five previous attacks of rheumatic fever, the first being 21 years ago never scarlet fever. Present attack commenced five weeks ago

Present state - very anemic, pain and swelling left elbow, shoulder and wrist, and right ankle. Heart mitral regurgitant murmur, soft and blowing in character, Lungs and abdomen - nil. Urine - acid with urates, no albumen perspiring freely

Date	Position of Disease	Temperature	Leucocytes	Urea	Hemoglobin	Hemoglobin	Small lymphocytes	Large lymphocytes	Polymorphonuclears	Eosinophils	Heart Cells	Myocytes	Treatment	Remarks
5.11.02	H	101.2	4164000	22.100	70	82	6.50	5.00	88.07	39	-	-	Sod. Sal. gr. xx two hourly	"
6.4.	"	100	4128000	12.450	68	82	6.50	6.38	86.11	"	"	"	"	pains much easier
7.11.	"	100	4500000	8600	66	76	20.32	4.05	73.61	68	32	"	"	almost free from pain
8.11.	"	"	4304000	8550	67	77	25.00	6.07	70.14	59	16	"	gr. xx four hourly	no pain
10.11.	"	"	4192000	10200	72	85	4.71	5.82	49.58	57	13	"	"	"
12.11.	"	"	3964000	6900	67	80	33.48	10.65	67.74	67	37	"	gr xx ter in die with ferri et am. ad. gr. v i.e.d. alternately	"
15.11.	"	"	4402000	7300	67	76	17.80	6.77	51.41	4.07	102	"	"	"
18.11.	"	"	4368000	15200	66	75	8.62	4.27	85.01	1.64	"	"	Sod. Sal. gr. xx two hourly	relapse on evening of 17 th Nov! Temperature 101°
19.11.	"	"	4448000	13250	67	75	15.30	7.30	71.80	2.00	16	"	"	pains less severe
20.11.	"	"	4144000	8600	64	77	23.17	6.33	66.50	5.53	29	"	"	still better
22.11.	"	"	4008000	8500	64	74	29.71	4.86	58.42	6.32	68	"	gr xx four hourly	no pain
24.	"	"	4226000	7850	70	82	26.00	6.00	66.66	7.00	33	"	gr xx ter in die	"
28.	"	"	4124000	6400	71	86	34.13	7.04	45.61	7.74	36	"	"	Discharged. 29. 11. 1902.

No 3

No 4
 Williams Berry, aged 29, Shoemaker, admitted 4th Nov 1902

Previous history - five years ago patient had rheumatic fever, which confined him to bed for six weeks. since then has enjoyed fairly good health until the onset of the present attack, twelve days before admission.

The right elbow and left shoulder joints were the first to become affected and then in turns left elbow and right shoulder, and right and left wrist joints, never scarlet fever

Present state - patient very anemic, pain and swelling in both wrists and shoulder joints; both elbows painful but not swollen, Perspiring freely. Heart 1st sound at apex - very soft; no increase in area of cardiac dulness; no murmur. Lungs and abdomen - nil Urine - acid albumen and urates - nil.

Temperature 101.2 Pulse 90. Respirations 24

Date	Deviation of 0.5° each	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hematocrit	Sedimentation	Rheumatoid Factor	Lymphocytes	Large Lymphocytes	Poly-nuclear Neutrophils	Mononuclear Neutrophils	Mast cells	Myocytes	Treatment	Remarks
4.11.02	12 days	101.2	4156000	141000	77	86	10.66	638	82.09	38	47				Pod. Sal. gr xx two hourly.	
5.11.	"	96.8	3886000	13000	70	91	8.72	620	86.38	24	53				"	much easier
6.11.	"	N	4064000	106650	70	86	16.72	576	73.62	546	62				gr xx four hourly.	pains gone; feels very comfortable
8.11.	3 rd	"	3840000	9350	68	88	24.24	428	64.79	677	1.01				"	no change
10.11.	"	"	4110000	7250	70	85	28.91	508	61.14	450	37				gr xx ter in die internally with Fern cream. et. q. tid.	"
14.11.	"	"	3763000	8900	67	88	18.91	648	71.70	2.00	32				"	slight relapse; pains in shoulder
15.11.	4 th	97.4	3920000	13200	67	85	12.61	937	75.58	1.97	52				"	pains no worse
16.11.	"	98	4060000	10450	70	86	12.50	941	75.81	1.70	48				gr xx hourly.	pain and swelling right hip and knee; left wrist, back, and both shoulders painful
17.11.	9 th pain	98	4100000	9710	73	89	9.69	869	78.76	2.18	167				gr xx four hourly.	pains much easier
18.11.	"	N	4380000	7650	77	87	18.31	1108	66.61	3.22	84				"	pains almost gone
21.11.	"	"	4110000	7000	74	90	19.74	733	68.35	4.13	92				"	no pain
22.11.	"	"	4428000	9050	76	88	26.50	1058	60.12	2.91	53				gr xx ter in die	"
23.11.	5 th	"	4204000	6600	74	88	26.03	700	62.28	3.95	76				"	"
1.12.	6 th	"	4574000	10500	80	87	15.64	1450	58.57	3.73	66				"	"
2.12.	"	"	4666000	6250	82	87	17.00	820	60.20	3.00	60				"	Discharged - Anemic

5.12.1902.

No 4

No. 5

James Bradford, aged 25, Costermonger, admitted 13th November 1902

Previous History Patient had rheumatic fever five years ago, and since then three attacks of subacute rheumatism. The present attack followed on a severe wetting about ten days before admission. The left wrist was the first joint to be affected, and then in turn the knees, ankles, and left elbow joints. never scarlet fever

Present State Patient is a well built young man with pale skin. There is pain, swelling, and redness of the right knee and ankle, and left elbow, and wrist joints. peripetation slight. Heart, 1st. Sound, soft and prolonged but unaccompanied by any murmur; area of cardiac dulness normal. Lungs and Abdomen - nil. Urine - slightly acid, contains neither albumen nor urates
Pulse 94. Respiration .26 Temperature 101°

Date	Resolution of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin index	Small Lymphocytes	Large Lymphocytes	Polymuclear Neutrophils	Eosinophils	Streak cells	Myelocytes	Treatment	Remarks and progress of disease
11 p.m.	2 nd day													
13.11.02	7 ^{am}	101	4528000	12000	82	90	20.67	10.27	68.23	32	"	"	Sod. Sal. gr xx hourly	"
9 am	2 nd	98.4												
14.11.02		99.3	4688000	8200	80	85	26.92	12.82	58.97	71	56	"	gr xx 4 hourly	much better
15.11.02		N	4562000	7000	83	90	34.75	7.27	65.85	145	17	"	"	only slight pain in knee
16.11.02		"	4644000	6700	82	90	47.66	10.23	34.62	248	"	"	"	no pain
17.11.02		"	4716000	5900	80	84	38.11	13.41	45.21	307	19	"	"	Took discharge 18.11.1902

No 5

No. 6

Leonard Snee, aged 30, cardriver, admitted 20th November 1902

Previous history - With the exception of measles as a child, patient has always had good health, until the onset of the present attack five days before admission. The patient is exposed to variations of weather and temperature. The attack commenced in both ankles, and then affected the right knee, shoulder, wrist, and left knee. Never scarlet fever was not under treatment outside

Present state

patient is a muscular man and not particularly anaemic. There is pain, swelling, and slight redness of the left knee and ankle joints and right wrist and shoulder joints. Perspiring freely. Heart. 1st sound at apex, soft and prolonged, no murmur heard; heart boundaries - not much increased. Lungs and abdomen - nil. Urine - acid, no albumen. Loaded with urates. Pulse 98. Respiration 26. Temperature 101.2

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin %	Small Lymphocytes	Large Lymphocytes	Polymorphous Neutrophils	Eosinophils	Most Cells	Treatment	Remarks
20.11.02	5 th day	101.2	5,572,000	22,500	90	83	13.15	16.46	64.46	2.6	30.16	Sod. Sal. qd x 2 hourly	Much better, no toxic symptoms
21.11.02	6 th day	100.8	5,060,000	13,800	86	84	21.68	15.04	62.12	8.6	24.0	Sod. Sal. qd x 2 two hourly	Pains gone. Suspicious of miasm
22.11.02	7 th day	100.8	4,508,000	9,100	79	87	21.78	11.07	63.51	4.4	26.1	Sod. Sal. qd x 2 four hourly	Soft murmur at apex
23.11.02	8 th day	100.8	4,480,000	7,100	76	84	27.13	13.48	56.34	1.9	17.0		murmur heard at apex and conducted towards axilla.
24.11.02	9 th day	100.8	4,320,000	5,300	77	89	30.32	12.58	56.00	2.6	31.0	Sod. Sal. qd x 2 in the	murmur more pronounced. no discomfort at heart, looks well
27.11.02	12 th day	100.8	4,480,000	6,700	76	84	32.69	15.37	51.2	1.9	30.0		free of pain
1.12.02	15 th day	100.8	4,670,000	10,250	79	84	32.62	15.11	58.37	2.4	52.0	Sod. Sal. qd x 6 i.d. alternately with 3R. m. 65	
6.12.02	20 th day	100.8	4,558,000	9,800	83	84	29.16	16.49	63.48	3.0	37.0		up for 2 hours in afternoon
9.12.02	23 rd day	100.8	4,940,000	9,250	85	84	30.48	17.38	60.36	3.4	38.0		Slight pain in left knee - no swelling
13.12.02	27 th day	100.8	5,100,000	10,750	88	86	26.07	10.35	60.74	1.4	45.0		Kept in bed all day
15.12.02	29 th day	100.8	4,810,000	8,300	87	84	27.83	15.50	50.34	6.7	33.0		pains gone - murmur - distinct

No. 6

Discharged 17. 12. 02

No 7

James Cowley, aged 44, Painter, admitted 29th November 1902

Previous History

Four previous attacks of rheumatic fever.

Present attacks commenced 14 days ago with pain and swelling in the wrist and ankle joints. The shoulder and knee also became affected. Palpitation and shortness of breath on exertion. never scarlet fever.

Under treatment for four days before admission.

Present State

Very anæmic. Pain and swelling in both wrists and in knee joints; also in the left elbow, both knees and shoulder, severe pain in the loins.

Erythema papulatum. two small patches over left knee. Heart - apex beat in 5th interpace and in nipple line, left border of dullness in the 1/2" outside nipple line; right border of sternum; upper border lower border at apex loud blowing

V. S. mitral murmur is heard. Lungs and abdomen

- nil. Uric acid, no albumen or urates

Temperature 102. Pulse 100. Respiration 30.

