ach. Disappointing as is the surgery for malignant disease, yet it is to-day our only ray of hope in these cases. Certainly the surgery of benign lesions has given us brilliant results and accomplished much good. It is capable of doing much more good than it is doing to-day. In almost every community cases of ulcer of the stomach die from obstruction, perforation or hemorrhage, which could be saved by timely operative procedure. These cases are entitled to the benefits of modern surgery, and they can obtain it if the surgeon can convince the general practitioner of the possibilities for good in such radical treatment. These cases are on the borderland between medication and surgery, and the best results, the greatest good can be obtained only by the helpful co-operation of the surgeon and physician; not by indiscriminate operating, nor by protracted routine medical treatment, but by the judicious selection of the treatment required to cure the individual case.

ACUTE ARTICULAR RHEUMATISM.

THE STATISTICS OF A SERIES OF 270 CASES FROM THE SERVICE OF DR. OSLER IN THE JOHNS HOPKINS HOSPITAL.*

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BALTIMORE.

The cases in this series are those of acute articular rheumatism which have been admitted to the medical service of the Johns Hopkins Hospital during a period of thirteen years (1889-1902). During this period the total medical admissions were 14,567, and of these 294 were for acute rheumatism, which equals practically 2 per cent. These 294 admissions represent 270 patients, some of them being admitted several times in different attacks. During the same period there were 54 cases diagnosed as subacute rheumatism, 39 as chronic rheumatism, 35 as gout, and 86 as arthritis deformans. The figures from the Montreal General Hospital have been sent me by Dr. Campbell Howard. In a period of 10 years (1891-1901) among 9,992 medical admissions there were 388 for acute articular rheumatism, which equals 3.8 per cent. During the same time there were 154 cases of subacute rheumatism. A comparison with the figures of some of the London hospitals is interesting. In St. Thomas' Hospital, during a period of ten years (1890-1899), there were 18,998 medical admissions, of which 997 were for acute rheumatism, which equals 5.2 per cent. In St. Bartholomew's Hospital, for a period of thirteen years (1888-1901), there were 31,085 medical admissions, of which 1,241 were for acute rheumatism, nearly 4 per cent. Church[1] gives figures for various London hospitals which give the proportion of acute rheumatism as being from 3.5 to 7 per cent. of the total admissions. There is probably little doubt that this disease occurs less frequently with us than it does in England. It may be said that in this series any doubtful case has been classified as subacute rheumatism.

INCIDENCE.

Sex.—Among the 270 cases there were 198 males and 72 females, a proportion of 2.7 to 1. This is almost exactly the proportion of males to females in the medical admissions.

Color.—There were 223 white and 47 colored, a ratio of 4.8 to 1. The proportion in all admissions of white to colored is about 7 to 1.

Age.—The number of cases and percentage in each decade are as follows:

Age.	Cases.	Percent.	Age.	Cases.	Percent.
1-10	7	2.6	41-50	36	13
11-20	70	26	51-60	15	5
21-30	93	34	61-70	3	1
31-40	46	17			

It has to be kept in mind that we have a comparatively small number of children admitted to the wards. Nearly 20 per cent. of the patients were over 40 years of age. The oldest patient was aged 66 years.

Occupation.—Only 93, or 36 per cent., worked out of doors and were therefore usually exposed to weather. This group comprises laborers, drivers, stevedores, etc. Of the others, 25 per cent. of the total were engaged in house work, 11 per cent. were mechanics, carpenters, etc., 10 per cent. were attending school, 10 per cent. were barbers, tailors, etc., and only 8 per cent. were in the higher walks of life, merchants, etc.

Time of Year.—The incidence in the various months is as follows:

Month.	Cases.	Percent.	Month.	Cases.	Percent.
January	23	8.5	July	19	7
February	36	13.3	August	11	4
March	35	12.9	September	8	3
April	38	14	October	11	4
May	39	14.4	November	11	4
June	22	8	December	17	6

It will be noted that 55 per cent. of the cases occurred in the four months, February, March, April and May, and that three-quarters of the total number were in the first six months of the year. This is in direct contrast to the figures from the London hospitals, where, as Church points out, the maximum is in the autumn months, September, October and November. Prevalence in the spring months has been noted in Montreal by Howard.[2]

Family History.—A family history of rheumatism was given in 69 cases, which equals 25.5 per cent. It was about equal on the father's side, mother's side and in the immediate family. No special relationship between a family history of rheumatism and an especially severe attack could be made out. There was a family history of tuberculosis in 39 cases, which equals 14.5 per cent. Rheumatism and tuberculosis were associated in the family history in 12 cases. There was a family history of gout in 2 only. Of course, it is to be kept in mind that a family history of "rheumatism" might be more correctly termed one of arthritis. Other than true rheumatic arthritis is usually included by patients under the general heading of rheumatism.

