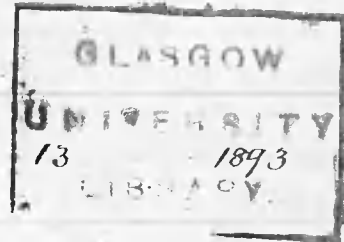


An excellent thesis; full of thought &  
close exact observation, fully supported by  
reading, and with precise references to  
authorities. M.B.



On the severer forms of Scarlet Fever,

with special reference to

Antipyretic Methods of Treatment.—

I have to state that the following thesis  
has been composed by myself and that  
it is founded upon work done by my-  
self since graduation, as M.B., C.M., in 1886.

John W. Carlaw

Oct. 1893.

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On the severer forms of Scarlet Fever,  
with special reference to  
Antipyretic methods of Treatment.

So much has been written, within recent years, on Scarlet Fever and especially on the treatment of that disease, that one cannot but feel, in approaching the subject, how great is the risk of merely echoing an oft-repeated tale. In order to avoid this risk as far as possible, it is proposed in the present paper to limit discussion in the manner indicated in the title; and it may conduce to clearness if it is stated at the outset that the main argument will have reference to the extent of the applicability of antipyretic methods of treatment to cases of scarlet fever. It will be attempted to show that such treatment is by no means suitable for all cases, or indeed for all severe cases, and it is accordingly considered to be necessary as a preliminary to indicate some scheme of classification, so that one may be in a better position to decide in what types of scarlatina active measures are called for, such as are commonly grouped under the term "antipyretics".

Antipyretic treatment in general has had its ups and downs, both in this country and on the continent. Even among its earlier advocates we do not find unanimity of opinion, and soon after Currie's death we have Jackson publishing (in 1808) a second edition of his "Outline of the history and cure of Fever, endemic and contagious", with, as an appendix, a "Reputation of the strictures made by the late D. Currie on that part of the work which

relates to the affusion of cold water on the surface". Historical details may be found in full in Liebermeister's article, in v. Ziemssen's Handbook of General Therapeutics,<sup>1)</sup> and in D. Barr's recent volume on typhoid fever.<sup>2)</sup> It is unnecessary to repeat these details here, but it may be noted that as applied to scarlet fever the treatment by cold water never seems to have fallen into such disfavour as it did in connection with the continued fevers. That it was misused in scarlatina as in other fevers does not admit of doubt. This was recognized by Currie<sup>3)</sup> himself and we have it on Graves'<sup>4)</sup> authority that "at the time that cold affusions were used in the treatment of scarlatina much mischief was done by their indiscriminate employment and this added to the general feeling of dislike towards them". Though the original expectations formed of the use of cold had thus failed in scarlatina as elsewhere, it is noteworthy that in 1824 (about 40 years before Braund's work on "Die Hydrotherapie des Typhus") there was published in Vienna a treatise by A. Frölich, entitled "Gründliche Darstellung des Heilverfahrens in entzündlichen Fiebern überhaupt, und insbesondere im Scharlache, mittelst der Anwendung des lauwarmen, kühlen und kalten Wassers, durch Waschungen, Bäder und Uebergießungen". Trousseau is very distinctly enthusiastic

1) English Translation, vol. II, 1855, p. 10.

2) The Treatment of Typhoid Fever, by James Barr, M.D., 1892; see p. 7.

3) Medical Reports on the Effects of Water, cold and warm, as a remedy in Fever and other Diseases, by James Currie, M.D., F.R.S., vol. II, p. 76 of second edition, 1805.

4) Clinical Medicine, New Sydenham Soc<sup>y</sup>, 1884, vol. I, p. 188.

in his recommendation of cold water in the treatment of scarletina<sup>1)</sup> but insists upon the necessity for selecting suitable cases. In a lecture of February 21<sup>st</sup>, 1862, S. Gardner<sup>2)</sup>, in speaking of the treatment of scarlet fever, says that he has not used cold affusions but does not disapprove of them, especially in children, when the reaction is high and they give comfort; and he adds that he has used sponging with cool or tepid water and found it beneficial. Coming to the '70's we have in the Lancet quite a number of papers (by C. Albutt and others) recording benefits derived in scarlet fever from various forms of application of cold. S. Allan's "Notes on Fever Nursing" were published in 1879 and at that date, when the British school was still very chary of active antipyretic methods in continued fevers, he strongly recommended the cold pack for scarlet fever when the temperature is high and there are severe head symptoms.