Date	Position of Pulse	Temperature	Erythrocytes	Leucocytes	Hæmoglobin	Staining Globin Index	Platelets per cmm	Poly-nuclear leucocytes	Poly-nuclear leucocytes	Mononuclear leucocytes	Small cells	Myocytes	Treatment	Remarks
24.11.02	102	100	3144000	31750	50	78	12.28	9.53	77	75	43		Gf xx hourly	"
30 "	"	100 1/2	3282000	16950	47	71	15.20	7.70	76	70	30		Gf. xx two hourly	slight stiffness in joints; pains gone. Somewhat deaf
1.12.	"	N 99.6	2652000	9300	45	75	25.00	7.80	66	50	20	20	Gf. xx four hourly	"
2.12.	"	N	2952000	7900	44	74	26.58	6.80	63	53	21.3	64	"	no stiffness; deafness gone. recurrence of pain in right knee
3.12.	4	N 99.3	3204000	10550	46	71	23.68	7.70	65	67	1.88	75	"	no swelling
4.12.	"	N 99	3136000	8200	48	76	26.11	6.50	64	57	1.42	53.18	"	feels better
5.12.	"	"	3252000	6350	47	72	24.85	7.44	65	42	3.37	27.16	"	Comfortable
7.12.	"	"	3460000	6600	47	67	23.59	10.98	62	36	2.26	53	"	"
8.12.	"	"	3496000	7100	46	65	21.40	7.00	69	40	1.04	20	"	"

Took own discharge 9.12.1902

No 7

No. 8

John William Hamilton, aged 16. Railway worker. admitted 23rd December 1902

Present history - with the exception of measles and whooping cough.

Patient has had good health until the onset of the present attack, six days before admission.

Pain and swelling appeared in the left ankle joint followed successively by pain and swelling in the left knee, right ankle and then right knee. never had scarlet fever.

Present state - Well nourished youth, with pale skin. Pain and swelling in both knees, perspiring freely. Heart 1st sound at apex soft and prolonged; boundaries - normal; Pulse 112.

Lungs - free. Respiration - 30. Abdomen - nil. Urine very slightly acid containing urates in solution. Temperature 102^o 4

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin Small	Lymphocytes	Large Lymphocytes	Polymorphs	Neutrophils	Eosinophils	Must cells	Myelocytes	Treatment	Remarks
23.12.02	7 th day	102.4	4598000	18850	62	67	18.00	8.00	73.53	4.3				Hot. 13 coal. No. 1 coal. ad of 2	
24.12.	8 th	99.6	4350000	11300	57	65	20.51	4.36	66.92	1.19				Soft stools. 92	not much change
25.12.	9 th	98.8	4025000	9500	57	67	21.41	4.14	67.36	1.83					urine - alkaline, easier?
26.12.	10 th	98.4	4470000	6500	57	60	19.33	12.30	63.28	5.07					suspicion of mummus at apex
27.12.	11 th	98	4054000	7500	55	59	26.44	7.64	61.36	3.71					Still easier; deposit of phosphate in urine.
28.12.	12 th	100	4700000	9800	58	61	25.47	7.47	65.51	1.34					Pain nearly gone - urine alkaline
29.12.	13 th	100	4518000	12150	56	61	18.73	8.93	71.94	4.5					Right knee swollen, very painful. urine - slightly alkaline.
30.12.	14 th	100	4506000	9250	57	63	18.40	5.52	75.45	4.0					Left mummus at apex
31.12.	15 th	99.1	4544000	14000	58	63	18.09	7.95	73.55	2.4					Severe pain in both and thighs this morning knees better. urine - alkaline, phosphatic deposit
2.1.03	16 th	98	4420000	9900	60	67	19.54	5.41	72.82	1.94					right wrist swollen and painful
3.1.	17 th	99.4	4640000	10600	60	66	15.92	8.40	73.79	2.41					right wrist and thigh. v.s mit distinet. Conducted to anilla. is much better
4.1.	18 th	99.2	4700000	10900	57	57	19.48	8.07	70.80	1.37					slight pain still.
5.1.	19 th	98.6	4632000	12450	58	62	23.52	7.19	67.51	2.33					easier
6.1.	20 th	99	4698000	11400	63	67	22.44	6.51	65.53	2.37					still easier
13.1.	21 st	99.4	4590000	10150	65	70	22.89	6.45	66.92	3.71					only slight pains in thighs
16.1.	22 nd	98.8	5070000	7850	64	63	26.12	7.95	63.26	2.45					"
20.1.	23 rd	99.1	4520000	11050	58	61	25.39	6.61	62.57	7.46					"
28.1.	24 th	99.8	5100000	8300	60	58	27.45	3.26	62.59	6.68					no pains
14.2.	10 th	99.8	5296000	8400	66	62	22.20	6.10	67.34	6.10					murmur less audible
5.3.	13 th	N	5234000	10150	70	66	32.23	6.56	55.54	5.21					from 24 th Feby to 24 th March Temperature Normal
24.3.	16 th	N	4802000	8800	67	69	26.44	6.11	60.70	3.40					murmur disappeared
															discharged 25 th March 1903

No. 8

No. 9

Mary Driscoll, aged 42. housewife admitted 29th December 1902

Previous history - Two previous attacks of slight Arthritis. The first ten years ago, and the second a few years later. A few days before the onset of the present attack she got her feet wet while washing. To this she attributes the cause of her attack. The attack commenced with pain and swelling in the ankles, then in knees and wrists. never scarlet fever

Present state - well nourished woman, but anaemic. Pain, swelling and redness of the left knee, wrist and hand joints. She had an eruption which commenced on the face, then affected arms and legs; is not itchy but causes a burning heat. The eruption is elevated, slightly dusky red in colour, and the size of the patches varies from about 1/4" to about 1" in diameter. They are chiefly situated on the back of the arms and front of legs. No spots on the back of legs or front of arms, a few on the lower part of the back; some of the patches are paler in the center and well defined. Eruption is painful on pressure, never had an eruption before. Heart 1st sound at apex, soft and prolonged; apex beat in normal interspace. Pulse 92. Lungs - nil. Respiration 28. Abdomen - nil. Urine - acid. trace of albumen. Urates - nil. She is perspiring freely. Temperature 101.6

Date	Duration of Disease	Temperature	WBC	Leucocytes	Hemoglobin	Hemoglobin	Small Lymphocytes	Large Lymphocytes	Polynuclear Leucocytes	Eosinophiles	Monocytes	Treatments	Remarks
29.12.02	8 th day	101.6	3780000	23200	54	71	16.41	5.36	77.57	1.28	21	Salicine gr. xx hourly	
30.12.	2 nd wk	101.8	3416000	19150	53	77	14.34	8.30	76.41	37	56	gr. xx two hourly	much easier; spots not so painful
31.12.	"	100	2578000	17750	58	81	14.78	5.28	74.93			"	"
1.1.03	"	100	3394000	18200	54	79	13.34	5.37	80.67	14	39	"	"
3.1.	"	100.8	3666000	21000	62	88	16.13	5.82	76.20	100	40	"	still easier; spots still painful murmur very soft heard at apex
6.1.	"	100.4	3702000	20500	59	79	13.74	4.14	81.10	57	38	"	spots fading hand slightly swollen, and painful
9.1.	"	100	3480000	21300	62	89	11.80	3.83	81.98	109	17	"	easier; spots fading gradually
12.1.	4 th	99.8	3568000	18500	69	85	13.72	6.44	78.13	50	33	"	still slight swelling in hand
15.1.	"	99.6	3556000	16500	61	76	15.44	4.57	78.16	78	14	"	eruption nearly gone; murmur distinct, and conducted to axilla
18.1.	"	99.4	3700000	15700	64	85	22.78	4.41	71.88	1.20	20	gr. xx four hourly	slight stiffness in left wrist; no pain
29.1.	5 th	99.2	4100000	11000	66	80	28.06	5.01	65.42	74	74	"	no pain or stiffness
9.2.	7 th	98.8	4654000	11500	69	74	37.93	7.85	58.03	71	53	"	"
20.2.	9 th	N.	4566000	4000	79	86	34.93	8.77	52.60	1.25	40	gr. xx c.c.d. 1/2 hrly. v with alternate 2gr and nil	"
30.3.	16	N.	4706000	8650	82	87	36.92	6.30	53.24	2.78	74	"	out of bed for two hours in afternoon.
4.4.	"	"	4690000	8700	80	85	34.32	5.56	65.81	4.30	"	"	"
11.4.	17	"	4800000	7600	83	86	28.21	4.86	63.51	3.29	52	"	Discharged herself 13.4.1903

No. 9

No. 10

Sarah Ann White, aged 42, Shopkeeper, admitted 8th January 1903

Previous history - With exception of slight attacks of Bronchitis, has always had fairly good health till onset of the present attack. 14 weeks before admission she believes she caught a chill. This was followed by pain and swelling in various joints, commencing in the knees, then extending to elbows, ankles, and shoulders. She perspired a good deal at first. Catamenia - regular. never been married never scarlet fever

Present state - Patient is a well developed woman, but slightly anemic. Pain, swelling, and slight redness of the right wrist, pain unaccompanied by swelling in left knee. Heart at apex - very soft mitral murmur, no increase in area of cardiac dulness; pulse regular and soft and numbers 106 per minute. Respirations 34. Lungs - rhonchi; respiration 34. Cough sonorous. Abdomen - nil. Urine - acid. no albumen or urates. Temp. 101.4

Date	Duration of Disease	Temperature	Wt. through	Wt. coccyx	Hemoglobin	Hemoglobin	Wt. of erythrocytes	Wt. of erythrocytes	Wt. of erythrocytes	Wt. of erythrocytes	Wt. of erythrocytes	Wt. of erythrocytes	Treatment	Remarks
8.1.1903	14 weeks	100 101.4	4170000	18100	70	84	10.23	700	82.51	21	4	4	Pot. Bicarb Pot. Cit. w. a. gran Syrup. 9.5. sig. ad 1 four hourly	
		100 100.4	4238000	13950	70	78	13.85	510	80.83	19			"	no change pains still very severe urine - slightly alkaline.
10.1		100 100.4	4202000	12400	71	84	10.42	570	83.37	17			"	pains still present. cough very troublesome
11.1		100 98	3594000	15250	64	89	8.77	839	81.63	18			Poultices to Chest	right hand very painful Bronchitis very severe
12.1		100 100	3900000	17200	66	84	11.04	630	85.10	21	21		mixture $\frac{3}{4}$ t.i.d.	not much change in Rheumatism Bronchitis still severe
15.1	15	N.C.	4268000	15350	68	79	6.39	330	85.52	17			2 m. Juss. 3x Lid alternately	Bronchitis slightly better murmur more distinct
19.1			4266000	19300	71	83	15.90	305	80.17	25	22		"	free of rheumatic pain Bronchitis - still better
22.1			3828000	13700	65	64	11.29	345	84.33	22			"	Chest much better. mucous rales and copious expectoration no rheumatic pain. increased conduct. observations stopped. no return of Rheumatism

No. 10.

