

## FEVER IN CHRONIC ENDOCARDITIS.

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THE mechanics or physics of cardiac valvular lesions have been very thoroughly studied and discussed, but, except in a certain group of cases which have been called malignant or ulcerative or infective, the other clinical features of the malady have been very generally neglected, though French<sup>1</sup> has written a most interesting article on the course of fever in certain cases of endocarditis. It is certainly forced and arbitrary, far from scientific, and hardly at all helpful—perhaps misleading—to divide cases of chronic valvular lesions into the two groups, the purely mechanic and the malignant. I have frequently been impressed in the wards of the hospital by cases of chronic endocarditis without evidence of complications, in which the fever has been a striking symptom, but in which the course of the disease could in no sense be called malignant. It may be suggested that these febrile cases without evidences of secondary lesions are infective, a suggestion which may represent the truth, but which in the present state of our bacteriological knowledge is largely theoretical and hardly helpful. In the hope of learning some facts as starting points for a partial clearing up of this subject, I have gone over the records of all the cases admitted to the Presbyterian Hospital between April, 1897, and March, 1905, which were put down as endocarditis either primary or secondary, including those called malignant endocarditis.

The total number of histories studied was 1093, or, viewing the different histories of a patient admitted more than once as making but a single history, 972. Of these 71 were discarded either because they were evidently fresh and first attacks (9 cases), or because the patient's stay in the hospital was so brief that the records were quite incomplete (41 cases), or because on reading the histories and records of autopsies the diagnosis seemed not to have been justified (21 cases).

This leaves 901 cases, which I have divided into five groups:

1. Those in which the temperature did not exceed 100°, 316 cases.
2. Those with a temperature exceeding 100°, and in which there were rheumatic articular symptoms, 131 cases.
3. Those with a temperature exceeding 100° and showing petechial or other hemorrhagic eruptions, 23 cases.
4. Those with a temperature exceeding 100° and presenting clear evidence of complications other than articular rheumatism or hemor-

<sup>1</sup> The Practitioner, 1904, vol. Lxxviii, p. 753, The Temperature and Course of Infectious Endocarditis.

rhagic eruptions, complications which would readily explain the presence of fever, 207 cases.

5. Those with a temperature exceeding 100°, but without clear evidence of any complication sufficient to account for the elevation of temperature, 291 cases.

In these statistics patients admitted at different times have some of them been classed in more than one group.

In drawing these distinctions of temperature a rare or occasional passing of the limit was not considered.

1. In only 316 cases of the 901, that is about one-third, did the temperature remain below 100°. In these cases it is interesting to note that 168 (53 per cent.) gave distinct histories of previous attacks of rheumatism or chorea, and while in the hospital 28 (9 per cent.) had symptoms of articular rheumatism or chorea:

Mild rheumatism . . . . .	14 cases.
Severe rheumatism . . . . .	9 "
Chorea . . . . .	5 "
	<hr/>
	28 cases, 9 per cent.

There were also 4 cases showing petechial eruptions, and 1 with purpuric eruption.

It is interesting further to see that in many of these patients complications were observed either clinically or postmortem, which might have been expected to produce more elevation of temperature—viz.:

Acute pericarditis . . . . .	3 cases.
Dry pleurisy . . . . .	6 "
Pulmonary tuberculosis . . . . .	3 "
Pulmonary tuberculosis (doubtful) . . . . .	3 "
Infarction of the lung . . . . .	2 "
Tonsillitis . . . . .	1 "
Parotitis . . . . .	1 "
Cholecystitis . . . . .	1 "
Chronic colitis . . . . .	1 "
Infarction of the spleen . . . . .	1 "
Chronic gastritis and pancreatitis . . . . .	1 "
Periurethral abscess . . . . .	1 "
Femoral phlebitis . . . . .	1 "
Ulcers of the legs . . . . .	1 "
Hemiplegia . . . . .	3 "

2. The patients who suffered with distinct symptoms of articular rheumatism while in the hospital, and whose temperatures ranged above 100°, were 131 in number, or 20 per cent. of the febrile cases. Of these 109 (17 per cent. of the febrile cases) showed no further complications. Compare this percentage with the 9 per cent. of afebrile cases which had symptoms of articular rheumatism. In a considerable proportion of these cases the rheumatic symptoms were slight and yet the fever was high, and one of the interesting facts elicited by this study is that patients with chronic endocarditis and with rheumatic symptoms in the joints may have a high degree

of fever. Acute articular rheumatism by itself may of course produce high fever, but I believe from the study of these cases that chronic endocarditis with articular rheumatism is apt to be associated with a considerably higher degree of fever than is rheumatism without endocarditis, and that this should be borne in mind in estimating the seriousness of cases of markedly febrile endocarditis with joint symptoms.