While scarlet fever has thus occupied a somewhat unique position in never having been decidedly considered non-suitable for antipyretic treatment, it does not seem any the less necessary to examine carefully this suitability, especially in view of the more modern theories of the fever process. The factors at work in the different febrile diseases have, no doubt, much in common but, at the same time, these different diseases have many individualities. S. Barris work<sup>3)</sup> has thrown much new light on the treatment of typhoid fever but it is very much to be questioned if his method and arguments can be

1) Clinical medicine, New Sydenham Soc<sup>ty</sup> Translation, 1869, vol. 7, p. 196 et seq.

2) Clinical medicine, 1862, p. 195.

3) Op. cit.

applied to fevers in general; he does not indeed claim that they should. Again, the hyperpyrexia of acute rheumatism has been considered for itself and nothing has been lost thereby; not to go beyond our own city, we have only to refer to the successful case of treatment by cold shown by S. West. Robertson at the Pathological and Clinical Society in October, 1891, and to the discussion which then took place upon the subject.<sup>1)</sup>

The following paper, then, will attempt to deal with the question as to how far antipyretic methods are applicable to the specific infectious disease, scarlet fever, and we shall now proceed to the preliminary classification of cases mentioned as desirable; in making this classification the opportunity will be taken of insisting upon one or two details which seem to have found insufficient notice in recognised text-books.

On account of the great variability of the disease it is admitted to be a task of some difficulty to name distinct classes for the grouping of cases of scarlatina. This difficulty may be judged from the fact that Thomas in his article in v. Ziemssen's Cyclopaedia of the Practice of Medicine<sup>2)</sup> spends almost four pages to a discussion of this question of grouping. No rigid classification will be attempted here; all that is desired is to indicate, generally, the different ways in which scarlatina may prove severe and for

1) See Transactions Glasg. Path. and Clin. Soc., vol. IV, p. 6. See also Wilson Fox, On the Treatment of Hyperpyrexia as illustrated in acute articular rheumatism, by means of the external application of cold, 1871; also, Discussion in Clinical Society of London, reported in the British Medical Journal, 1888, vol. I, p. 697; ∇ ∇

2) English Translation, vol. II, 1875, pp. 234-237.

5

This purpose the simplest plan will be by reference to a series of 630 cases of scarlatina which it was my good fortune to have under my care in Belvidere between September 1888 and July 1890. The great majority of these cases conformed to the type "Scarlatina simplex" and may be at once set aside. Of the others it need hardly be said that their mode of "severity" varied greatly. This will be at once evident from the following note of the immediate cause of death in the fatal cases:-

Total Deaths = 50 = 8%.

Of these -

- 17 were attributed to renal complication;
- 5 " " " pulmonary complication;
- 4 " " " laryngitis;
- 2 " " " pyæmia;
- 1 was " " cardiac disease with embolism;
- 1 " " " rheumatism, chorea &c;
- 1 " " " tubercular meningitis;
- 1 " " " purpura hæmorrhagica;
- 1 " " " post-scarlatinal diphtheria.

33 are thus accounted for, and there remain

17 cases - cases of "bad scarlet", in which complications such as the above were practically absent.

"Complications" is a word which it is very hard to define and in scarlet fever it is especially difficult to differentiate "complications" from the "symptoms" of the attack. This difficulty has been felt in drawing up the preceding list - and it was felt also in a paper, formerly published,<sup>1)</sup>

<sup>1)</sup> Glasgow Medical Journal, 1891, vol. 7, p. 329.

dealing with rheumatism and chorea as "complications".<sup>1)</sup> But, while "there is no other disease of childhood in which so many fatal complications occur as in scarlet fever,"<sup>2)</sup> we wish now to leave "complications" as far as possible aside. We have then two principal modes in which scarlet fever shows its severity, though even here we sometimes have a combination of symptoms. These two modes are characterised—(A) by the severity of the attack on the throat and neighbouring parts, & (B) by the prominence of serious nervous phenomena.

Of the 17 fatal cases already left unaccounted for by "complications",  
 11 belong to (A)  
 4 6 . . . . (B)

(A). The 11 were, practically, what is called *Scarlatina anginosa* and had very bad throats, most of them with discharge from the nose and all of them with swollen necks, in some instances the swelling becoming distinctly "brawny". The rash was sometimes delayed and "irregular" and the patients were usually restless, sometimes distinctly delirious; in 4 of the 11, convulsions occurred just before death and in another there was inversion of the thumbs, this & Cheyne-Stokes breathing being noticed just at the close. These nervous phenomena raised the question of serious involvement of the kidneys or might sometimes have been considered the result of the high temperature; but, apart altogether from their cause, nervous phenomena, while occurring in cases of this group, were super-imposed upon an alarming throat-and-neck-condition and did not appear to constitute the essence of the disease as in group (B).