N^o 11

Frederick Champness, aged 42, Timber porter, admitted 24th June 1902

Previous history -

Patient was admitted to ward 10 of the Infirmary in October 1900 with Acute Bronchitis a month later he suffered from severe pain and swelling in the various joints of his body, successively, the temperature on one or two occasions rising to 103 No previous attacks of rheumatism, Has been practically free of rheumatism till the onset of the present attack. Fourteen days before admission he got a chill, and his Ankles became very painful and swollen, This was followed by pain in the knees and elbows, and in neck and head. never scarlet fever no history of shortness of breath

Present state -

Patient is a fairly robust man. Though somewhat pale. Pain and swelling in the legs, knee and ankle and pains in head - Heart nothing abnormal. Lungs and abdomen - nil. Digestive system - normal Urine - slightly acid, no urates or albumen Temperature 101.6 Pulse 92 Respiration 30.

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Rheumatoid Index	Small Lymphocytes	Large Lymphocytes	Polymorphs	Neutrophils	Eosinophils	mast cells	Myeloid	Treatment	Remarks
25.6.02	15	99.2 101.8	4512000	7000	76	86	19.27	8.65	71.57	29				Sod. Sal. gr. xx four hourly	"
27.6.	17	99. 100.8	4762000	6200	76	80	20.32	7.56	70.10	99				"	Pains easier.
29.6.	3 rd week	99.4 N	4848000	6350	79	81	27.60	3.24	67.00	175	37			"	Pain still in leg and shoulder no swelling; heart - nil
1.7.	"	99.2 N	5058000	7200	78	77	30.00	5.50	63.50	100				"	Easier
8.7.	4 week	99.6 100	4986000	7750	82	82	32.82	6.53	56.74	161	30			"	no change in rheumatism slight Pharyngitis.
16.8.	9 "	100.8 99.2	4660000	4850	80	84	36.00	8.22	54.13	105				Sod. Sal. Stopped Liq. ferri. mis 3. x 6 tid	no pains
24.8.	11 "	98.8 100.	5030000	5200	86	85	23.58	10.17	65.13	110	70			"	pains worse
1.9.	13 "	N	5320000	4850	95	70	25.20	5.71	68.10	35	23			Sod. Sal. gr. xx two hourly iron stopped.	since administration of iron the temperature has remained up and the pains have been worse

N^o 11.

Date	Duration of Disease	Temperature	Pulse		Hemoglobin	Hematocrit	Small Lymphocytes	Large Lymphocytes	Poly-nuclear Neutrophils	Basinophiles	Brest cells	Anyletes	Treatment	Remarks
			Rate	Temp										
5.9.1902	14 Wks	N	5128000	5350	78	76	14.71	6.68	69.39	120	.	.	gr. xx four hourly	pains almost gone
17.9.	15 th	N	5076000	5150	74	73	28.29	4.61	65.27	81	.	.	gr. xx tid with Liq. ferri-mur on xx tid, alternately	pains gone
24.9.	16 th	N	4650000	5200	74	74	34.33	7.24	57.19	49	.	.	Sod. sal. gr. xx two hourly	20.9.02 Swelling over right sternal articulation at level of 5 th rib; pains in muscles of right upper arm
26.9.	"	N	4482000	7200	72	80	29.70	5.77	62.48	1.28	25	51	Sod. sal. gr. xx four hourly	pains nearly gone. Subcutaneous node over insertion of right deltoid
1.10.	17 th	N	4916000	5800	74	75	24.72	6.94	66.56	62	31	83	"	25.9.02 Heart sounds - apex very weak, no murmur. pains rather worse again 30.9.02 pains - much better 2.10. no increase of cardiac dullness
4.10.	"	N	4842000	6000	73	74	24.53	3.52	70.46	74	21	.	Sod. sal. gr. xx tid in ferri-claim cit grv < any v. chlo 3x tid alternately	3.10.02 pain - much better, sickness after medicine; slight pain over node on chest, oedema no pain
6.10.	18 th	N	5480000	4500	76	69	19.72	8.33	70.71	1.11	11	.	"	no pain; Heart sounds weak no murmur.
9.10.	"	N	4960000	5100	72	72	17.42	10.21	71.25	87	32	.	"	no pain 12.10.02 Evening. Temperature 101
13.10.	19 th	N	4702000	4950	71	75	29.28	3.27	66.05	74	18	46	"	Had a shiver, and then sweat profusely, subcutaneous node in arm which increased in size no pains in body or heart
14.10.	"	N	4470000	5150	70	74	26.37	6.39	65.64	79	29	49	Sod. Sal. gr. xx two hourly Iron stopped	no pain; Heart - nil
15.10.	"	N	4650000	6000	70	75	34.59	5.45	59.36	23	34	.	"	"
17.10.	"	N	4428000	5700	72	81	22.43	3.42	73.73	58	10	.	gr. xx four hourly	free of pain
19.10.	"	N	4266000	5150	72	84	25.59	4.63	68.92	52	21	10	"	"
22.10.	20 th	N	4578000	6200	76	83	32.72	6.85	60.00	43	.	.	"	pain in right knee, no swelling; no other pain
24.10.	"	N	4256000	6750	70	82	27.83	4.66	66.16	1.33	.	.	"	"
27.10.	21 st	N	4000000	6100	69	86	24.45	5.61	68.62	78	34	17	"	pain in knee easier.
1.11.	"	N	4538000	6200	73	80	21.98	2.49	70.95	39	.	.	"	no change from 27.10.02
6.11.	22 nd	N	4600000	5350	68	73	23.67	7.52	68.16	43	19	.	"	Pain in both knees, and slight swelling in right; Heart - nil
9.11.	"	N	4528000	5400	72	76	20.69	4.52	68.80	32	16	.	gr. xx two hourly	"
12.11.	23 rd	N	4832000	5800	74	81	17.85	4.64	77.32	18	.	.	Sod. sal. gr. xx tid in ferri etc. tid alternately	Knees nearly better; boggling in ears, etc.
14.11.	24 th	N	4000000	5000	64	79	17.06	9.07	72.76	36	34	18	15.11.02 in ferri stopped Sod. sal. as before 17.11.02 Sod. sal. gr. xx 2 hourly 19.11.02 gr. xx 4	both knees swollen; general oedema; heart dulness extended to right; pulse very soft; no murmur

Date	Readings of Blood	Temperature	Erythrocytes	Leucocytes	Hemo-globin	Hemo-globin index	Small Lymphocytes	Large Lymphocytes	Poly-nuclear Neutrophils	Eosinophiles	Mast Cells	Platelets	Treatment	Remarks
21.11.1902	24.43.0	101.2 102.2	3864000	9050	64	81	15.72	12.23	71.65	38			19.11.02. Sod. Sol. 37.99 21.11. - - -	(Slight) Heart dulness extended to right, but not up. Pulse - soft easily compressible and full, no friction or murmur
23.11. "	"	102.8 102.6 97.2 98.8	3860000	3550	62	79	32.70	11.36	53.25	51	17		gt. xx four hourly 3 lig. Strych. Pot. 20d aq. D 37. four hourly alternately	21.11.02. Knees and right shoulder - swollen - 22.11. pain and swelling in joints almost - edematous - gone 23.11. no pain; no edema
30.11. "	25	N	4070000	6600	66	82	37.66	10.35	49.40	138	18		Sod. Sol. gt. xx four hourly and lig. Strych. m.v. bid	no pain; no edema H.D.N. 11.0 sound - still soft. no murmur has not had nodes with this relapse. 30.11.02. no pain
4.12. "	26	N	4318000	6200	68	80	42.67	10.81	45.06	91	32		"	"
9.12. "	27	N	4382000	6400	70	82	32.12	6.25	57.71	187	100		Sod. Sol. gt. xx bid 2.7R. mil. vom. m.v. 34g. arsenic in 7H. bid	greatly improved
18.12. "	28	N	4546000	7250	74	78	38.46	10.80	46.45	91	36		"	"
27.12. "	29	N	4694000	6800	77	79	31.83	4.28	60.61	326			"	26.12.02. got up in afternoon, no pain;
31.12. "	30	N	4576000	6350	75	81	35.65	4.64	57.54	210			Sod. Sol. gt. xx two hourly	30.12.02. slight pain in left ankle 31.12. no better
1.1.03	"	N	4480000	4900	74	82	32.78	10.86	52.04	185	41		"	ankle still painful
4.1. "	31	N	4454000	5200	73	81	31.88	7.30	59.40	131	37		"	ankle easier
6.1. "	"	N	4568000	5550	75	82	22.94	7.47	67.47	186	18		"	ankle slightly swollen
8.1. "	"	N	4624000	10150	73	81	23.27	6.47	69.02	121	4		"	left ankle and front of skin still slightly painful
10.1. "	"	N	4824000	5700	76	81	27.25	11.83	59.70	110			"	Subcutaneous nodule over - chondr. sternal artie; 5" left
12.1. "	32	N	4680000	8050	80	78	31.43	12.77	52.64	59			"	11.1.02. Subcutaneous nodule on back of forearm nodule in chest bigger; otherwise - no change; nodules disappeared
16.1. "	"	N	4926000	5200	74	78	33.12	6.34	59.71	81			"	"
19.1. "	33	N	4818000	6000	76	85	39.64	2.73	55.46	152	38		Sod. Sol. gt. xx two hourly	pains nearly gone.
26.1. "	34	N	4952000	6250	79	75	38.72	2.64	57.57	101			"	no pain
1.2. "	35	N	5138000	6300	78	75	38.82	3.17	52.86	78	34		"	"

George Stanger, aged 22. Cardriver, admitted, 19th January 1903

Previous history - Five weeks ago the present attack commenced with severe pain and swelling in both knees. Very much better in about a fortnight, and went to work one day only, to find that the pain returned the same evening considerably worse. The pain and swelling spread from the knees to the ankles, and then to the joints of the upper extremity. Scarlet fever when a child. No previous attack of rheumatism. While at home he suffered from pains over the left breast, and shortness of breath on exertion.