Previous History.—This was practically negative in 66, or 25 per cent. There was a history of previous acute articular rheumatism in 121, or 45 per cent. Patients had tonsillitis previously in only 10 instances, which equals 3.7 per cent., and gave a history of chorea in only 7 instances, which equals 2.6 per cent. There was a previous history of both tonsillitis and chorea in only one instance. These figures appear to be rather small when we consider the generally accepted view that tonsillitis and chorea are so intimately associated with rheumatism. There was a previous history of lues in 12 cases. Fairly marked alcoholic history was given in a rather large number, nearly 39 per cent., all of whom had been moderate or heavy drinkers. It is of interest to note that a very much larger percentage of all our cases of gout gave a marked alcoholic history. The number of the attack with which the patient was first admitted is given as follows:

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Practice of Medicine, and approved for publication by the Executive Committee: Drs. Frank A. Jones, George Dock and J. M. Anders.

1. Church: Allbutt's System of Medicine, vol. iii.

2. Howard: Pepper's System of Practical Medicine, vol. ii.

Attack.	Cases.	Percent.	Attack.	Cases.	Percent.
First	140	52	Fifth	3	1
Second ...	72	26.6	Sixth	1	.3
Third	26	9.6	Uncertain ..	18	6.6
Fourth ...	10	3.7			

It will be noted that 52 per cent. of our cases were admitted with the first attack. In the cases from St. Thomas' Hospital previously noted, 54 per cent. were admitted with the first attack and 27 per cent. with the second attack.

Age at the Time of First Attack.—This was known definitely in 255 cases. It will be seen that in three-quarters of the patients the first attack occurred below the age of 30. It is interesting to note, also, that in over 11 per cent. the first attack occurred after the age of 40. In 3 per cent. the first attack was over the age of 50, which is to be noted in connection with the statement sometimes made that acute articular rheumatism never occurs for the first time after the half century is passed. In our oldest case the initial attack was at the age of 66. The figures are as follows:

Age.	Cases.	Percent.	Age.	Cases.	Percent.
1-10	22	8.6	41-50	22	8.6
11-20	93	36.4	51-60	7	2.7
21-30	76	29.8	61-70	1	.3
31-40	34	13.3			

Complaint Made by the Patient.—Arthritis was complained of by 167, "rheumatism" by 84, various other symptoms by the remainder. It is of interest to note that of these 6 complained of sore throat, 2 of chills and 2 of chorea.

Onset.—There was a definite history of exposure to wet or cold immediately before the onset of the attack in 32 cases, or 12 per cent. Arthritis was the first symptom noted by the patient in 194 cases, or 82 per cent. Chills at the onset occurred in 18 cases, practically 6 per cent. This is rather an interesting point, as little stress is usually laid on chills at the beginning of rheumatic fever. Tonsillitis was the symptom of onset in 10, in only one of which was it associated with chill. Various other symptoms were first noted in a few cases, such as fever, sweating, nose bleed, skin rash, etc. There was only one instance in which trauma was an apparent etiologic factor. This patient was struck on the shoulder by a piece of timber and was severely injured. The next day other joints were involved with arthritis, but not the injured one, which escaped entirely.

SYMPTOMS.

Arthritis.—This, of course, was by far the most prominent symptom and was present in every case of the series. It is of interest to note the relative frequency with which the joints were involved. Taking all the cases the knee was involved far more frequently than any other joint, viz., in 142 cases, or 53 per cent. The ankle was next, in 88 cases, or 33 per cent. As is usually the case, the lower extremity was involved more frequently than the upper extremity; in this series in a proportion of about four to three. The order of frequency of involvement of the joints is as follows: knee in 142, ankle in 88, shoulder in 75, wrist in 62, elbow in 54, hip in 52, the hand in 47 and the foot in 42 instances. It is interesting that in all the joints of the lower extremity both sides were more often involved than one alone; for example, in the case of the knee more patients had both knees involved than one. In all of the joints of the upper extremity the contrary was the case; one wrist, for example, was much more often involved than both. Fluctuation was noted in the joints in 47 cases.