These rheumatic febrile cases have been divided into three groups according to the elevation of temperatures, the dividing lines being  $101.5^{\circ}$  and  $103^{\circ}$ .

In these 109 cases the fever was: (a) of the first degree ( $100.1^{\circ}$  to  $101.5^{\circ}$ ) in 42 cases; (b) of the second degree ( $101.6^{\circ}$  to  $103^{\circ}$ ) in 36 cases; (c) of the third degree (above  $103^{\circ}$ ) in 39 cases.

In 4 additional cases there was chorea besides the rheumatism; 2 with fever of the first degree and 2 with fever of the third degree; and in 1 case there was chorea without rheumatism, the fever being of the third degree.

The remaining cases gave evidence of other complications besides rheumatism.

3. Those showing petechial or other hemorrhagic eruptions and whose temperatures rose beyond  $100^{\circ}$  were 23 in number. In 13 of the cases the eruption was called petechial, in 10 hemorrhagic. Blood cultures were made in 12 cases, with negative results in 8 cases; positive in 4.

The micro-organisms found in these 4 cases were in 1 case the pneumococcus, in 1 case the streptococcus pyogenes, and in 2 cases the staphylococcus pyogenes aureus. All of these 4 cases with positive cultures died in the hospital.

The range of temperature in these cases and the high mortality are shown in the following table:

TABLE I.

Summary.	Cases.	Deaths.
1. Maximum temperature $100^{\circ}$ - $101.5^{\circ}$ barring an occasional rise	2	1
2. Maximum temperature $101.6^{\circ}$ - $103^{\circ}$	4	3
3. Maximum temperature $103^{\circ}$ or more	17	15
Total febrile cases	23	19

Autopsies were made in 7 cases, all revealing an endocarditis of different degrees of severity (see Table III.); in 2 cases a focus of infection, in 1 a septic uterus, and in the other a pelvic abscess.

4. The fourth group, in which there were complications other than articular rheumatism or chorea and hemorrhagic eruptions, and probably sufficient in themselves to have caused the elevation of temperature, were 207 in number; 32 per cent. of the febrile cases; 23 per cent. of all the cases.

The most frequent complications were lobar pneumonia, acute pericarditis, acute pleurisy, cerebral embolism, thrombosis or

bemorrhage, pulmonary tuberculosis, acute tonsillitis, phlebitis, typhoid fever, colitis, and bronchopneumonia.

TABLE OF COMPLICATIONS IN THIS GROUP.

	Cases.	Temperature.		
		100.1°-101.5°	101.6°-103°	Over 103°
Rhinitis . . . . .	1	—	—	1
Tonsillitis . . . . .	12	2	6	4
Laryngitis . . . . .	1	1	—	—
Influenza . . . . .	1	1	—	—
Otitis media . . . . .	3	1	1	1
Mastoiditis . . . . .	1	—	—	1
Acute pleurisy . . . . .	22	4	5	13
Empyema . . . . .	3	—	2	1
Cancer of the pleura . . . . .	1	—	—	1
Lobar pneumonia . . . . .	37	—	—	37
Bronchopneumonia . . . . .	6	—	2	4
Pulmonary tuberculosis . . . . .	13	5	2	6
Acute pericarditis . . . . .	20	3	5	22
Gastroenteritis . . . . .	1	—	—	1
Colitis . . . . .	6	3	1	2
Hypertrophic cirrhosis of the liver . . . . .	1	—	—	1
Cholecystitis . . . . .	1	—	1	—
Cancer of the peritoneum . . . . .	1	—	1	—
Purulent pyelitis . . . . .	1	1	—	—
Nephritis, acute exacerbations . . . . .	4	3	—	1
Uremia . . . . .	1	—	—	1
Abortion . . . . .	2	1	—	1
Carcinoma uteri . . . . .	1	—	—	1
Gonorrhoea . . . . .	2	—	—	2
Mastitis . . . . .	1	1	—	—
Meningitis . . . . .	1	—	—	1
Tumor of the brain . . . . .	1	—	—	1
Cerebral embolism, thrombosis, or hemorrhage . . . . .	23	8	2	13
Delirium tremens . . . . .	1	1	—	—
Superficial ulcers and gangrene . . . . .	6	3	—	3
Abscesses and cellulitis . . . . .	10	2	2	6
Erysipelas . . . . .	3	—	—	3
Phlebitis . . . . .	9	3	2	4
Periostritis . . . . .	1	—	—	1
Fracture . . . . .	1	—	—	1
Typhoid fever . . . . .	7	—	—	7
Malarial fever . . . . .	6	—	—	6
Incision of the leg . . . . .	1	—	—	1
Phlebotomy . . . . .	3	1	—	2
Aspiration of the chest . . . . .	6	—	4	2
Tapping abdomen . . . . .	4	—	4	—

These four operations at the end of the list are included because they were in each of these instances followed by a sharp and unexpected rise in temperature.