Present state - Patient is well nourished, but very anæmic. Swelling pain and redness of both wrists, left elbow and shoulder, and right knee. There is also pain unaccompanied by swelling in all the other joints, perspiration profuse. The left border of the cardiac dulness is at nipple line, and the right at middle of sternum; at the apex a systolic murmur is heard which is loud and blowing, and conducted towards the axilla. Pulse soft and regular numbers 99 per minute. Respiration 29. Lungs - nil. abdomen - nothing abnormal. Urine - acid albumen - nil. urates - abundant deposit. Temp 102

Date	Diastolic of Pressure	Temperature	Leucocytes	Leucocytes	Hæmoglobin	Hæmoglobin Index	Small Lymphocytes	Large Lymphocytes	Poly-nuclear neutrophils	Eosinophils	Mean Cells	Mycelocytes	Treatment	Remarks
11 p.m.														
16.1.1903	35	102	3868000	20250	60	77	14.30	5.82	74.88	19	19		Salicine. qd xxx hourly	"
17.1.	36	100.4	3736000	15450	59	78	13.74	6.20	77.00	76	19		qd xxx twice	much better; swelling going down
20.1.	37	99.8	3514000	17150	58	81	15.39	3.23	78.70	209	57			still better; pains almost gone
21.	37	99.8	3514000	17150	58	81	15.39	3.23	78.70	209	57			"
23.	39	98	3900000	10200	58	73	26.75	4.28	67.83	2.53	58			"
25.	41	98.2	4020000	10150	57	70	23.64	2.89	68.76	3.47	43	86	qd xxx four hourly	"
27.	43	98	4080000	11550	59	72	20.40	3.28	72.97	2.12	14	58		still slight pain, at bend of humerus.
29.	45	98.8	3826000	9800	58	75	13.95	2.11	81.24	82	84			pain and slight swelling in right hip
31.	47	99	4420000	12900	56	63	21.73	2.41	76.24	1.40	30			pain much worse
2.2.	49	98	4326000	9700	58	67	20.00	3.03	73.93	1.81	50	40		pain now very slight
6.2.	53	98	4626000	9900	66	71	27.95	4.20	65.81	1.46	18	36		slight pain still in hip and shoulder no new heart changes
12.2.	59	98	4078000	9000	66	80	26.14	1.53	66.44	2.09	19			pains practically gone
15.2.	62	99	4360000	13250	64	73	27.46	2.57	67.52	1.89	20			recurrence of pain in left shoulder and right knee
22.2.	69	98	4680000	8500	67	71	28.90	3.61	65.07	1.80	60			up for an hour or two per day no pain
3.3.	78	98	4552000	7850	69	75	29.64	3.80	64.11	2.47	22			"
12.3.	87	98	4408000	6350	70	79	34.00	2.50	60.00	3.00	50			Took discharge 14 3 1903

No 13

Thomas Saviour. Aged 26. Ice cream vendor. Admitted 29th January 1903

Previous history - Two previous attacks of rheumatism. Has had no other illness as far as he can remember, until the onset of the present attack which commenced four days before admission with pain and swelling in the knees, followed in succession with pain and swelling in the ankles, wrists, legs, elbow and shoulder joints.

Present state - Patient is robust, but anaemic. There is pain swelling and slight redness in the knees, ankles, wrists, and right shoulder; also pain but no swelling in left shoulder, and right elbow. Apex beat is in fifth interspace, and just internal to nippleline; Pulse regular and of low tension, and at Apex a soft systolic murmur is heard; Lungs - slight bronchial catarrh. Bowels - constipated. Perspiring freely; urine - very slightly acid; urates held in solution; trace of albumen. Abdomen - nil Temperature 102°4.
Pulse 90. Respiration 28.

Date	Day	Temperature	Haemoglobin	Leucocytes	Hypertension	Hypotension	Small	Zyphing	Zyphing	Poly nucleated	Leucocytes	Granules	Myelocytes	Treatment	Remarks
30.1.1903	5	100.8	4696000	13600	70	74	16.7	6.83	7.56	1.9	0	0	Salicine gr xxx two hourly	pains easier; albumen trace	
31.1	6	102.4 102.4 107.2	4668000	11200	66	75	16.2	5.61	7.23	5.12	3.2	0	"	pains gone	
1.2	7	107.2	4610000	10400	69	74	17.4	6.75	6.96	7.00	7.9	0	"	heavy sweating during night; no pains; murmur more distinct blowing in character; and conducted to axilla	
2.2	8	107.2	4794000	4750	61	63	11.31	2.69	7.57	1.60	0	0	"	"	
3.2	9	107.2	4696000	6050	64	68	14.1	6.37	6.92	8.66	7.6	0	"	"	
4.2	10	107.2	4750000	5200	69	71	26.15	7.76	6.78	8.40	7.9	0	Salicine gr xxx four hourly	"	
6.2	12	107.2	4860000	6650	71	74	23.76	5.50	6.57	5.01	3.1	0	"	"	
8.2	14	107.2	5260000	6100	72	68	21.5	5.9	6.42	5.4	6.0	0	"	"	
12.2	18	107.2	4872000	7650	75	73	20.6	4.71	7.24	7.15	3.9	0	"	"	
15.2	21	107.2	4896000	8150	80	81	24.3	4.00	6.5	7.0	3.9	0	"	"	
22.2	28	107.2	4754000	14000	81	85	16.11	3.01	7.5	7.5	3.0	2.0	"	"	
26.2	32	107.2	4246000	10050	75	75	12.2	2.72	3.3	3.7	1.3	0	"	"	
8.3	40	107.2	4638000	7000	89	83	14.3	1.25	8.0	6.3	3.3	3.3	"	"	
17.3	49	107.2	5116000	7700	86	86	14.3	1.77	7.8	6.0	1.3	7.2	Sod. Sal gr xxx four hourly	allowed to get up for two hours return of pain in shoulder yesterday close plates - 131693 P. 22 cells millimetre	
19.3	51	107.2	5032000	6900	87	87	14.4	1.00	6.0	6.0	1.5	0	"	"	
26.3	58	107.2	4680000	10300	74	85	15.3	3.71	6.4	6.0	2.0	1.5	"	"	
28.3	60	107.2	4936000	6000	81	84	15.0	3.3	6.0	6.0	2.0	0	"	"	
31.3	63	107.2	5224000	8500	86	85	33.28	2.0	7.0	7.0	2.0	0	"	"	

Discharged 4.4.1903

No. 14

Henry J. Bailey, aged 20, carpenter, admitted 12th February 1903

Previous history - Three years ago had pneumonia followed by acute rheumatism. No attacks of rheumatism previous to this. The present attack is his second one, and commenced twelve days before admission, in both ankles; followed in a day or two by swelling and pain in the elbows, knees and right shoulder in succession. Does not remember getting any severe wetting, never scarlet fever or any other illness.

Present state.

Patient is robust in build but pale, swelling and pain in both ankles and right knee. Heart boundaries normal; Apex beat in fifth interspace and inside nipple line. Lungs-free. Abdomen-nil. Urine-acid no urates or albumen; Digestive system-nil. Temperature 101.2. Pulse. 90. Respiration 25. Perspired freely during night.

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin Index	Small Lymphocytes	Large Lymphocytes	Plasma cells	Neutrophils	Eosinophils	Mast cells	Myelocytes	Treatment	Remarks
13 2 1903	day 4	99.2 100.4	4218000	13650	66	78	2688	162	7482	366				Pot. Bicarb. Pot. cit. a 2 gr 4x aq. a 1 - 4x - four hourly	"
14 2 . .		98.8 100.2	4490000	11700	70	77	1670	543	7453	349				"	Slightly better Discharged himself. 15.2.1903

No. 16

No. 15
 Henry Withers, aged 27. Newfound. admitted 20th February 1903

Previous history - well till four years ago, when he suffered from acute rheumatism. Since then has had good health till the onset of the present attack, seven weeks ago consequent on a severe wetting, at first the ankles were swollen and painful the next day wrists, and left shoulder became affected. It spread from joint to joint. never bronchitis.

Present state Patient is very thin and anemic. Pain swelling and redness of right knee and wrist. Both shoulders are painful but not swollen. Perspiration profuse, slight increase of cardiac dullness to right and left, at the apex a systolic murmur is heard. Pulse - rapid and small. Lungs - hacking cough with some mucous rales at bases. Abdomen - nil. Urine - acid in reaction, no albumen, abundant urates. Temperature 101.4 Pulse 100. Respiration 26.

Date	Duration of disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin %	Small Lymphocytes	Large Lymphocytes	Polymorphous Neutrophils	Eosinophils	Prost cells	Myelocytes	Treatment	Remarks
20.2.1903	day + night	101.4 -50	4528000	20600	72	79	17.68	2.35	79.54	39			Pot. Bicarb. & Pot. Cit. gr xxx 9-9-2 aq. 3.	
21.2.	51	99 101.6	42346000	17050	69	74	18.10	5.23	76.65	20	20			Slightly better. cough troublesome sweating freely; urine - alkaline Pain - left side. Physical signs of consolidation - left base. Pulse 126 Respiration 41; sweating freely at night. very ill
22.2.		101.6 102.4	4272000	37900	60	70	18.18	3.23	78.18	20	20		M. chlor at morph & in Tussis 3- $\frac{1}{2}$ T.V water necessary.	
24.2.		101.4 102.4	3960000	35500	64	80	12.63	1.07	86.27				Pot. Bicarb. & Cit 3 tid and alternately Liq am. ac. 7- $\frac{1}{2}$ T.V sp Camp. C. "xv Liq. Styracine. "v hN	Pain - right ankle - stiff neck pain in side still severe Pulse 132 Respiration 44. Urine - slightly alkaline;
26.2.		101.2 100	3734000	33600	63	83	10.99	3.05	85.33	61			Pot. Bicarb. stopped and Liq. am. ac. etc Given four hourly	Pain in left ankle; cough and pain not quite so troublesome;
2.3.		99 100.2	4538000	38500	66	72	12.66	4.72	81.11	150				Resolution has commenced! much easier; scarcely any pain; copious expectorations
5.3.		98.6 100.4	4256000	26800	68	79	12.21	2.27	84.88	62				much better; only very slight pain in ankle, and chest; murmur still present
8.3.		N	4440000	21550	72	81	15.35	2.42	81.81	40				no pain; much better observations stopped

No. 16

Joseph Azyme, aged 31. hairdresser, admitted 27th February 1903

Previous History - six years ago subacute rheumatism. Present attack commenced fourteen days ago, after a severe wetting, and affected first the knees and then the ankles. The affection spread to the other joints, which in turn became painful and swollen
never scarlet fever

Present state very pale and thin, swelling, pain and slight redness of left elbow. Increase of cardiac dulness - extended to middle of sternum and nipple line, at apex is a soft systolic murmur. Pulse - regular. Lungs and abdomen - nil. urine - acid. urates abundant. no albumen. Temperature 101.4

Date	Amount of Urine	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin Index	Small Lymphocytes	Large Lymphocytes	Polymorphs	Platelets	Basophils	Mast cells	Myelocytes	Treatment	Remarks
27.2.1903	75	101	4896000	15950	52	58	18.00	4.45	76.27	1.27				Pot. Bicarb Pot. Cit. ad gr. xxx aq ad 3 q. q. l.	
28.2.	100.2 101	101	4398000	11750	50	56	15.76	6.31	71.78	75	18	18			pain and swelling left shoulder and elbow. murmur distinct urine - acid - sweating.
1.3.	100 102.4	102.4	4542000	15800	52	57	13.56	4.51	68.35	78	18	18			pain - severe, swelling also in knees and ankles. urine - acid some sweating nearly all joints painful and swollen. does not seem to be abating. slight diarrhoea urine - alkaline
2.3.	101.2 101.4 99.8	101.4	4394000	17750	52	59	17.02	3.48	78.91	58					slightly easier
3.3.	100 99.8	100	4262000	12300	50	58	18.13	2.56	74.36	49.2					pains - much better
4.3.	99	99		10000											very much better.
5.3.		N	4600000	9350	52	56	27.33	1.00	65.53	6.00	33				murmur less distinct
7.3.			4554000	12000	55	60	24.62	4.82	62.83	2.26	75			Medicine 6 hourly	free of pain. murmur faint
9.3.			4576000	9200	55	60	35.61	1.14	60.76	1.90	57				no pain - murmur - disappeared
12.3.			4768000	7200	64	67								3 R. Pot. Bicarb. gr. xiv ferri et am. cit. gr. iij	Took discharge on 14.3.1903. very anemic

No. 17
 James Sullivan. aged 19. porter. admitted 6th April 1903

Previous History - Three years ago patient suffered from subacute rheumatism, two years later scarlet fever which was unaccompanied by rheumatism, since then he has had good health until the onset of the present attack, eight days before admission patient got a severe wetting followed three days later by pain and swelling of ankles. Two days later pain in the region of the heart. The rheumatism followed in the shoulder, hand, and hip joints.