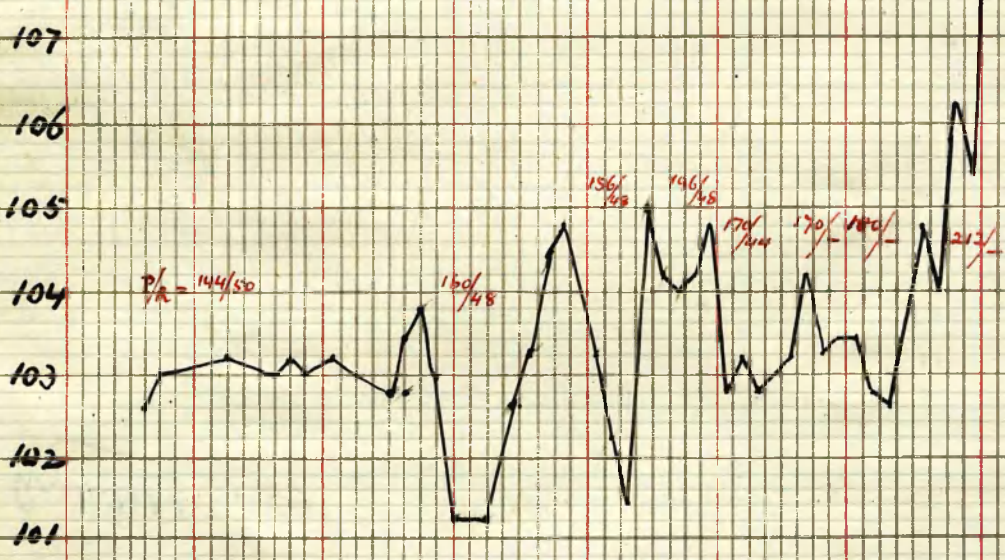
1) Compare parts marked on pp. 3, 4 & 8 of copy appended.  
 2) Lewis Smith in Archives of Pediatrics, 1891, p. 911.



Feb. Day	18	19	20	21	22	23	24	25
	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	<u>IX</u>	<u>X</u>	<u>XI</u>
URINE.	AGBUMEN, TRACE OF,							
oz.	16 1/2	15	11 1/2	Not measured				

109  
BOWELS. Diarrhea → → →  
(Green offensive motions)

Death at 1:40 a.m.



The following may be taken as cases illustration of group (A):-

CASE I. Severe scarlet fever with bad throat, discharging nose, "brawny" neck, etc.; death on 11<sup>th</sup> day.

George A-; aet. 5 1/2 years, admitted February 18<sup>th</sup>, 1889.

History:- Became ill on 15<sup>th</sup> with vomiting, abdominal pain, sore throat, and headache; rash seen on 17<sup>th</sup>.

(Feb. 18) On admission:- Sparse "scarlet" rash on body and limbs; throat congested; glands of neck much enlarged and tender; tongue furred; chest clear. To have a drink of hot toddy; a hot dry pack; pilocarpine, 1/16 gr. every 4 hours. Local treatment to neck and throat.

Evening:- The rash is better out after the pack but is not bright; to be sponged repeatedly for restlessness.

Feb. 19:- Ulceration on right tonsil; local treatment modified. Rash still scattered and not bright; stop pilocarpine. Urine shows a trace of albumen. (This trace continued till the close).

Feb. 20:- Right side of neck much more swollen; slight nasal discharge - not foul; tongue very dry. Rash disappearing. Abdominal pain and diarrhoea (foul green motions). Still restless; to have chloral. Stimulant also ordered and milk to be boiled and lime water added.

Feb. 21:- Right side of neck "brawny"; foul discharge from both nostrils.

Feb. 22:- Neck apparently softening in centre of swelling. Pupils unequal; right larger than left; both react to light. Skin dry; disquamating.

Feb. 23:- Incision into neck; no pus. Fluid return through nose. Con-junctivae injected. To have head lotion (evaporating).

Feb. 24:- Tissues seen yellowish-white in incision opening. Mouth very sore. Voice husky, because of continued strutting (in delirium).