5. We now come to the cases in which there was an elevation of temperature beyond 100° without any marked complication to account for it. Such cases I find amount in number to 291. It occurred, then, in 32 per cent. of our cases. It is not to be assumed that this percentage would hold with all cases of chronic endocarditis outside of as well as within the hospitals, for undoubtedly those

who are feverish are, if other things are equal, more likely to come into the hospital than those who have no fever. Still, the large proportion of 32 per cent. is certainly striking.

In none of these cases were there symptoms of articular rheumatism during the patients' stay in the hospital.

I have divided them into three groups, as in the last series, according to the degree of fever, the dividing lines being 100°, 101.5°, and 103°.

Cases with fever above 100° without apparent cause: (a) 100.1° to 101.5°, 172 cases, 19 per cent. of all our cases; (b) 101.6° to 103°, 66 cases, 7 per cent. of all our cases; (c) above 103°, 53 cases, 6 per cent. of all our cases.

(a) These cases, 172 in number, gave no frank signs of major complications, but in a few instances there were suggestions of slight complications as follows:

Infarction of the lungs . . . . .	12 cases.
Bronchopneumonia . . . . .	2 "
Tuberculosis . . . . .	7 "
Pleurisy . . . . .	8 "
Pericarditis . . . . .	1 "

In 1 of the cases cultures made from the blood developed pure growths of staphylococcus pyogenes aureus. There were slight indications of pleurisy in 1 case, but no other indication of complications.

In 15 cases of this group (V. A.) autopsies were made, and in 11 the autopsy as well as the clinical picture revealed nothing which would have been apt to produce fever unless simple passive congestion of the viscera can do so. In 4 cases, however, though the signs and symptoms during life suggested no complications, some were found postmortem as follows:

1. Acute colitis, acute pleurisy, and cerebral thrombosis.
2. Pleurisy with effusion.
3. Cholecystitis, portal thrombosis, and acute peritonitis.
4. Lobar pneumonia and acute pericarditis.

(b) The cases with fever reaching 101.5°-103° without apparent cause number 66.

(V. B.) Of these cases 8 came to autopsy. In only 1 of these was any lesion found outside of the heart likely to cause fever. In that case there was the appearance of a chronic dry pleurisy and a thrombosis of one vertebral artery.

(c) The last 53 cases with temperatures above 103°, as they are the most interesting, I have divided into three sub-groups:

1. Cases in which this high degree of fever was not long continued, 14 cases, 1½ per cent. of all our cases.

(V. C. 1.) In 5 of these autopsies were made, and in only 1 was any complication found which would be likely to raise the temperature. In that case there was an acute pericarditis.

## THACHER: FEVER IN CHRONIC ENDOCARDITIS

TABLE II.

	Cause of fever not explained.												
	I.		II.		III.		V. A.		V. B.		V. C. <sup>1</sup>		
	Cases.	Perct.	Cases.	Perct.	Cases.	Perct.	Cases.	Perct.	Cases.	Perct.	Cases.	Perct.	
Temperature not above 100°, 316 cases, 35 per ct. of total.	168	53	58	75	16	69	88	51	34	54	14	16	23
Previous history of rheumatism	53	17	14	10	8	35	39	23	11	16	6	6	4
Single attack or a few mild attacks	75	24	66	45	5	21	35	21	15	22	16	6	5
Repeated attacks or very severe attacks	53	6	20	15	8	18	11	6	6	8	4	2	1
Repeated severe attacks	20	6	4	3	0	0	2	1	2	3	2	1	1
Chorea	168	53	98	75	16	69	88	51	34	54	28	9	10
Total	28	9	131	100									
While in hospital 28 (9%) had symptoms of arthritis	14	5	57	65									
Mild rheumatism or chorea	9	3	40	30									
Severe rheumatism	6	2	4	3									
Chorea	1	0.7	1	0.7									
Erythema multiforme	1	0.7	1	0.7									
Erythema nodosum	1	0.7	1	0.7									
Tonsillitis	1	0.7	1	0.7									
Total	28	9	131	100									

Cause of fever not explained.