Present state Thin and pale young man Increase of cardiac dulness. Apex beat in fourth interspace and in nipple line. Heart sounds very weak accentuation of pulmonary second sound. At the apex a systolic murmur is heard; Lungs - slight bronchial catarrh Abdomen - nothing abnormal. Swelling, pain and redness of both ankles and left wrist. Temperature 101.2 Pulse 86 Respiration - 38. Urine - acid; no albumen or urates

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Prothrombin	Urea	Uric Acid	Calcium	Phosphorus	Serum Cholesterol	Alumina	Neutrophils	Eosinophils	Monocytes	Myelocytes	Treatment	Remarks
6. 4. 1903	5	101.2	4270000	26100	58	67	20.41	2.48	76.71	19	19						Sod. Sal. gr. xx two hourly C. Sod. Bicarb. gr. x	no pain; sweating a good deal during night
7. 4. "	6	98.2 99	3460000	24200	62	89	18.11	2.95	78.14	78							"	no pain; cardiac dulness - less; murmur more distinct
9. 4. "	8	N	4078000	22100	60	73	18.88	1.79	76.93	23							Sod. Sal. 3i q. q. h C. Sod. Bic	Epistaxis last night and this morning; murmur distinctly audible
11. 4. "	10	98.4 98.6	3536000	24050	57	80											"	Took his discharge on 12. 4. 1903

No. 18

Alexander Henderson. - aged 8. School boy, admitted 24th March 1902

Previous History - one previous attack six months ago

Present state - Anemic; pain and swelling in both hips and knees, and left ankle; heart, lungs and abdomen - nil

Temperature 100.6

Date	Duration of attack	Temperature	Erythrocytes	Leucocytes	Hb-cong. def.	Figuring taken	Small lymphocytes	Large lymphocytes	Poly nuclear leucocytes	Eosinophils	Mast cells	Myelocytes	Treatment	Remarks
24.3.1902	4 th day	100.6	4210000	11300	60	71	"	"	"	"	"	"	Sod. Sal. gr. & bit	
27.3	"	99.2 99	4064000	13500	57	70	"	"	"	"	"	"	"	Pains gone
3.4	2 nd	"	4624000	8200	61	65	"	"	"	"	"	"	"	"
6.4	"	"	5008000	10200	72	71	"	"	"	"	"	"	Lys. ferri Phos 3i bit	
20.4	4 th	"	5112000	8500	74	72	"	"	"	"	"	"	"	out of bed

No 19

Alice Tepper, aged 10 School girl, admitted 28th. August 1902

Previous History - One previous attack of rheumatic fever three years ago; since then indefinite pains at intervals, never scarlet fever

Present state - Anemic; pain and swelling of knees and shoulders; pain in soles of feet; mitral regurgitant murmur - blowing in character, and conducted towards axilla; Lungs and abdomen - nil; urine - nil. Temperature 102

Date	Duration of Illness	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hopewell index	Small lymphocytes	Large lymphocytes	Polynuclear neutrophils	Eosinophils	mast cells	lymphocytes	Treatment	Remarks
28.8.1902	5 th day 1 st day	102	3990000	14650	62	77	5.15	8.34	85.61				Sod. Sal. gr. x two hourly	
29.8	1 st day 99	99.6	4234000	14350	58	68	15.66	7.70	74.99	1.70			gr. x four hourly	pains much better
2.9	2 nd day	N	4076000	9500	62	77	29.73	9.34	56.85	4.87			gr. x ter. in. die C. lig. ferri mix m. x 2 2.0	free from pain
11.9	3 rd day		4700000	9600	76	80	19.22	8.81	70.11	1.74	11			"
21.9	10 th day 100.6		4460000	11350	74	82	17.66	6.42	75.57	3.4			gr. x two hourly 22.4.2 gr. x four hourly	pains in left arm and back
29.9	5 th day	N	4720000	6650	79	84	39.11	6.11	46.26	6.15	37		gr. x ter. in. die	no pain
12.10	7 th day		4568000		80	87	34.38	3.74	56.38	5.07	52			"
30.10	10 th day		4782000		83	86	36.19	4.80	54.19	4.57	80			"

No. 20

Lucy Rastall, aged, 10, School girl, admitted 31st January 1903

Previous History - On the 31st January 1903. patient was admitted with an abscess on the head, this was opened and dressed, and the abscess cavity healed up. Previous to this she had no illness, excepting the illness of childhood. never scarlet fever or rheumatism, on the fourth of April, she felt slight pain in the right knee while going about the ward.

Present state - Patient has somewhat transparent skin, and fair hair; slightly anemic. Pain on moving right knee, and on walking; no swelling. Lungs and abdomen - nil Heart - slight cardiac irregularity. Temperature 100.6 slightly acid; no urates or albumen. Perspiration - slight.

Date	Duration of disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin	Small lymphocytes	Large lymphocytes	Poly nuclear neutrophils	Eosinophils	Mast cells	Mycobacteria	Treatment	Remarks
6.4.1903	3	100.6	4666800	12900	73	78	20.79	3.80	74.34	1.05			Sod. Sal. gr. x q. q. h.	blood plates. 845555 - per cubic millimeter
8.4.	5	N	5102000	10700	72	70	26.20	5.53	69.77	1.30			Sod. Sal. gr. v. q. q. h.	no pain
13.4.	10	"	5330000	10800	75	70	39.14	4.06	53.48	2.90			Sod. Sal. gr. tid	blood plates 319161 - per cubic millimeter slight cardiac irregularity
25.4.	22	"	5418000	8300	84	77							Liq. anemic 77 m. F.H. nuc. ven. in diag. chem. after tid	Heart condition better

No 21

Caroline Hampson, aged 12, School girl, admitted on the 11th April 1903
 Previous History - was quite well till the 7th inst, when she suffered from pain and swelling in the ankles and left knee, no previous attack, never scarlet fever.

Present state - Dark complexion, Pain, swelling, and slight redness of the dorsum of left foot, left shoulder, and both ankles. Perspiration - profuse, Temp - free. Heart - nil. Abdomen - nothing abnormal. Temperature - 102.4. Urine - acid loaded with urates, - no albumen.

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hæmoglobin Index	Small Erythrocytes	Large Erythrocytes	Polynuclears	Neutrophils	Lymphocytes	Monocytes	Treatment	Remarks
12.4.1903	5 ^{day}	102.4	4404000	15600	65	73	1947	419	70.66	247	19	" Sod. Sal. gr. x two hourly	Sweating freely. blood plates 1295000 per cubic millimetre
13.4.	6 ^N	99.4 101.2	4312000	11650	64	74		73.66				"	much easier
14.4.	7 ^N		4550000	10000	66	72	2864	124	62.81	693	35	" Sod. Sal. gr. x. q. 6 ^h	Slight pain in shoulder. otherwise free; no sweating; blood-plates 464000 per cubic millimetre
17.4.	10 ^N		4452000	8300	62	69	4052	247	49.25	708	65	"	no pain blood plates 397000 per cubic millimetre
23.4.	16 ^N		4578000	7900	72	78						"	

Subacute cases

No. 22.

Emily Cooley, Aged 20. Capsule maker. admitted 22nd August 1902

Previous History - had rheumatic fever two years ago; never rec'd fever, present attack commenced six days ago.

Present state - is very anæmic. pain and swelling in right wrist, left knee, and left shoulder; Mitral regurgitant murmur conducted towards axillary region; Temperature 100.2
Urine - nil

Date	Deviation of pulse	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hypochromin	Small Lymphocytes	Large Lymphocytes	Polymorphs	Neutrophils	Eosinophils	Monoc. cells	Myelocytes	Treatment	Remarks.
22.8.1902	6 th day 11 th 20 th	100.2	4472000	7500	70	78	16.8	5.4	76.1	1.6				1 Sod. Sal. gr. xx two hourly	
23.8	"	N	4210000	6500	68	80	72.5	6.6	66.3	3.1				gr. xx four hourly	Pain and swelling much better
26.8	2 nd	"	4200000	7750	65	77	26.9	3.5	67.6	2.6				gr. xx tid	Pain and swelling gone.
29.8	"	"	4112000	7100	58	70	27.73	5.70	64.48	1.67	17				
2.9	3 rd	"	4108000	7300	62	75	23.76	3.44	71.45	1.24	09				
10.9.	4 th	"	4204000	6900	68	80	23.77	4.42	71.38	2.26	14				

No. 23

Harriett Dilling. aged 28. Ironer. admitted 5th November 1902

Previous History - Five weeks ago, knees and ankles became swollen and painful, and later, extended to the joints in the upper extremities. No previous attacks of rheumatism never - secalot fever.