Fever.—The average duration of fever in 254 cases was 12 days. It is, however, to be kept in mind that a certain number of the cases were admitted late in the disease, and in some of these the fever dropped very rapidly after admission. The fever persisted for a period of over four weeks in 26 patients, the longest duration being ten weeks, which occurred in two patients.

In studying the temperature records there are two types of cases which rather stand out, as has been noted before in studies of series of cases, those in which the temperature is perhaps at an average of about 103 for a few days and then rapidly goes down to normal, and those in which the temperature is never so high, perhaps averaging only 101, but continues elevated for a very much longer time. The joint symptoms in these two cases may be identical. In many cases these persisted after the temperature had fallen to normal. There was no instance of hyperpyrexia in the series. In only 10 cases was the fever above 104. In only 29.5 per cent. did it reach 103 or over. This leaves 70.5 per cent. of the cases with a temperature not above 102.5. There is a fairly general impression among those who have had hospital experience, both in the north and in Baltimore, that the general type of rheumatic fever in the latter place is not so severe. Certainly one does not see the very severe acute types of the disease so frequently as in the north.

There are various symptoms of common occurrence, such as general malaise, loss of appetite, sweating, constipation, etc. These require no special consideration.

Cardiac Conditions.—These, of course, are of special interest and are worthy of being considered in some little detail. It is convenient to divide the cases into three groups: (1) those cases in which the heart sounds were clear throughout; (2) those in which there was no question of the presence of an organic cardiac lesion, and (3) a group of doubtful cases in which it is very difficult to say how much cardiac involvement was present.

1. *Cases with Clear Heart Sounds.*—Of these there were 100, or 38 per cent. In 86 of these there was throughout no departure from normal conditions. In 6 there was a reduplication of the second sound at the base on admission, but no murmurs were made out at any time. In 4 there was reduplication of the second sound at the apex on admission, but no murmur was made out at any time. In 2 there was pericarditis, but the sounds were unchanged; in 1 there was gallop rhythm on admission, and in 1 marked irregularity of the heart's action on admission, both disappearing later. As these cases were all discharged with perfectly clear heart sounds and no other signs of cardiac involvement they may be regarded as practically having escaped. Of course, it may be said that myocarditis was present in the cases with gallop rhythm or marked irregularity. This may be the case, but on discharge they showed no signs of any cardiac affection either valvular or muscular.

2. *Cases with Undoubted Organic Lesions.*—In this group there were 85 cases, or 32 per cent. In 95 per cent. of these the mitral orifice was involved and in 23 per cent. the aortic orifice. In 18 per cent. both the aortic and mitral orifices were involved. In the St. Thomas series out of 535 cases the mitral valve was involved in 97 per cent. and the aortic valve in 12 per cent. It is interesting to note that in our series the aortic valve was involved in practically double the relative number of cases in the St. Thomas series. One would be inclined to say from general impression that the reverse might have been expected because the writers on cardiac disease in Great Britain lay rather

more stress on rheumatic involvement of the aortic orifice than is usually done in this country. Of the 85 cases with organic valvular lesions mitral insufficiency was found in 54, mitral stenosis in 3 and mitral stenosis and insufficiency together in 8. This gives 76 per cent. of all cases with the mitral valve alone involved. Mitral insufficiency with aortic insufficiency occurred in 12; mitral insufficiency and aortic stenosis in 1; mitral stenosis and aortic insufficiency in 1. In 2 double lesions of both aortic and mitral orifices were thought to be present and in only 4 cases pure aortic insufficiency without mitral involvement. This gives a percentage of 4.7 for an aortic lesion alone. In the St. Thomas series the aortic orifice alone was involved in 3 per cent. It may be noted that so far as known no case of ulcerative endocarditis occurred in this series.