V. C. subdivided.

Max. temp. of 103° or higher in case of fever not being classified under 6 per ct. total.

1<sup>st</sup> 2<sup>d</sup> 3<sup>d</sup> Cases. Cases. Cases.

Max. temp. 102° to 103° cause of fever not being clear, 66 cases, 7 per ct. total.

Max. temp. 102° to 101° occurring on a higher than usual day, 19 per ct. total.

Cases. Per ct. Cases. Per ct. Cases. Per ct.

Total.

Cases. Per ct. Cases. Per ct. Cases. Per ct.

Urine:	136	43	53	33	14	60	82	47	82	48	24	...	0	5	10
Albumin less than 5% . . .	60	10	12	9	5	21	56	...	17	25	10	...	4	7	8
Albumin 5% or more . . .	106	34	29	22	15	65	100	58	87	65	28	...	7	10	11
Case hyaline and granular	18	0	2	1	1	4	9	3.5	4	5					
Case hyaline and granular with casts	11	...	1	9.7	...	...	3								
or with blood															
No record of urinary excretion															
Leukocytes:															
10,000	9	...	8	...	2	...	11	...	4	...	6	...	9	2	8
10,000 to 14,000 . . .	10	...	14	...	4	...	19	...	5	...	0	...	1	2	4
15,000 to 19,000 . . .	5	...	9	...	5	...	7	...	4	...	0	...	2	8	4
20,000 to 29,000 . . .	4	...	4	...	4	...	4	...	4	...	1	...	0	9	1
30,000 or more . . .	2	...	1	...	9	...	...	...	1	...	3	...	9	2	1
Liver:															
Probably enlarged . . .	23	7	9	9	2	9	23	18	0	8	4	...	2	9	2
Edge less than 2 inches below	21	8	0	4	2	9	17	9	0	8	6	...	1	1	3
More than two inches below border of ribs in right axillary line	45	11	4	3	5	21.8	47	27	23	34	18	...	6	9	2
Spleen:															
Probably enlarged . . .	7	2.3	3	2	9	9	6	2.9	1	1	2	...	...	1	1
Probably not enlarged . . .	9	2.3	0	4	0	20	15	3	6	9	5	...	...	...	4
Mildly congested . . .	32	10	7	5	2	9	27	15	16	23	12	...	8	5	4
Fluid in pleura . . .	106	54	30	22	2	9	59	52	26	39	21	...	9	5	7
Signs of congestion . . .	8	9	3	2	2	9	...	...	4	5		...	9	5	7
Blood-stained sputum . . .															

† V. total, 291 cases, 82 per cent. of total.

‡ Suggestion of slight complication.

† Three of these cases had two rheumatic complications.

‡ Fever not high long.

† Above 100°. Prolonged high fever with no indication of complication.

TABLE III.

	Total cases.	Died in hospital.	Per cent.	Autopsies.	Known to have died after leaving.	Known to be still living.
I. . . . .	316	51	16	19	17	123
II. . . . .	131	16	12	7	4	123
III. . . . .	25	23	80	7	1	0
IV. . . . .	207	83	40	35	8	10
V. . . . .	231	117	40	36	19	123
V.a . . . . .	172	60	34	15	14	123
V.b . . . . .	62	27	40	8	2	1
V.c . . . . .	53	30	56	13	2	1

TABLE IV.—The Valves at Autopsy.

	I.	II.a	II.b	II.c	Total II.	III.	IV.a	IV.b	IV.c	Total IV.	V.a	V.b	V.c	Total V.	Total.
Large vegetations with ulceration	2	--	--	3	3	2	--	--	1	1	1	--	2	2	11
Sclerosis with ulceration	3	--	--	--	--	--	--	--	--	--	--	--	--	3	3
Large vegetations without ulceration	1	1	--	--	1	1	2	1	4	7	--	--	--	1	10
Small vegetations	1	--	--	--	--	2	--	--	--	1	1	1	1	5	5
Small vegetations with sclerosis	5	1	1	--	2	2	1	1	9	11	3	2	2	7	27
Marked sclerosis of valves	4	--	--	1	1	--	--	3	4	7	5	6	5	16	23
Slight sclerosis of valves	3	--	--	--	--	--	3	1	5	9	5	0	3	8	20
Total . . . . .	19	2	1	4	7	7	6	6	23	35	15	8	13	36	104

I. Temperature not over 100°.

II. " over 100°, with joint symptoms.

III. " over 100°, with petechial or other hemorrhagic eruption.

IV. " over 100°, with complications explaining fever.

V. " over 100°, without complications explaining it.

a. " 101.1° to 101.5°.

b. " 101.6° to 103°.

c. " over 103°.