Present state

Slightly anaemic, pain and swelling of left wrist and right knee, Perpiration-free, first sound at apex - soft in character; no murmur; apex beat - fifth interspace and inside nipple line; area of cardiac dulness - normal. Lungs and abdomen - nil urine - acid - no albumen or urates

Date	Position of Pulse	Temperature	Ethrocytes	Leucocytes	Hemoglobin	Hemoglobin (Schell)	Hemoglobin (Small)	Hemoglobin (Large)	Hemoglobin (Lymphocytes)	Polymerization	Prothrombin	Fibrinogen	Prothrombin	Prothrombin	Treat. Cells	Myocytes	Treatment	Remarks
5 11. 1902	5 th	100°8	4836000	12100	80	82	15	34	10	68	72	72	1	02	22		Sod. Sal. gr. xx two hourly	pain and swelling less
6 11		98°4 99°6	4508000	10050	78	86	20	08	6	14	71	67	1	34	36		"	no pain
7 11		N	4604000	10350	74	80	22	94	4	39	65	64	1	12	32		gr. xx - q. q. h.	
9 11		N	4416000	7950	73	82	33	80	7	16	56	85	1	87	31			
11 11		N	4436000	6650	75	84	35	72	5	74	57	10	1	29	14		Sod. Sal. Stopped gr. xx. tid gets up in afternoon	
14 11	6 th	N	4474000	9900	74	82	24	92	12	03	56	39	1	35	30		"	15 11 02 severe pain in right knee and left wrist is much better
16 11		N	4508000	11300	75	82	13	79	8	54	76	91	4	5	"		Sod. Sal. + gr. two - hourly gr. - stopped	
17 11		99	4290000	9200	73	85	22	08	9	48	67	33	3	7	73		gr. xx. q. q. h.	no pain
18 11		N	4560000	10750	76	83	22	41	7	14	68	76	1	52	16		gr. xx. tid	
20 11	7 th	"	4456000	9150	75	84	24	42	7	72	61	57	7	4	59			
23 11	"	"	4450000	90500	70	74	35	73	7	28	54	68	3	86	44			
24 11	"	"	4688000	8950	75	79	27	47	9	89	58	86	3	34	43			Discharged herself 7 11 1902

42 24

George Newport, aged 53. Horsekeeper, admitted 11th November 1902

Previous history - Four years ago, patient had an attack of rheumatism since then, practically, free of rheumatism, Five days before admission, knees became painful and swollen. never scarlet fever

Present state - Patient is a muscular man, and not particularly anemic. Pain and swelling of the left knee, right ankle, and right shoulder joints, Heart - 1st sound at apex is soft, no murmur; boundaries of cardiac dulness - normal; apex beat in normal interspace. Lungs - free Abdomen - nil. Urine - alkaline. Urates held in solution, no albumen, Temperature. 99° 6

Date	Duration of disease	Temperature	Pyrexia	Leucocytes	Hemoglobin	Meaning of hemoglobin	Small lymphocytes	Large lymphocytes	Polymorphonuclear leukocytes	Eosinophils	Streak Cells	Mycocytes	Treatment	Remarks
11.11.1902	1 st day	99.6	4716000	8100	40	85	31.88	8.85	55.37	3.52	67	.	Sod. Sal. gr. xx hourly	!
12.11.	"	N	4626000	6000	87	44	21.33	4.88	62.66	5.33	83	.	gr. xx tid	Pain gone; has buzzing in ears, and headache, etc.
13.11.	"	N	4958000	7500	87	87	24.78	6.52	64.56	3.04	108	.	.	symptom of Sod. Sal. poisoning, better;
14.11.	2 nd	N	5156000	6300	89	86	22.66	5.30	65.83	5.50	50	.	.	feels very comfortable
16.11.	"	N	5218000	6000	94	90	27.42	10.94	58.93	3.65	54	.	.	allowed up for a letter
21.11.	3 rd	N	5280000	6900	95	89	38.05	7.91	50.88	3.19	.	.	.	Discharged - 22.11.1902

N^o 25

Alice Knowles, aged 28. married, Admitted 28th November 1902

Previous History - Two previous attacks of rheumatic fever. The present attack commenced one week before admission. The first joints to be affected were the ankles, and later the right knee joint. Never scarlet fever.

Not under treatment outside

Present state

Pain and swelling of the right knee joint, and pain without any swelling in both ankle joints.
 Heart - apex beat in 6th interspace, and 1" outside nipple line; bulging of the precordium; area of cardiac dullness increased in a downward tendency and to the left. The 2nd right interspace a diastolic murmur, conducted with intensity down the sternum; pulse - soft and of the water hammer type; numerous. 102 per minute, distinct pulsation in the Carotids.
 Lungs - free, abdomen - nil. Urine - acid, albumen - nil - no deposit. Pulse 102, Respiration 24 Temperature 100.2

Date	Direction of Disease	Temperature	Leucocytes	Haemocytes	Haemoglobin	Prothrombin	Small lymphocytes	Large lymphocytes	Polymorphous	Neutrophils	Eosinophils	Monocytes	Treatment	Remarks
28.11.1902	day 1 st	100.2	3814000	9250	72	94	23.08	7.86	66.03	1.02			Sod. Sal. gr. x. two.	
29.11.	2 nd	N	3950000	8000	70	88	30.88	9.45	56.72	2.31	.63		gr. x. tid	pains gone. epistaxis in early morning
30.11.		N	3736000	7350	66	88	28.11	8.17	60.28	2.71	.51		"	very comfortable
1.12.		N	3944000	7100	60	76	35.50	6.70	54.04	3.58	.14		gr. x. tid	"
3.12.		N	3788000	6450	68	89	22.08	9.60	65.64	2.25	.81		gr. x. tid with alternately 1/2 gr. Merc. Vom. and Ely. ass. 3 rd tid	"
6.12.	3 rd	N	3852000	6600	64	83	24.42	9.12	59.75	2.28	.41			"
9.12.		N	3890000	7100	62	79	24.41	8.39	64.84	2.34				"
17.12.	4 th	N	3820000	5750	63	82	32.60	9.47	53.96	3.86	.19			Discharged herself - 20.12.02

N^o 27

No 26

Mary Leonard, aged 40, Cook, admitted 11th November 1902.

Previous History - Twelve weeks before admission, she suffered from pains in various joints of the body. She attended the out-patients department of St. Bartholomew's Hospital for two or three weeks, and feeling much better as the result of the treatment, she took up again her duties as a cook. In the course of a few days the joints again became painful, her feet swelled at night, and in the morning she noticed a puffiness about the eyes. No previous attack of rheumatism, and never scarlet fever.

Present state - very anaemic. Skin pasty looking. Pain and slight swelling of the left knee, ankle and shoulder joints. Heart - Hypertrophy of the left ventricle, the apex beat is in the 6th interpace, and just outside nipple line; 2nd aortic sound - accentuated. pulse - high tension, and numbers 80 per minute. Urine - acid - smoky colour $\frac{1}{6}$ albumen; quantity for 1st 24 hours was 23 oz. contains - Lyaline, granular, and epithelial casts; Specific gravity - 1020. Lumps - free. Respiration 22 abdomen - nil. Temperature 99.

Date	Rotation of Base	Temperature	Erythrocytes	Leucocytes	Procent of Glob	Hemoglobin	Small Lymphocytes	Large Lymphocytes	Very narrow Neutrophils	Eosinophils	Mast Cells	Myelocytes	Treatment	Remarks
11. 11. 1902	11 th	99	2240000	10800	36	74	2056	646	6794	331	122		Sod. Sal. gr. x. two - hourly	
12. 11. 1902	"	N	2270000	5900	34	74	1486	550	7083	400			gr. x. tid	pains - almost gone
14. 11. 1902	"	N	2422000	6000	34	70	2294	369	6848	453	33		Sod. Sal. stopped, put on Inuretic mixture	Observations - stopped on the 20. 11. 02. - patient had a uraemic convulsion and died

No 27

William Sawyer, aged 28. Shoemaker, admitted 29th November 1902

Previous History - until the onset of the present attack, the patient has had good health. On the 22nd November he got a very severe wetting, followed on the 26th by severe pain in the head and back of neck, and by swelling and pain in the right hip joint. no previous attack, never scarlet fever.

Present state - Patient is well developed. Pain and swelling of right hip, and severe pain in back of neck and head, Perspiring freely, Heart, Lungs and abdomen shows nothing abnormal, Urine is acid in reaction. no albumen or urates. Temperature 100.80. Pulse 92. Respiration 26.

Date	Duration of Disease	Temperature	Erythrocytes	Leucocytes	Hemoglobin	Hemoglobin Index	Small Lymphocytes	Large Lymphocytes	Polynuclears	Mononuclears	Stromaphils	Plant Cells	Mycocytes	Treatment	Remarks
29.11.1902	1 st day	100.8	4808000	8700	94	87.21.73	6.82	67.05	3.50	1.17				Sod. Sal. gr. xx hourly	Headache and hip much better
30.11.	2 nd day	98.2 99.2	4612000	7200	92	90.14.74	12.59	48.53	3.05	1.08				gr. xx q. q. h.	toxic symptoms
1.12.	3 rd day	99.2	5160000	4200	91	88.32.37	9.44	44.55	7.71	1.44				gr. xx tid	"
3.12.	4 th day	99.2	5488000	6600	94	85.31.81	8.95	54.24	4.76	1.18				.	pains gone toxic symptoms - gone
5.12.	5 th day	94	5476000	8850	94	85.22.43	6.62	65.17	5.13	1.64				gr. xx q. q. h.	slight return of pains in head frontal region; no pain in hip heart - nil
6.12.	6 th day	103.4 103.2	5160000	9200	94	91.13.15	7.30	77.03	1.37	1.63				gr. xx hourly	very flushed; 1 st sound - soft and prolonged, no murmur pain - in head, no pain elsewhere
7.12.	7 th day	N	5520000	8600	91	87.15.76	10.11	68.28	5.64	1.14				gr. xx q. q. h.	pains gone
8.12.	8 th day	N	4966000	7300	90	90.22.43	14.88	57.31	4.39	1.47				"	"
10.12.	9 th day	N	5208000	7500	92	88.27.27	7.67	60.60	4.24	1.30				"	"
13.12.	12 th day	N	5732000	7300	95	87.24.52	7.08	57.28	5.31	1.78				"	"
17.12.	16 th day	N	4960000	6700	86	86.24.31	4.64	55.47	4.45	1.11				.	Discharged himself 19.12.1902

No. 28.

Robert Church, aged 22. Labourer, admitted 2nd December 1902.

Previous History - Five weeks ago got a severe chill while at work. This was followed by pains and slight swelling in left ankle, right ankle and left knee joints; from commencement of his illness to time of admission was attending out patients at St Bartholomew's Hospital no previous attack, never scarlet fever.