3. *Doubtful Cases.*—In this group are 78 cases, or 28 per cent. Of these 60 were discharged with a cardiac murmur present, the exact nature of which was doubtful. In 18 there was a murmur present at some time during the course of the disease, which disappeared and the patients were discharged with clear heart sounds. These latter cases are included with this doubtful group because it is impossible to say just how much involvement of the endocardium there had been. It may be said that practically the only sign of cardiac involvement in all the cases of this series was the murmur. The heart was not enlarged, its rate was normal, there was no thrill or any other sign suggesting cardiac disease. By far the largest division of these 60 cases is that in which the first sound was heard at the apex accompanied by a soft murmur, not carried to the axilla and not heard over the base of the heart, while the second pulmonic sound was not accentuated. There were 24 cases in this group. In 3 additional cases the only difference was an accentuated second pulmonic sound. In 3 others a reduplicated second pulmonic sound was present only on admission. In another group comprising 6 cases the first sound was heard at the apex accompanied by a soft systolic murmur heard out as far as the mid-axilla. In 8 cases there was a soft systolic murmur at the apex not carried to the axilla, but heard over the body and in the pulmonic area. In 5 cases the first sound was heard at the apex accompanied by a soft murmur not carried to the axilla and not heard over the body, but present in the pulmonic area. In 8 cases the first sound was clear at the apex, but there was a soft systolic murmur heard only in the pulmonic area. In 2 cases the first sound was clear at the apex, but there was a soft systolic murmur over the base. Of the 11 cases in which a murmur was heard at the base or in the pulmonic area only, one would be inclined to say that the murmur probably did not mean any definite cardiac involvement, and this especially in the cases where it altered with a change in position. In reference to the larger group of 49 cases, in which the principal feature was a soft systolic murmur heard at the apex, one has more difficulty in arriving at any sure conclusion. In many of them probably only time enables one to know with certainty. In some instances patients were discharged with a murmur thought to be only functional, but returned subsequently with undoubted signs of an organic lesion. Others, again, who went out with a suspicious condition returned with a normal heart and clear sounds. It may be noted that cases like those here described occurred in the group in which the murmurs appeared and disappeared under observation.

In the second division of this group are 18 cases in which there were murmurs which appeared and disappeared while the patient was under observation, the heart being otherwise perfectly negative. In 7 of these there was only a soft systolic murmur at the apex which was not carried to the axilla. This murmur persisted for periods varying from 2 to 14 days. In 1 case it was accompanied with pericarditis, in 1 other case with pericardial effusion. In 7 cases there was a soft systolic murmur at the apex, which was carried to the axilla and also heard in the pulmonic area or over the body. This murmur persisted for periods of 10 to 30 days. In 2 cases a soft systolic murmur was heard only in the pulmonic area, and in 1 only over the body of the heart.

The conditions that occur in the course of an acute rheumatism which may cause these murmurs are various. The most important are (1) fever, (2) toxemia, (3) anemia, (4) myocarditis, (5) dilatation and (6) endocarditis. The first two are probably often operative in the early stages of the disease and may have been a cause in some of the cases in which the murmur cleared up with the subsidence of the acute symptoms. But they hardly explain a murmur which persists, unless we believe that they may mean more or less permanent change, most probably in the heart muscle. Anemia may have been a factor in some instances, but was not a prominent one. The incidence of myocarditis is difficult to estimate. It would be impossible to give any positive symptoms and signs for minor grades of it. Yet the toxemia of acute rheumatism may affect the heart muscle more than we imagine. Dilatation of the heart stands in much the same relationship. It was possible to recognize its presence in some cases, but how frequently the lesser degrees occur would be impossible to state. Yet it may be taken for granted that few of the patients were discharged with any degree of dilatation, and hence while it may explain some cases of temporary murmur, it does not explain the cases with more or less permanent murmur. Endocarditis is probably the most important factor in the production of these murmurs. How extensive this process may be in such cases we are unable to say, but it is quite possible that in many of this group there were small vegetations near the margins of the mitral segments. Such may be associated with but little actual regurgitation of blood and be of but little immediate importance. These vegetations may be gradually absorbed until only smooth elevations remain. How far such cases may undergo a gradual progressive change in the valves, with subsequent marked regurgitation, without any definite further rheumatic infection, is a question. But we must remember the tendency to slow progressive sclerotic changes under any circumstances. It would seem reasonable to suppose that in any event a subsequent attack of rheumatism would find such valves more readily affected. When we remember that in some cases with undoubted acute endocarditis a murmur may only appear late or not at all, the difficulties in the exact diagnosis of endocarditis are evident. The symptoms and physical signs may be very variable and uncertain. These murmurs are probably akin to those transitory ones noted in chorea. A positive verdict as to the exact nature of many of them can only be reached by time. Yet in general terms it would seem reasonable to suppose that in many of these cases the slowly advancing process leading to definite change in the mitral valves has begun, and that years later such patients come again under observation with the undoubted signs of organic mitral disease.