TABLE V.—Blood-culture Cases.

Groups.	Negative.			Positive.					
	Died.	Living.	Total.	Strept.	Staph.	Pneu.	Difst.	Living.	Total.
I. . . . .	0	0	0	--	--	--	--	--	0
II. . . . .	7	11	17	1	--	--	--	--	17
III. . . . .	7	1	8	1	1	--	4	--	12
IV. . . . .	6	5	11	--	1	2	2	1	14
V. . . . .	3	7	10	1	2	2	5	1	15
V.a . . . . .	0	0	0	--	1	--	1	--	1
V.b . . . . .	0	4	4	--	--	--	--	--	4
V.c . . . . .	3	3	6	1	1	2	4	--	6
Total . . . . .	22	24	46	2	5	5	11	1	58

Four of these 58 "blood-culture" cases appear in two groups, and 1 case appears in three, reducing the actual total to 52.

<sup>1</sup> Discharged almost moribund. Staph.



2. Cases in which there was a suggestion of moderate complication, 16 cases, 2 per cent.; these suggestions pointed toward:

Possible consolidation in . . . . .	4 cases.
Possible tuberculosis in . . . . .	1 "
Infarction of the lung in . . . . .	7 "
Pleurisy in . . . . .	1 "
Acute bronchitis in . . . . .	2 "
Infarction of the spleen in . . . . .	1 "

In only 1 of these cases was there an autopsy. In this no complication was discovered postmortem beyond general passive congestion of the viscera and dropsy.

3. Lastly, cases in which this high temperature was prolonged without any symptoms or signs indicating complications, 23 cases, or 2½ per cent. Autopsies were made on 7 of these, and in only 2 were there found complications likely to produce fever. In these 2 cases there were:

1. General miliary tuberculosis.
2. Acute meningitis.

The above figures show the frequency of fever in chronic endocarditis, the frequency of its various degrees, and its comparative frequency under certain conditions. Table II. shows the frequency of certain clinical features in some of the groups into which we have divided the cases. We can here see whether a rheumatic history, urinary changes, enlargement of the liver, etc., are more frequent in the afebrile cases, in the rheumatic febrile cases, or in the febrile cases without rheumatism or other complications.

Regarding the mortality among the patients of the different groups, the reports from those who left the hospital alive have been very incomplete, having been received from only about one-fourth of them, but I will give the statistics as far as they are available. (See Table III.)

We notice here that the highest immediate mortality is in the febrile cases with petechial or other hemorrhagic eruptions. Next, but far less fatal, are the febrile cases with important complications other than rheumatism, and the febrile cases without complications. Far the mildest, as regards mortality, are the afebrile cases and the febrile cases with rheumatic symptoms. It is surprising to see that the latter, the febrile rheumatic cases of chronic endocarditis, are less deadly than the afebrile cases. This may be due to the fact that the pains drive into the hospital patients whose hearts are not very much affected.

From Table IV. we can see that the clinical course of the fever is not always determined by the character of the endocardial lesion. Of the 21 cases in which autopsy discovered large vegetations, with or without ulceration, 4 did not go above 100°, and 4 others did not go above 101.5°. The 3 cases in which sclerosis with ulceration of

the valves was noted were all afebrile. Of the 36 uncomplicated febrile cases in which autopsies were made, only 3 had large vegetations (these 3 showing ulceration), 7 had small vegetations and sclerosis, 2 small vegetations alone, 16 marked sclerosis, and 8 slight sclerosis. Of the 13 autopsy cases with high fever, above 103° without complications, 2 had large vegetations with ulceration, 2 small vegetations with sclerosis, 1 small vegetations alone, 5 marked sclerosis, and 3 slight sclerosis, showing the much greater frequency of sclerosis than vegetative changes in cases with high fever.

Table V. shows the results of cultures from the blood.

The cases whose temperature curves follow, with very brief statements of the main features of the cases, will show the great variety to be met with in the course of fever in chronic endocarditis. In some it is an extreme intermittent fever (the septic type); in others it has long waves, it may be of a week or several weeks (typhoid type); in others it is fairly steady, and in others, again, extremely irregular. Instances will be seen where high and prolonged fever of whichever type is followed by improvement, occasionally by a long period of fair health.