Nov. 15

15

16

DAY

IX

X

12246810 24681

110

109

108

107

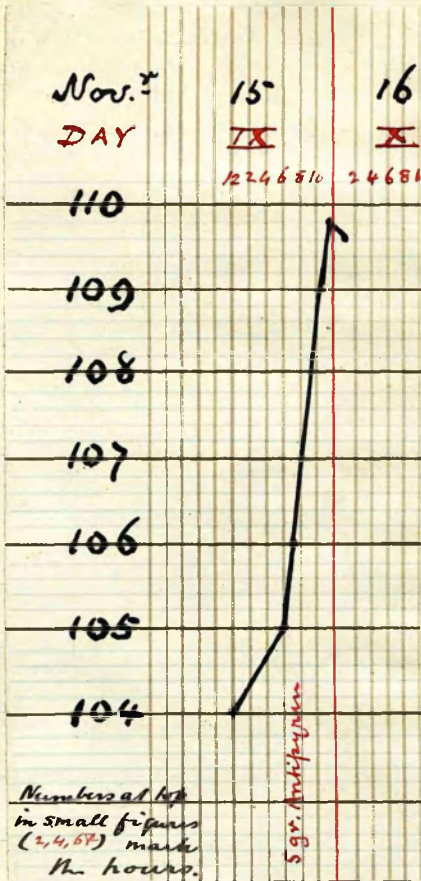
106

105

104

Numbers at top  
in small figures  
(2, 4, 6, 8, 10) mark  
the hours.

Sgt. Antipenko



Skin dry; spongings being continued.

Feb. 25. Died. No post-mortem examination permitted.

CASE II. Severe scarlet fever with bad throat, "brawny" neck, &c; death on 10<sup>th</sup> day; post-mortem examination of neck.

Wm P.; aet. 2 1/2 years, admitted November 15<sup>th</sup>, 1888.

History:- Illness began on 7<sup>th</sup> with sickness, vomiting and sorethroat; rash seen same day; swelling of left side of neck since 12<sup>th</sup>.

(No. 15) On admission:- Traces of rash; slight dyspnoea; throat congested; tonsils enlarged and ulcerated; swelling on left side of neck and left cheek, pitting on pressure behind the ear and with surface glistening in part; chest clear; pulse fairly good.

W have local treatment to neck and throat.

7.45 p.m.:- 5 gr. antipyrin.

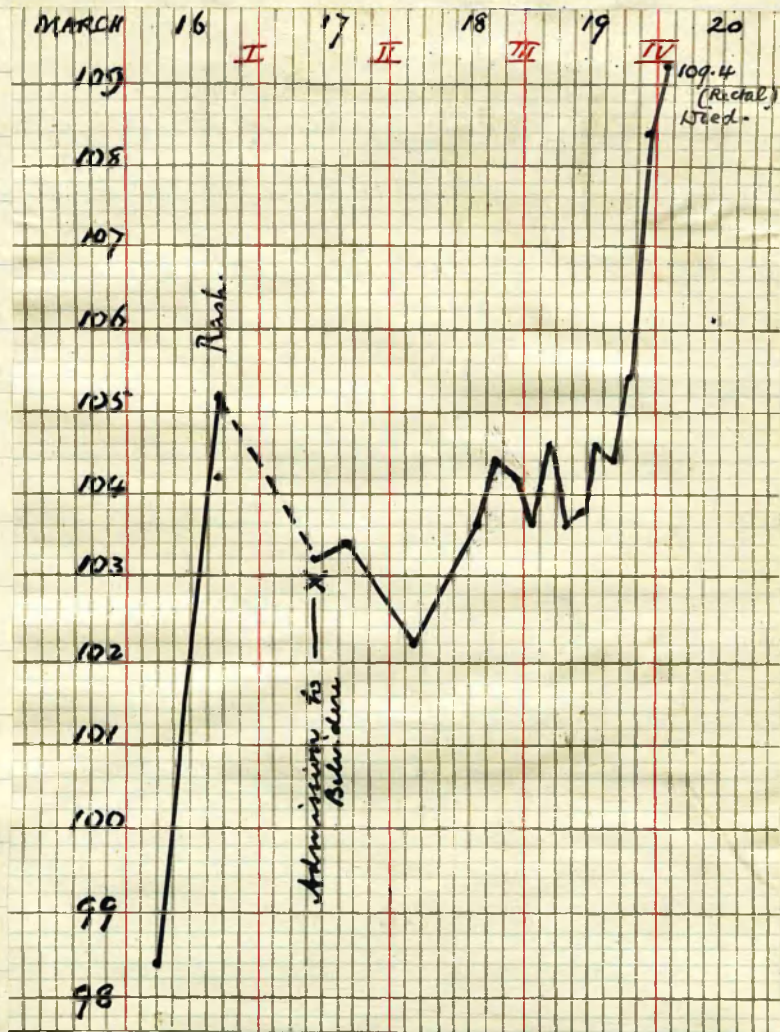
11.20 p.m.:- Convulsion; tried chloral and sponging of limbs.