The question of the treatment of these cases is an important one. How long should such a patient be kept

in bed and at rest? Certainly until as many as possible of the etiologic factors noted before can be excluded. It is in our power to do this usually in the case of fever, toxemia, anemia and dilatation, but in a less degree with myocarditis. As to endocarditis we can speak with little certainty. The only safe rule is to consider them all as possible cases of this condition. We have treated these cases much after the method so strongly advised by Caton.[3] The first essential is, of course, prolonged, complete rest. How difficult this is in private practice and how often impossible in hospital work we all know. The average hospital patient will rarely consent to remain at rest after the acute symptoms have subsided. With children it is not easily done. The second is the application of small blisters over the precordia. We believe this to be often of considerable value in all the cardiac complications of rheumatism. The third is the administration of sodium or potassium iodid in small doses for some time.

It may be said in reference to the present series that of the 85 cases with definite organic disease on discharge, in 5 this developed under observation. In the remainder the murmurs were present on admission. Of these 5 cases in 3 the attack was the first, in one the second and one had numerous attacks in childhood, but had been free for 23 years before the present attack. All these patients were over 20 years of age. Of the 60 cases with a doubtful murmur on discharge, in 4 this came on under observation, 3 being in the first attack and one in the second.

To sum up, it seems reasonable to suppose that in many of the cases classed as "doubtful" there had been some changes in the mitral valves likely to be progressive. Such patients years later will probably be found to have organic lesions.

Murmurs Which Developed Under Observation and Which Persisted.—There were 9 cases in this group. Of these 5 were regarded as cases of definite organic lesion, all being mitral insufficiency. Two of these came on within a period of 24 hours; that is, from perfectly clear heart sounds a murmur developed in one day which was permanent. In one case the first change noted was reduplication of the second sound in the pulmonic area. In a few hours this was followed by murmurish quality of the first sound at the apex, which rapidly became a positive murmur. In the other case within a few hours the transition was noted from a clear first sound to a murmurish quality and very soon a definite murmur. It is worthy of note that in all these cases the pulse was not affected in any way that could be made out at the time of development of the murmur. It was little above normal in any of them. The remaining four of these nine cases were doubtful and are included in the third group given before.

The influence of the age of the patient at the time of the first attack is a well-known factor in the development of endocarditis. The comparison of the ratios of the cardiac conditions is given for two periods, below and over the age of 20 years. The large percentage of doubtful cases is to be regretted, but there seems no other way of disposing of them:

Age at First Attack.	Heart Clear.	Organic Lesion.	Doubtful.
Below 20 years....	33.6%	44.5%	21.8%
Above 20 years....	50	21	29

The comparison is striking, and the nearly double percentage of the cases with organic lesion in those with the first attack below 20 years is to be noted.

If the cases be arranged by decades the high percentage of cases with organic lesion in those coming within the first ten years is very marked. The figures give the percentages:

Age at First Attack.	Heart Clear.	Organic Lesion.	Doubtful.
1-10	18	64	18
11-20	37	40	23
21-30	46	18	36
31-40	41	12	47
41-50	60	24	16
51-70	25	37	38

Pericarditis.—This occurred in 16 cases, or 5.9 per cent. These figures agree fairly closely with those of the St. Thomas series, namely, 6.1 per cent., and the figures from the St. Bartholomew series, namely, 7.5 per cent. These percentages are very much lower than those given by the older writers on the disease, the most common explanation given for the diminished frequency being that it is due to the use of salicylates. The age of the patients with pericarditis varied from 12 to 51 years, 6 were below the age of 20 years and 10 over it. Contrary to the experience of many writers, relatively few cases, only 3, occurred with the first attack, 7 occurred with the second attack and 5 with the third. As to the time of onset of the pericarditis the earliest was on the fifth day, the patient being admitted with the pericardial rub present. The latest time of onset in the disease was on the 61st day in one case. All but two were within the first four weeks. There was one case with pericardial effusion present on admission. The duration of the pericardial rub was very variable. The shortest period was five days, when effusion occurred. The longest period was 18 days, observed in two patients. Delirium occurred with pericarditis in only one case. This is rather surprising, considering the emphasis which is usually laid on the association of the two conditions. The temperature did not go above 102 in 9 of the patients, in 2 being below 101. In 3 it was irregular, not going above 103, in 2 not above 104, and in only 1 reached 104.5. The pulse rate was below 100 in 2 cases, went up to 115 in 4, up to 125 in 5, and from 136 to 140 in 4. Leucocytosis was present in the 7 cases where a count was made. In the majority the number varied between 15,000 and 19,000 per c.mm. The highest count was 35,000 per c.mm.