From this review we see that:

1. A large proportion of hospital cases of chronic endocarditis, even when uncomplicated, have fever.
2. In many this fever is of high degree and long continued without apparent cause.
3. Neither the presence nor the degree of fever in these cases follows strictly the variety or degree of endocardial lesion.
4. The febrile cases with hemorrhagic eruptions are extremely fatal.
5. The febrile uncomplicated cases are about as fatal as the cases with marked complications and very much more fatal than the afebrile cases.
6. Nevertheless, some of these cases with high and prolonged fever get better.
7. The line marking off the group of malignant endocarditis is very uncertain.
8. The rheumatic febrile cases of chronic endocarditis are as favorable as the afebrile cases, or possibly more so.

CASE I.—R. G., male, aged eighteen years. Never had rheumatism, but often tonsillitis. Dates heart symptoms from six years ago, when tonsils were removed. Dyspnoea and forcible heart action since then. In hospital five months. Long waves of typhoid-like fever from three weeks to a few days in length, and occasional isolated high shoots. Four loud murmurs. A little hypertrophy of the heart. No Widal reaction; six tests. Leukoocytes, 13,000, 16,000. Blood cultures negative three times. No typhoid bacilli obtained from urine. Spleen never palpable. In good health since July, 1904; that is, for the last nine months; working fairly hard as

a cook. No symptoms except a little pain below apex of heart. The murmurs still distinct.

CASE II.—B. B., female, aged fifty years. History of considerable rheumatism. Heart symptoms twenty-two years. In hospital one month. Irregular intermittent temperature for two weeks, after that below 100°. Leukocytes below 7000, counted four times. No complications. Discharged in much improved condition.

CASE III.—J. B., female, aged twenty-two years. History of slight rheumatism. Dyspnoea and oedema for four months. In hospital two months with prolonged high intermittent fever. Loud mitral systolic and aortic diastolic murmurs. No chills or sweating. No malarial organisms found (two examinations). Leukocytes, 18,000, 7000, 11,000. On admission petechial spots, rather old, and murmurs over both lower extremities. Comfortable most of the time while in the hospital. Blood culture negative. No complications except three large intestinal hemorrhages in one day. Discharged improved.

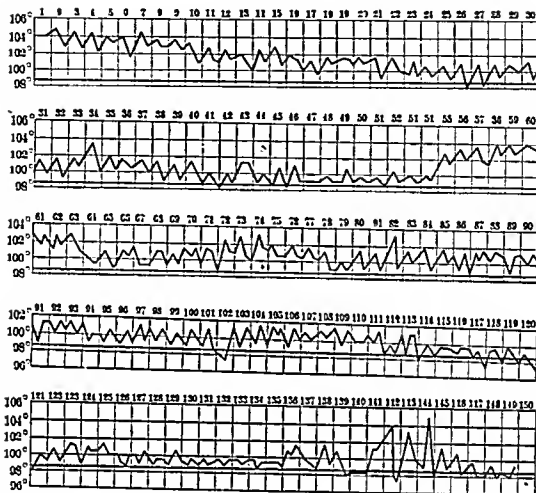
CASE IV.—A. M., female, aged twenty years. No previous history of rheumatism; palpitation for one year. Two weeks before admission to the hospital vaccination took; one week later chilly. On admission a double murmur was heard at the apex, and later a diastolic at the base and the pulse became "Corrigan." The heart was much enlarged. She was in the hospital about six weeks; the first four days the temperature ranged between 102° and 103.6°, and then gradually came down to normal at the end of three weeks. The liver and spleen were a little enlarged. The leukocytes were 8000, 18,000, and 8000. Two blood cultures were made with negative results. The Widal test was negative on three trials. Ten months later she returned with a gastrointestinal disturbance and the same cardiac condition, except that the mitral presystolic murmur was not heard. She was in the hospital two weeks, but only on the first day did the temperature exceed 99.5°. The leukocytes were 5000.

CASE V.—L. T., female, aged thirty years. History of severe rheumatism, but none in hospital. Mitral presystolic and systolic murmurs. Albumin, 30 per cent.; no complications. In the hospital five weeks, with frequent irregular bouts of fever, though only four times above 102°. The last two weeks only once above 100°. Discharged not improved.

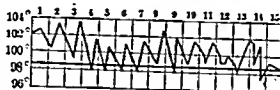
CASE VI.—C. K., male, aged ten years. History of considerable rheumatism, but none while in the hospital. Cardiac symptoms for five years. In hospital five weeks with irregular, moderate, intermittent fever. There were no complications. He seemed to improve, but died two weeks after leaving the hospital.