Nov. 16:- Died at 12.15 a.m.

Post-mortem examination (restricted to neck):- Tough, infiltrated tissue under skin, covering and separating the muscles; much enlarged lymphatic gland; oedema of tissues; no pus.

(B). The remaining six fatal cases were rather such as would be called "scarlatina maligna", although that term has received a somewhat varied significance.<sup>1)</sup> In them the throats were not very badly affected but in all there was an unsatisfactory

1) Cf. Henoch, Lectures on Children's Diseases, New Sydenham Soc. 4<sup>th</sup> Edition, 1889, vol. 7, pp. 223, 224, 237; also Joynt, in Lancet, 6<sup>th</sup> June, 1891.



eruption, while the persistent vomiting and the collapse, described as of nervous origin<sup>1)</sup> were among the symptoms, whose further nature may be gathered from the abstract reports of CASES III and IV which follow:

CASE III. Severe scarlet fever (surpical), with slight affection of the throat but with exceedingly <sup>or, rather, inconstant</sup> ill-developed rash, persistent vomiting, violent delirium 7<sup>2</sup>; death on 4<sup>th</sup> day.

Wm P-; aet. 13 years, admitted March 17<sup>th</sup>, 1890.

History:- Has been a patient in the Royal Infirmary, suffering from gluteal abscess. Temperature rose suddenly yesterday evening and a scarlatinal rash was then noticed (but see Mar. 18)

(Mar. 17) On admission:- Diffuse "scarlet" rash; tongue pale, furred; throat congested; glands in neck hardly felt; heart's sounds normal.

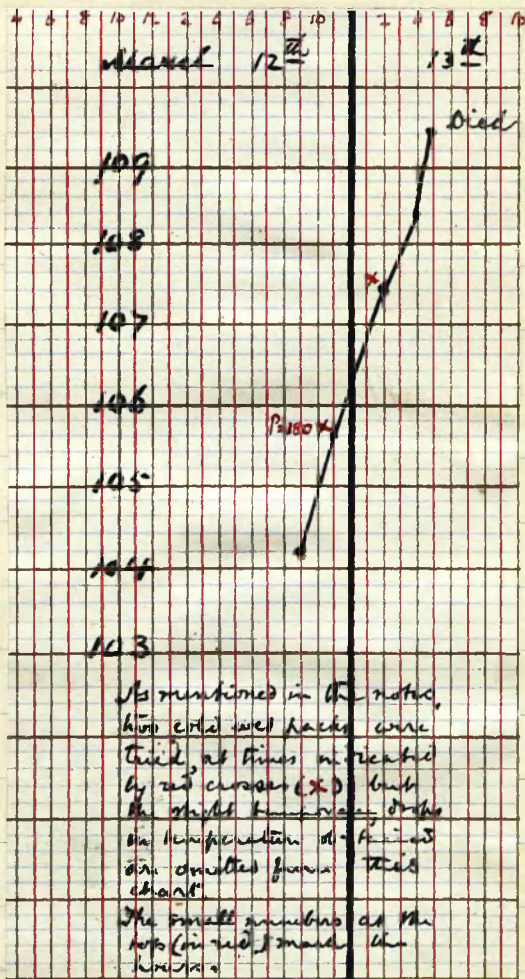
Mar. 18. 1.30 p.m.:- Rash is rather dusky on trunk & has disappeared from the legs and on the arms has left only petechial parts. The throat is no worse and there is only slight swelling in the neck. The bowels are loose, the motions being green and offensive. Urine contains trace of albumen. Patient is inclined to be sick. He was restless during last night and was sponged with tepid water and acetic acid; is now to have sponging with tepid water and mustard.

7 p.m.:- Still very restless and, through getting out of bed (in ward), was found with cold extremities; pulse very small and about 160 in the minute.

7.30 - 8.30 p.m.:- Hot mustard pack.