It is probable that in the majority of these cases there was some involvement of the myocardium. This, however, may be difficult to estimate. In cases with definitely associated pericarditis and endocarditis, the myocardium is probably always involved. Among these 16 cases there seemed undoubted associated endocarditis in 8, in 4 there was doubtful evidence of it, and in 4 no evidence of endocardial disease. As already noted, it may be impossible to accurately estimate the amount of involvement of the heart muscle.

Results.—Effusion occurred in 2 cases, in 1 of which it was present on admission. The pericardium was tapped in one of these with some temporary relief, but death occurred later. Adherent pericardium, of the presence of which there could be no doubt, was present in 3 cases. Death followed in 3, in 1 with effusion, in all with endocarditis, and, of course, probably with myocarditis as well.

Adherent Pericardium.—This was found to be present in 6 cases, in 3 of which it apparently followed pericarditis, which occurred under observation. None of the patients with adherent pericardium were admitted in the first attack, 3 of them being in the second attack and 1 each in the third, fourth and sixth. In one patient, who was continuously under observation, a period of four months elapsed between the pericardial rub and undoubted signs of adherent pericardium.

3. Caton: British Medical Journal, Oct. 12, 1901.

Pulse.—The general impression on going over the figures of the pulse rate is one of surprise that the average is not higher. In 59 per cent. of the cases the pulse rate never rose above 100. In only 3 cases was it above 130, and in only 14, or 6 per cent., was it over 120. More than half of these were cases of pericarditis. When one considers the fever, the toxemia and the not infrequent endocardial and myocardial involvement it is certainly surprising that the pulse rate is not more increased than these figures indicate. As has been noted, we have observed cases with endocarditis and the development of definite organic lesions in which the pulse rate was practically unchanged. It is important to remember this and not attach much importance in a doubtful case to the absence of any disturbance of the pulse as being against endocarditis. Yet the contrary may be true, as in one patient who, during recovery in his first admission, had a persistently rapid pulse, about 120. His heart was negative and the sounds were clear. Five days after discharge his symptoms returned and he was admitted with arthritis and a soft systolic murmur at the apex, which persisted without any other signs of cardiac disease. On discharge this murmur was very soft and the pulse was 100. There may have been endocarditis throughout without any cardiac signs at first or the rapidity may have been due to myocarditis.

Urine.—This was apparently clear throughout in 130 cases, or 48 per cent. Albumin was found only on admission or once subsequently in 96 cases, or 34 per cent. Of these cases casts were found in 18, while no casts were discovered in 78. Albumin was found occasionally, but was not constant in 14 cases, or 5 per cent. Casts were present in 6 of these, and in 8 none were found. Albumin was present throughout in 31 cases, or 11 per cent. In 22 of these casts were found, in 9 no casts. It has to be remembered in connection with the finding of casts that in the great majority the urine was alkaline in reaction. The diazo-reaction was positive in 3 out of 91 cases where it was looked for. Bile was found in 2 cases and sugar in 2 cases. Quantitative uric acid estimations were made in some cases without any special departure from normal being found.

Blood.—The average hemoglobin percentage in 77 cases was 65.9 per cent. The average count of the red corpuscles in 69 cases was 4,532,000. These counts were, as a rule, taken when the patient came under observation. Later counts give rather lower counts in some cases, but the drop is not as marked as might be expected. The most marked drop in hemoglobin percentage was of 20 per cent. in twelve days, but with this the number of red cells was practically unchanged. As soon as possible the majority of the patients are put on iron, which may have some influence in diminishing the reduction. The anemic patients are probably better put on iron from the beginning. The average leucocyte count in 83 cases was 11,776. Of these, however, in 29 the count was below 10,000, and taking the average of the remaining 54 cases the count is found to be 14,260 per c.mm. This represents the total of the average count of the leucocytes in these cases, but if the highest leucocyte count in each case be taken the average for the whole is 15,380 per c.mm. In 17 cases the count was over 15,000, and in 4 over 20,000. The highest count obtained in any case was 38,000. A full differential count was made in 11 cases. These were practically all normal and the average count was polymorphonuclears 76 per cent., small mononuclears 13 per cent., large mononuclears and transitionals 8 per cent., eosinophiles 2 per cent., Mastzellen less than 1 per cent. It may be noted that leucocytosis occurred in all the cases of pericarditis where a count was made, but that many of the undoubted cases of endocarditis had normal counts. No constant connection could be traced between endocarditis and leucocytosis.