Present state - Patient is robust; Pain, swelling and some redness of the left knee joint. Pain unaccompanied by swelling in left ankle, Heart, Lungs, and abdomen, show nothing abnormal, Urine - acid, contains neither urates nor albumen, Temperature 100

Date	Direction of Pulse	Temperature	Erythrocytes	Leucocytes	Procytoblasts	Megakaryoblasts	Small Lymphocytes	Large Lymphocytes	Megakaryocytes	Granulocytes	Maast Cells	Mycetozoa	Treatment	Remarks
2.12.1902 10.30 p.m.	A	100	4984000	9050	92	92	24.95	10.08	64.07	88			Sod. Sal. gr. xx. hourly	Slight perspiration pains gone
3.12. 9 a.m.	N	99.3	5002000	6900	86	85	26.04	10.59	61.98	131	17		gr. xx. four-hourly	no change Heart - nothing abnormal
4.12.	N	100	5128000	7900	84	81	22.01	9.01	66.83	293			"	Slight return of pain in both knees.
5.12.	N	99	4858000	9050	84	86	25.65	9.96	63.00	287	50		gr. xx. two-hourly	pains nearly gone
6.12.	N		4690000	7900	82	87	25.37	6.62	64.85	323	21		gr. xx. four-hourly	pains gone
7.12.	N		4632000	8200	79	85	26.33	8.74	62.89	170	40		"	
8.12.	N		4768000	7700	76	75	27.38	6.12	62.07	142			1) gr. xx. tid 2) Ph. mic. Pom. 3) any anemic salt alternately	
11.12.	N		5142000	7400	84	81	26.29	9.21	62.18	2.11	19		"	Slight pain in knees. 4 day duration; Discharged himself
16.12.	N		4846000	5250	82	84	22.31	8.84	65.20	3.15	42		"	

19.12.02

No. 29.

Louis Thomas Money, aged 40, Night watchman, Admitted 19th December 1902

Previous History -

Eight years ago, he had acute articular rheumatism; no attack previous to this one, and with the exception of slight indefinite pains, and shortness of breath on exertion, has had fairly good health, six weeks before admission, he believes he got a very severe chill while attending to his duties. A few days later, his right elbow became swollen and painful, and later his left elbow, and right shoulder, from the onset of his illness to the time of his admission here has been confined to bed, never reached fever

Present state

Patient is very anemic, Pain in left shoulder and left knee joints - no swelling; Heart - Left border - nipple line; right middle of sternum; upper - left border 3rd cartilage; accumulation of 2nd pulmonary sound; at apex c + v.s. mit murmur, which is conducted towards the axilla pulse - soft and regular and numbers 80 per minute Lungs - free; Respiration 20. abdomen - nil urine - acid, no urates or albumen. Temperature. 98.6

Date	Duration of Disease	Temperature	Bantherocytes	Leucocytes	Hemoglobin	Specific Gravity	Small Lymphocytes	Large Lymphocytes	Mononuclear Leucocytes	Polynuclear Leucocytes	Strawberries	Prost Cells	Myocytes	Treatment	Remarks
19.12.1902	7	98.6	4058000	5150	70	.86	33.00	5.09	57.23	3.66	40			Pot. Bicarb. and Pot. Cit. aa qss xxx.	
20.12		N	4260000	6200	70	.87	31.61	9.85	56.66	2.04					pains - much better urine - distinctly alkaline
22.12		N	4098000	10900	66	.80	32.23	4.77	57.46	3.37	20				Slight pain in shoulder 23.12.02. No pain 25.12.02 got up out of bed; 27.12. recurrence in left shoulder and wrist
25.12	8	N	4120000	9600	66	.80	34.20	6.02	66.09	3.02	43				"
28.12	9	99.4	3994000	9800	63	.78	29.35	5.24	63.52	1.67					"
30.12	10	99.2 101.2	3840000	8950	65	.81	23.97	5.31	66.93	2.85	21				pain - not much better. 31.12.02 right wrist swollen
1.1.1903	11	97.6 99.	3584000	11650	64	.84	20.91	8.69	68.53	1.86					pain - still severe
3.1.	10	N	3660000	11100	63	.86	13.24	6.05	66.79	3.57	36				much easier
5.1.		N	3996000	10600	57	.71	31.62	5.13	57.11	5.73	39				Pains almost gone
8.1.		96.8 99.2	3828000	9000	59	.76	29.87	7.21	56.70	6.09					"
11.1.	11	N	3998000	8650	63	.78	30.05	3.53	68.85	2.55					only now slight stiffness
17.1.	12	N	4020000	7900	60	.76	26.60	4.60	63.60	4.60	40	20		" Tid	
8.2.	15	N	4394000	10450	64	.72	39.39	3.23	53.13	3.23	101				Discharged. 9.2.1903.

N^o 31

Albert Johnson, aged 23. Labourer, admitted 12th January 1903

Previous History - Few years ago when working (as a labourer) in lead works he suffered from lead colic and rheumatism, from that time he has had fever and rheumatism, up till the onset of the present attack three months ago which commenced with pain and swelling in the left hip, the rheumatism also affected his left knee; pain - but no swelling in both ankles. The pain has been more or less persistent ever since. Two months ago he had gonorrhoea.

Present state - Patient is well developed, and skin is pale pain unaccompanied by swelling in the left knee and hip; no pain in other joints. Apex beat is normal interspace; boundaries - normal; no murmur. Lungs - free. abdomen - nil. urine - acid containing neither urates nor albumen. There is a slight urethral discharge, and at the junction of the glans and prepuce is a large ulcerated surface. The inguinal glands are enlarged.

Temperature 99.4

Date	Pulse	Temperature	Leucocytes	Haemoglobin	Hæmoglobin Index	Small Erythrocytes	Large Erythrocytes	Polynuclear Neutrophils	Eosinophils	Mononuclear Neutrophils	Myelocytes	Treatment	Remarks		
12.1.1903	90	99.4	4930000	6200	76	77	2195	12	71	62	36	226	69	Pot. Biccant. Pot. Cit ad gr. xxx 4-9 h Emp. Comm. C 1 day for 2 wks	
14.1	"	N	4850000	6400	73	75	2634	6	15	66	03	337	14	"	no pain
16.1	"	"	4712000	6750	76	80	3374	3	04	66	73	225	21	"	"
22.1	"	"	4768000	5900	75	78	3171	4	89	56	36	519	15	"	"
27.1	"	"	4740000	6100	76	80	2924	4	37	61	10	432	89	"	"
3.2	"	"	4636000	6000	74	79	3692	5	76	51	15	538	72	" trial	"

N^o 33.

Thomas Johnson. aged 49, Labourer. admitted 20 December 1902

Previous History - Till the onset of the present attack, has had good health. twelve days before admission he was exposed to a very severe chill at his work. Four days later Knees and ankles became very painful and swollen. It started in right knee and ankle; then left knee and ankle, and swelling in right shoulder. No previous attacks of rheumatism. though he has frequently had attacks of tonsillitis. Not under treatment before admission, never scarlet fever.

Present state - Patient is a well developed plethoric individual. Pain in both knees and ankles, unaccompanied by swelling. 1st sound at apex-is soft and prolonged, but no murmur is audible; Apex beat is in normal interspace, and the area of cardiac dullness is not increased. Lungs - free; Pharynx and tonsils - free. Abdomen - nothing abnormal. Urine - normal, no urates or albumen. Temperature 99.8 Respiration 25 Digestive system - appetite - good; bowel - regular

Date	Duration of Disease	Temperature	Leucocytes	Haemoglobin	Hypochromia	Small Erythrocytes	Large Erythrocytes	Polychromasia	Platelets	Granulocytes	Max Cells	Prothrombin	Treatment	Remarks
21.12.1902	9	99	4852000	6650	82	50	2150	830	58.86	1078	56		Pot. Bicarb. + Pot. Cit u2. gr. ttt. four hourly	free perspiration during night.
22.12.	10	N	4936000	6800	82	83	2928	803	48.67	1357	53		" Tid	pains gone Urine - alkaline no pain. Urine - slightly acid
27.12.	15	N	5200000	7200	80	80	3337	912	53.85	570	57			31.12 or Slight pain in left ankle acute follicular tonsillitis affecting both tonsils. Pharynx also acutely inflamed; pains all over body.
4.1.1903	23	102.2 103	4700000	11100	80	85	1512	736	76.75	18	37	18	Sod. Sal. gr. ttt. q q h Local oil applied locally Iodine inhalation;	
5.1.	24	100.2 100.	4542000	9650	76	82	2190	1189	83.94	204	19		Iodine inhalation Gargle - pot. Chlor.	
7.1.	26	101 98.6	4620000	8900	80	86	2226	1013	61.63	596			"	very much better
10.1.	29	N	4400000	7250	80	90	2746	1011	57.64	1001	86		Sod. Sal. gr. ttt. tid Gargles continued	Throat still slightly red
12.1.	31	N	4860000	6800	81	83	2433	376	68.66	298	31			Discharged himself 22.1.03

N^o. 33

Thomas Spencer aged 36. Cabinet maker. admitted 12th January 1903

Previous History - Patient has had good health till 9 weeks ago, when after a severe chill he suffered from pain and swelling, beginning in both ankles, and involving successively the other joints. Pain over the left breast and shortness of breath on exertion. No previous attacks for a week or so before admission. He had been free of pain, but pain again commenced a few days later.

Present state Patient is thin and very anaemic. Pain in both knees, and shoulders, and in the left ankle; no swelling. Apex beat is in the 6th intercostal, and there is an increase in the transverse measurement of the cardiac dulness. A blowing systolic murmur is heard at the apex, and is conducted towards the axilla. Pulse - soft and regular, and numbers 92. Respiration - 25. Lungs - nil. Abdomen - nil, urine - acid no urates or albumen. Temperature 100.