CASE VII.—I. H., female, aged thirty-nine years. No history of rheumatism. No rheumatism while in the hospital. In hospital two months, with irregular, usually moderate elevation of tempera-

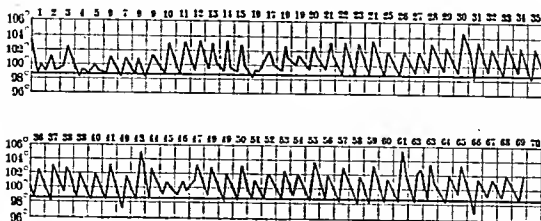
CASE I.



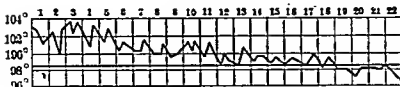
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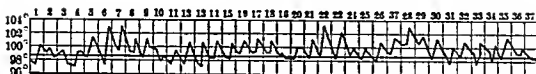
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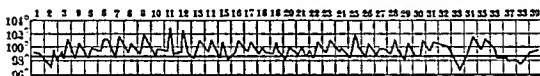
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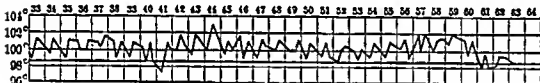
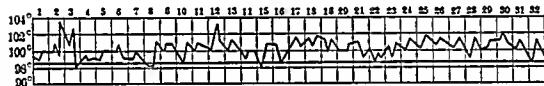
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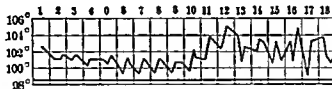
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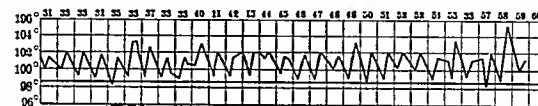
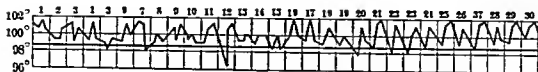
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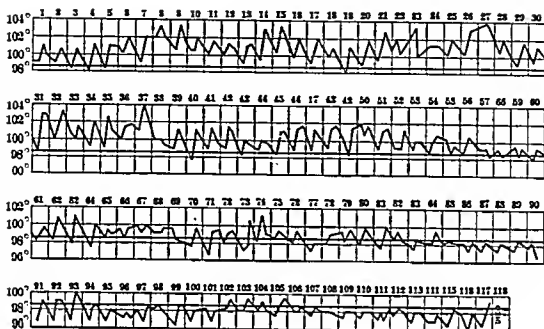
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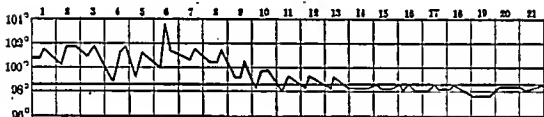
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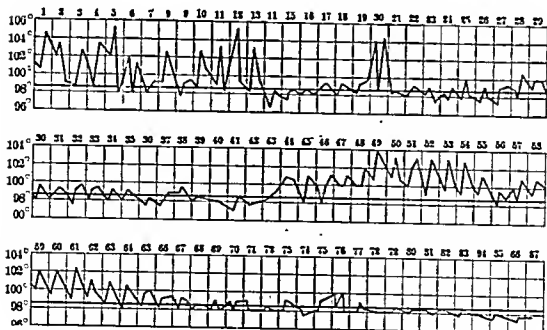
CASE X.



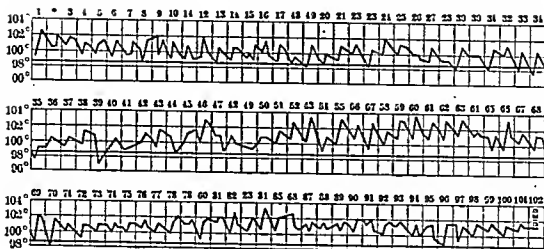
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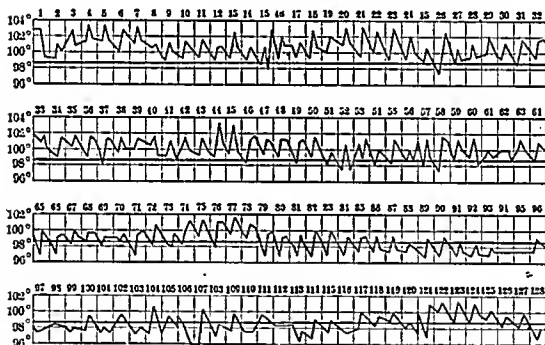
CASE XII.



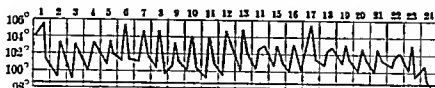
CASE XIII.



CASE XIV.