Miscellaneous Symptoms.—While the patients were under observation there was a variety of rarer symptoms, some of which may be noted. Tonsillitis occurred in 10 cases, chills or chilly sensations in 14, erythema in 8, urticaria in 2, a bullous eruption in 1 and herpes in 6 cases. Delirium was noted in 5, in 4 of which it occurred with the administration of the salicylate and was thought to be due to that. Chorea occurred in 4 instances at the same time as the rheumatism. Severe abdominal pain occurred twice without any evident cause. Both the patients recovered. In one there was marked leucocytosis. One may possibly ask if the severe abdominal pain in rheumatism is comparable to that sometimes seen in gout, as in a case reported at this meeting by Dr. Futcher. Double parotitis occurred in 1 case with recovery. There was some swelling of the tonsils. The condition of the heart was doubtful and it was impossible to say that there was endocarditis. The possible etiology of the parotitis is interesting in comparison, for example, with the same complication in pneumonia where an endocarditis is usually stated to be present. Iritis in one eye occurred in only one instance.

Subcutaneous Fibroid Nodules.—These were found in 4 cases, or 1.5 per cent. It is interesting to note that in the series from St. Thomas' Hospital only 9 instances were found in 997 cases, which is slightly under 1 per cent. Comparison between the figures of the two hospitals does not warrant any definite conclusion, but it is certainly surprising to find that these nodules apparently occurred as frequently in our experience as in one of the London hospitals, and this despite the fact that we have comparatively few children admitted to the wards. At St. Bartholomew's, during a period of six years for which records could be found, there were 16 instances among 662 cases, which gives a percentage of 2.4.

Nervous Complications.—Delirium occurred in 5 cases, in 4 of which apparently with the administration of salicylates, and in the remaining case with pericarditis. It was not due to high temperature in any case. It was in all active in character. Coma and convulsions did not occur. Chorea was associated with the attack of rheumatism in 4 cases. These were all children aged 14, 12, 8 and 6 years. In the first two there was definite endocarditis, and while the latter two are included in the group of "doubtful" cardiac cases, it is probable that they also had endocardial involvement. Only one had chorea previously. There was only one patient who showed symptoms of meningitis. This was a boy aged 12, who was admitted in his first attack. His mind was clear. There was marked rigidity of the neck muscles and the chin could not be brought near the sternum. There was no marked retraction and Kernig's sign was not typically present, although a suggestion of it was noted on both sides. The condition persisting, lumbar puncture was done and 40 c.c. of clear fluid obtained. Cultures from this were negative. The condition persisted for nearly two weeks. A second lumbar puncture gave 15 c.c. of clear fluid. During this time the leucocytes varied from 14,500 to 36,000 per c.mm. There was irregular fever varying from 99 to 105. He recovered after a protracted attack.

Pulmonary Complications.—These were comparatively few in number. In a number of cases some dulness was noted, usually at a base, and with this some blowing

breath sounds, but no tubular breathing. This occurred in several of the cases with pericarditis. Of true lobar pneumonia apparently only one case is recorded. In this the pneumonia was double and associated with both endocarditis and pericarditis. One patient was just convalescent from pneumonia when the attack of rheumatism began. Pleurisy was not of common occurrence. In the 16 cases with pericarditis it was present only in 3, while a pleuro-pericardial rub was heard in 3 others. Severe bronchitis occurred once, and also pulmonary hemorrhage with pulmonary tuberculosis in one case.

Duration.—The average stay of the patients in the hospital for the whole series was 26.4 days. The average duration of the attack for the whole series was 38 days, which rather supports the idea that "six weeks" is one of the essential points in the treatment of acute rheumatism. This, of course, is longer than the average stay in the hospital, as many had been ill for some time before admission, often without treatment.

Relapses.—It is difficult to say definitely what constitutes a relapse in acute rheumatism. If by a relapse we mean a return of the symptoms after a period during which they were completely absent, there were 12 cases in this series, or 4.4 per cent. But if the term is applied to cases in which the symptoms partially subside, to be followed by a period of recrudescence or exacerbation, it is most difficult to estimate the number. There were many prolonged cases with exacerbations, and it would be very hard to know where to draw the line, which to call relapses and which recrudescences.