Date	Temp. of Rectum	Temp. of Axilla	Pulse	Respiration	Systolic Pressure	Diastolic Pressure	Hemoglobin	Hematocrit	Reticulocytes	Leucocytes	Erythrocytes	Platelets	Tubercle	Lymphocytes	Neutrophils	Eosinophils	Basophils	Granul Cells	Psychocytes	Treatment	Remarks
13.1.1903	63	99.2 98.4	400	2000	9550	71	88	27.46	6.82	64.44	1314	79								Salicem. gr. ʒss two hourly	
15.1 "	"	N	435	2000	8850	70	80	25.76	6.46	67.82	1164	"								gr. ʒss four hourly	no pain
17.1 "	"	"	411	6000	6950	72	87	32.88	7.37	55.44	410	20								"	"
25.1 "	"	"	435	6000	6750	70	80	32.88	5.35	59.27	230	38	19							gr. ʒss tid	"
1.2. "	"	"	466	4000	8900	76	81	32.74	5.08	59.45	277	37									Discharged himself. 3.2.03

Joseph Inagone, aged 16. Capsule manufacturer, admitted 24th January 1903

Previous History - One year ago had an attack of subacute rheumatism. Previous to this he had good health. Four months ago he got a severe wetting, followed by pains all over body, but particularly in the joints from this time to the time of his admission he has had a return of the pains periodically, never kept his bed, for a week previous to admission his pains were much worse, he attended the out-patients at St. Bartholomews Hospital, never scarlet fever

Present state - Patient is well nourished, but very pale. Pain and swelling in left knee and ankle, and right shoulder. Pain but no swelling in the left elbow no increase of cardiac dullness. Apex beat in normal interspace. no murmur. Lungs and abdomen nil. Urine - acid in reaction, contains neither urates nor albumen. Temperature 99.6

Date	Temperature	Leucocytes	Strep. tobian	Staph. aureus	Small lymphocytes	Large lymphocytes	Polymorphs	Neutrophils	Eosinophils	Monocytes	Myelocytes	Treatment	Remarks
25.1.1903	120 99 99.8	4364000	9350	67	76	33.76	6.45	56.34	3.44			Salicine gr. xx	
26.1.	W	4566000	7450	67	73	31.00	4.40	61.00	3.20			gr. xx hourly	Pain nearly gone
28.1.	99 99.6	4148000	9850	65	78	27.24	5.48	59.56	1.69			hourly	14 out - no change pain over right knee
30.1.	W	4656000	8550	68	73	33.78	6.01	52.24	6.99				Still slight pain in hip
31.1.	W	4380000	8300	70	77	29.24	5.70	60.32	4.58			gr. xx tid	no pain
7.2.	W	4802000	10850	74	77	37.60	5.36	54.33	3.09				allowed to get up for 2.3 hours daily - 6.2.03
13.2.	98.4 100	4302000	8200	72	83	22.27	4.83	70.40	3.46				on 12.2.03. fresh pains in knee, back, and neck. Kept in bed.
16.2.	W	4774000	7100	78	81	31.00	6.00	58.10	4.86				pains gone.
24.2.	W	4456000	8900	71	75	30.34	5.61	62.57	3.67				
31.3.	W	4668000	12450	70	75	34.45	2.55	70.12	1.01				Discharged himself 5.3.03

Wily Hills. aged 28. married. admitted 28th March 1903.

Previous History - The present attack commenced eleven weeks ago after a severe wetting. no previous attacks; was nine weeks in the Middlesex Hospital. Two days after taking her discharge from the Hospital, she was admitted here.

Present state - She is slightly anemic; Pain on movement, slight swelling and stiffness in the right knee other joints are unaffected. Heart is feeble 1st sound at apex. no murmur. Lungs and Abdomen - nil. Urine - slightly acid; albumen and urates - nil, Temperature - 99

Date	Duration of Disease	Temperature	Leucocytes	Leucocytes	Haemoglobin	Hæmoglobin Index	Small Lymphocytes	Large Lymphocytes	Polymorphous Neutrophils	Eosinophils	Mononuclears	Myelocytes	Treatment	Remarks
29.3.1903	"	98.4	4474000	10550	75	'83	21.9	3.06	7.17	3.60	'18	"	Sod. Sal. gr + + tid	

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PART II

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Name	Age	Date of Admission	Class	Previous attacks	Family History	Remarks
1. William H.	16	28.1.1902	B	"	uncle and aunt maternal - rheumatic fever; parents - nil	"
2. Elizabeth W.	38	30.1. "	A	"	mother - rheumatic fever	followed 14 days after confinement
3. Walter R.	41	3.2. "	D	one; 1 year ago	"	"
4. William B.	33	6.2. "	D	"	"	"
5. William L.	52	8.2. "	A+B	two; 14 years ago " 8	Father and uncle (paternal) rheumatic fever	developed mitral regurgitant
6. Arthur H.	18	12.2. "	A	"	mother - rheumatic fever	"
7. Frank B.	33	14.2. "	A+B	one; 4 years ago	Father - rheumatic fever; aunt (paternal) - rheumatic fever	developed mitral regurgitant murmur.
8. Harriett D.	21	29.10.1901	A+B	two (1) 10 years ago (2) 4 " "	mother - rheumatic fever and died of heart disease	on admission - double mitral disease; Erythema multiforme
9. Dennis M.	46	17.2.1902	A	"	brother - rheumatic	"
10. Dennis W.	35	18.2. "	C	one; 14 years ago	mother - died of heart disease father died of complications of disease	"
11. Walter W.	32	20.1. "	D	one; 1 year ago	"	"
12. Peter J.	40	25.2. "	D	one; 2 years ago	"	"
13. William B.	44	4.3. "	D	two; (1) 10 years ago (2) 4 " "	"	"
14. Thomas V.	40	6.1. "	A	"	mother - rheumatic	developed mitral regurgitant murmur
15. Alexander H.	8	24.3. "	A+B	one - 6 months ago	mother and uncle (maternal) rheumatic fever; aunt - rheumatic fever and valve disease; one brother - tonsillitis	"
16. Alfred R.	48	22.2. "	A	one; 20 years ago	Father rheumatic	"
17. Mary J.	31	29.3. "	A	two; (1) 15 years ago (2) 7 " "	mother rheumatic fever	followed about a fortnight after confinement; developed a mitral regurgitant murmur
18. George D.	42	29.3. "	D	"	"	"
19. Mary H.	29	4.4. "	D	"	"	followed 14 days after confinement
20. Sarah G.	49	7.4. "	D	one; when a girl several slight attacks of arthritis	"	"
21. Martin S.	37	11.4. "	D	"	"	"
22. William B.	53	7.5. "	D	"	"	had ague several times
23. William R.	49	7.5. "	D	"	"	"
24. John H.	48	12.5. "	A	one; 24 years ago several slight attacks of arthritis	mother - rheumatic fever	"
25. George D.	20	3.6. "	A+B	"	mother & grandmother (maternal) rheumatic fever; Grandmother died of this disease	delirious for several evenings after admission, developed pericarditis and endocarditis (mitral regurgitation)

Name	Age	Date of Admission	Class	Previous attacks	Family History	Remarks
26 Francis O'H -	24	7.6.1902	A	"	Father rheumatic fever; One brother subacute rheumatism 1 sister chorea. One brother escaped.	"
27 Esther J -	19	17.6.	A+B	one - 3 years ago	Mother - rheumatic fever; Uncle maternal - "rheumatic"	mitral regurgitant murmur on admission
28 Charles A -	20	4.5.	C	two; (1) 6 years ago (2) 3 "	no account of relatives	Double mitral murmur on admission, developed hemiplegia
29 Joseph V -	28	8.7.	A	one; 14 years ago	Mother - "rheumatic" and embury - father and grandfather - (paternal) - "rheumatic"	mitral regurgitation and obstruction.
30 Emily C -	20	22.8.	D	one; 2 years ago	"	mitral regurgitation
31 Alice J -	10	28.8.	D	one; 3 years ago	"	developed two subcutaneous nodules
32 Frank D -	39	30.8.	D	one; 6 years ago	"	"
33 George W -	24	3.9.	D	"	"	mitral regurgitation
34 Isabella D -	22	21.9.	D	one; 3 years ago	"	"
35 John C -	36	17.10.	A	one; 15 months ago	Mother - rheumatic fever	"
36 Frank G -	34	24.10.	D	"	"	"
37 William C -	28	28.10.	A	two; (1) 13 years ago (2) 6 "	father and one brother - rheumatic fever; two brothers and one sister escaped.	mitral regurgitation
38 Elizabeth P -	37	5.11.	A+B	five; first attack 14 years ago	Mother and father "rheumatic" Mother had five brothers and two sisters; six had suffered from "rheumatic" and one from rheumatic fever; - Patient has one brother and one sister; sister - chorea; brother; knows nothing of him	mitral regurgitation had scarlet fever when a child.
39 William B -	29	4.11.	A	one; 5 years ago	Mother - rheumatic fever one sister - chorea;	"
40 George N -	53	11.11.	D	one; 4 years ago	"	"
41 Alice K -	28	28.11.	D	two; (1) 10 years ago (2) 9 "	"	aortic regurgitation
42 Harold D -	28	5.11.	D	"	"	never scarlet fever
43 Mary L -	40	11.11.	D	"	"	very anemic; chronic parenchymatous nephritis; died from uraemic convulsions.
44 James B -	25	13.11.	A	one; 5 years ago later - 3 attacks of subacute rheumatism	Mother "rheumatic"	"

Name	Age	Date of Admission	Class	Previous attacks	Family History	Remarks
45 Leonard D -	30	20.11.1902	D	"	"	developed mitral regurgitant murmur
46 James C -	44	29.11. "	A	four; (1) 33 years ago (2) 25 " " (3) 23 " " (4) 11 " "	mother - rheumatic fever wife also rheumatic fever	mitral regurgitation on admission
47 William S -	28	29.11. "	A	"	mother - chronic rheumatism	"
48 Robert C -	22	2.12. "	D	"	"	"
49 Louis M -	40	19.12. "	D	one; 84 years ago	"	mitral regurgitation on admission
50 John W ^m H -	15	23.12. "	D	"	"	developed an apical murmur temporarily
51 Robert L -	37	23.12. "	A	"	father - "rheumatics"	"
52 Mary D -	42	29.12. "	D	two previous attacks of slight arthritis	"	Erythema multiforme on admission; developed mitral regurgitation
53 Sarah A W -	42	8.1.1903	D	"	"	Bronchitis on admission
54 Fred C -	42	24.6.02	D	one; 2 1/2 years ago	"	developed two sub-cutaneous nodules
55 Thomas J -	49	20.12. "	A	none; several previous attacks of tonsillitis	father - rheumatic fever	suffered from acute tonsillitis after admission
56 Albert J -	23	12.1.03	D	10 years ago had lead colic and rheumatism	"	"
57 Thomas S -	36	29.1. "	D	"	"	mitral regurgitation on admission
58 George S -	22	19.1. "	A	"	father - rheumatic fever	mitral regurgitant murmur on admission
59 Joseph M -	16	24.1. "	C	one; 1 year ago	"	"
60 Thomas S -	26	12.1. "	D	two; (1) three years ago (2) two " "	"	mitral regurgitation
61 Henry B -	20	12.2. "	A+B	one; 3 years ago	father, grandfather, and twin brother - rheumatic fever.	"
62 Henry W -	27	20.2. "	D	one; 4 years ago	"	mitral regurgitation developed lobar pneumonia;
63 Joseph A -	31	27.2. "	D	one; 6 years ago	"	"
64 Sarah D -	63	6.3. "	D	"	one daughter - scarlet fever and 3 attacks rheumatic fever	"
65 Ellen W -	64	23.3. "	D	one; 12 years ago	"	"
66 Emily M -	28	28.3. "	A	"	mother - "rheumatics" father - lumbago	"
67 Lucy R -	10	31.1. "	A	"	mother - died from rheumatic fever	"
68 James S -	19	6.4. "	A	one; 3 years ago	father - "rheumatics"	pericarditis and mitral regurgitation; on admission
69 Caroline H -	12	11.4. "	A	"	father - gout; mother and grandmother - "rheumatics"	"
				"	father - rheumatism (doubtful rheumatic fever) and died of Malabar Cough; mother died in childbirth	"
70 Charles C -	29	15.4.03	A	"	"	"