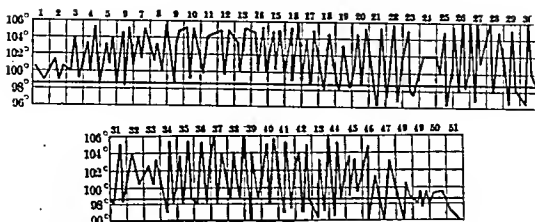
CASE XV.



CASE XVI.



## CASE XVII.



ture. No complication. Aortic and mitral systolic murmurs. Died. Autopsy showed sclerotic valves, especially the mitral and tricuspid. No complications to explain the fever.

CASE VIII.—E. L., female, aged thirty years. No history of rheumatism. In hospital two and one-half weeks. Aortic systolic and mitral systolic murmurs. Albumin up to 30 per cent. Temperature uneven, with remissions generally moderate. No complications. Discharged unimproved.

CASE IX.—M. B., female, aged nineteen years. Only doubtful history of rheumatism. No previous cardiac symptoms. In hospital two months, with moderate, rather irregular, remittent, and intermittent temperature. No Widal reaction. No tuberculin reaction. Leukoocytes, 7500. Urine normal. No complications. Discharged unimproved.

CASE X.—M. W., female, aged fifteen years. History of considerable rheumatism. In hospital four months, with very irregular, remittent temperature the first two months, after that, rarely fever. Albumin up to 30 per cent. Symptoms apparently the same during the febrile and the afebrile periods. No complication while in hospital. Died. No autopsy.

CASE XI.—J. K., female, aged forty-five years. No history of rheumatism. Cardiac symptoms for two months. In hospital three and one-half weeks. Mitral systolic murmurs. No joint symptoms. Moderate, irregular temperature for ten days, and normal for ten days. Discharged improved.

CASE XII.—B. M., female, aged eighteen years. History of considerable rheumatism. Cardiac symptoms for two years. No rheumatism in hospital. Mitral presystolic and systolic murmurs and a diastole at apex. No complications. In the hospital three months. During the first three weeks very irregular, high, intermittent temperature; later, a remittent wave of about three weeks. The rest of the time mostly normal, including the last three weeks in the hospital. Discharged and was in fair health for three months, but died seven months after leaving the hospital.



CASE XIII.—L. J., female, colored, aged thirty-nine years. Cardiac symptoms eight months; well-marked rheumatic history. In hospital three months. Temperature of long, irregular waves, with marked remissions. Mitral systolic and presystolic murmurs. Albumin up to 60 per cent. No complications. Died. No autopsy.

CASE XIV.—M. B., female, aged twenty-five years. History of much rheumatism. In the hospital four months. Double murmurs at apex; later, double murmurs at base. Albumin up to 25 per cent. Numerous crops of purpuric eruptions, the last was two days before death, but the temperature, which was irregular and remittent the first two months, was below 100° most of the last two months. The autopsy showed much sclerosis of aortic, mitral, and tricuspid valves, with only slight granulation.

CASE XV.—W. B., female, aged nineteen years. History of slight rheumatism; none in the hospital. In the hospital four weeks, with a high, fairly regular, deeply remittent temperature. Mitral systolic and presystolic murmurs. An attack of hemiplegia two days before admission. No petechiæ. Blood culture obtained growth of pneumococcus. Autopsy. No fungating masses on the valves, but a fringe of vegetations on the mitral valve and extending to the adjacent ventricular surface. Pneumococci were obtained from autopsy cultures.

CASE XVI.—A. C., male, aged thirty-four years. In hospital twenty-four days with a petechial eruption and high, not markedly remittent temperature. History of slight rheumatism. Cardiac symptoms only a few days before admission. Systolic murmur at apex. Edge of spleen palpable. Widal test negative; many trials. Blood cultures negative; three times. Died. Autopsy showed a "wet brain" and slight thickening of the mitral valves.

CASE XVII.—E. G., female, aged thirty-eight years. History of slight rheumatism; also some slight joint pains while in the hospital. No previous cardiac symptoms. In the hospital seven weeks, with very high intermittent fever, usually two waves daily. Double murmur at base; systolic at apex. No petechiæ. Autopsy. On one aortic cusp a polypoid mass-like granulation tissue, with surface slightly irregular, but without ulceration. Infarction of the spleen.

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#### ON THE USE OF OPIUM IN MYOCARDITIS, WEAK HEART, AND DILATED HEART.

By J. H. MUSSEY, M.D.,  
OF PHILADELPHIA.

THERE are sound clinical reasons for the belief that opium is a tonic in cardiac debility. Who has not seen the flagging heart of shock induced by pain or other depressive measures brought up