Cultures.—It is disappointing to report that our results throughout were practically negative, cultures from the joints, the blood and the urine yielding nothing positive. Cocci were grown in cultures from the tonsils. In one case the colon bacillus was obtained from the urine. The results have some negative value, especially in reference to the absence of streptococci and staphylococci from the cultures. All cultures made in the line of the work of Achalme were quite negative.

TREATMENT.

This will be referred to very briefly. The patients, of course, are kept absolutely at rest, are usually put on a milk diet and given large quantities of water, preferably alkaline. They wear flannel and are between blankets. The usual custom is to give the sodium salicylate in doses of 15 grains every two or four hours for one or two days or until the pain is relieved. Then oil of wintergreen in doses of 15 drops four times a day is usually substituted. With this the potassium salts are given in doses sufficiently large to render the urine alkaline. The local treatment of the joints usually consist in the application either of lead and opium lotion or of the oil of wintergreen. The latter we have found especially helpful. Fixation of the joint was frequently employed. Special conditions receive indicated treatment. Pain was the most frequent of these. One of the coal-tar products or morphia was most often used for this. The majority of the patients are put on iron at some period of the treatment. The special treatment of the cardiac cases has been referred to before.

DIAGNOSIS.

It is instructive to note the conditions which we have most often mistaken for acute rheumatism. This mistake we should say is much more frequently made than the error of taking rheumatism to be something else. Of polyarticular conditions gout has been the most difficult disease to distinguish. In four cases which afterwards were proved to be gout we mistook the polyarticular manifestations for those of acute rheumatism. This is a mistake, the possibility of which has probably not been sufficiently impressed on the profession of this country as most of us regard gout as being relatively infrequent and forget that the acute polyarticular form may be very difficult to distinguish from acute rheumatism. The age, sex, occupation and habits of the patient are all important in making a diagnosis of gout. In the absence of tophi, probably the systematic examination of the urine will be of much assistance.

The acute form of arthritis deformans may be often a cause of difficulty in diagnosis. Several instances of arthritis deformans were admitted to the hospital with the diagnosis of acute rheumatism. Here, as is well known, the differential diagnosis may be most difficult. Probably changes in the joints, especially the small joints, which are very apt to remain after the acuteness of the attack of arthritis deformans is over, are one of the best aids in making a diagnosis. The previous history and the presence of other suggestive signs of arthritis deformans are sometimes of help. The multiple gonorrheal arthritis, of course, frequently offers difficulties in recognition. All cases with atypical features are always carefully examined with the possibility of gonorrheal origin in mind. It is well to have a suspicious attitude of mind toward all cases of doubtful arthritis. We have regarded several cases as acute rheumatism which were afterwards proved to be gonorrheal arthritis. One case is of rather especial interest. It was that of a woman who was near the full term of pregnancy. She was admitted to the medical wards with a multiple arthritis which we thought was rheumatic. Before delivery she was transferred to the maternity ward, and after the birth of the child cultures made from the uterus yielded gonococci. The various forms of septic arthritis probably give most difficulty in children.

Of the monarticular conditions the gonorrheal arthritis may give difficulty, but the mistake most often made was in distinguishing between the rheumatic and acute tuberculous joint. The tendency was rather to regard monarticular rheumatic joints as tuberculous than the contrary. In a recent case in which the only joint involved was the hip, all the ordinary signs of tuberculous involvement of that joint were present. We regarded the case as one of tuberculosis until with the appearance of subcutaneous fibroid nodules there were symptoms in the other joints. The patient subsequently came under observation with a second well-marked attack of acute rheumatism. The monarticular form of arthritis deformans is rarely likely to lead to error.

MORTALITY.

Of the 270 cases only 3 died in the hospital, which equals 1.1 per cent. The St. Thomas series gave exactly the same rate, and that from St. Bartholomew's 2.2 per cent. All the fatal cases had endocarditis and pericarditis, or one might better say carditis. One died on the 13th day of the disease, the second on the 30th day with aortic and mitral endocarditis and pericarditis with effusion, and the third on the 37th day with aortic and mitral endocarditis and pericarditis. All were in the second attack.

This figure—1.1 per cent.—is small, but it does not represent the actual mortality from the disease. Of many of this series it may be said that the end is not yet. Most diseases are given their full due in the mortality returns, but acute rheumatism is an exception. The books would have to be kept open too long, and it might be 1910, 1920 or 1930 before the returns of the acute rheumatism of 1901 could be completed.