Mar. 19:- After the pack, mustard sponging was continued during the

1) Cf., e.g., Trousseau, op. cit., vol. II, pp. 177, 196; Graves, op. cit., vol. I, p. 362.



night, with the result that there is on the legs today a tolerably good "scarlet" rash, with a "measly" rash on the arms; on the trunk the rash is still livid and partly petechial. Patient has been very delirious and sleepless all night, in spite of continued tepid sponging of the trunk and limbs, with occasional cold applications to the head, and several 10 gr. doses of chloral. His eyes are injected; pulse still about 160; bowels still loose; sickness very troublesome, the vomited matter being sometimes "bilious". He has poultices over the loins & stomach.

Evening:- At D. Man's suggestion, sulphonal was tried, 20 gr. being given at 4 p.m. and again at 6, but it likewise failed to procure quiet.

Mar. 20:- Died at 12.35 a.m.; temperature (rectal), 109.4.

No post-mortem examination permitted.

CASE IV. Severe scarlet fever with collapse, vomiting, &c.; death within 48 hours.

Isa Mae — ; aet. 9 years, admitted at 9 p.m., March 12<sup>th</sup>, 1889.

History:- Became ill yesterday with vomiting, headache and sore throat; rash today; bowels have been loose; abdominal pain.

(Mar. 12) On admission:- Collapse; throat is affected but condition there moderate; some indistinct mottled rash over trunk; abdomen is not prominent; tongue has slight fur; there is "bilious" vomiting, also diarrhoea with offensive motions; conjunctivæ are injected; pupils are contracted.

To have - warmth; stimulant; mustard poultice to stomach; milk boiled and with lime water; local application to throat.

Later. (See chart). Pulse became slower in the first pack but the second pack did not agree (sickness & faintness) and patient had (after 15 minutes) to go back to bed.

Mar. 13<sup>th</sup>:- Died at 4.30 a.m. No post-mortem.



without in any way claiming that an absolute line can be drawn between the two groups, (A) and (B), it is considered convenient for practical purposes to distinguish thus the cases (A) in which a grave prognosis is first suggested by the condition in and around the throat from those (B) in which the danger all along is from the attack on the central nervous system. On comparing the groups as regards age, it is found that for (A) we have the limits - 1 year to 5 1/2 years, average = 3.1; for (B) - - - - - 5 years to 13 years, average = 9.1. The ages of the (B) cases were thus as a rule much higher than those of the (A) cases but in spite of this the (B) cases were cut off much sooner.

Day of death, for (A), varied from 5<sup>th</sup> to 10<sup>th</sup>, average = 8.2

for (B), " " 2<sup>nd</sup> to 13<sup>th</sup>, average = 5.8;

but the (B) case dying on the 13<sup>th</sup> day (See CASE VIII) had his life apparently prolonged by a persistent use of cold packs; omitting him we have the average day of death for (B) = 4.2. On either calculation it will be seen that, as a rule, the disease was much more rapidly fatal when it assumed the (B) type. The numbers available are of course too small to found much upon but they are at any rate instructive so far as they go.

It may be seen from the charts already submitted that in both groups, (A) and (B), very high temperatures were met with; and it is further to be remarked that in both there occurred some albuminuria, which was regarded as "febrile". In both of them, too, (in at least 6 of (A) and in 3 of (B)), the patients suffered from diarrhoea, of the importance of which symptom it seems desirable to take

a rather more extended notice. It has been mentioned by various authorities<sup>1)</sup> that when diarrhoea occurs in scarlet fever it indicates a bad prognosis; and, besides the fact of the motions being loose, their character is described by some writers as altered in other respects; but in no one work (unless on page 264 of Thomas's article) have I been able to find a complete account of the alterations and some do not mention them at all. In many of our fatal cases the motions were particularly observed and are noted as loose, green and offensive, with an appearance suggestive of vegetables (cabbage and spinach) chopped up and mixed with water; sometimes, of course, particles of undigested milk were distinguishable. Diarrhoea was recorded in 54 cases out of the 630 (= 8.6%) and in 33 of the 54 it was of the type above described. In 3 of those 33, the diarrhoea was associated with serious renal complication, but in the others (30) it was one of the symptoms of a violent initial attack, whether of the (A) or the (B) variety; 14 of the 30 died of the initial attack or of some early "complication."

These numbers indicate that, taking the cases over all, diarrhoea does not occur so frequently in scarlet fever as, for example, in measles; still, that scarlatinal patients are liable to a diarrhoea of serious import from a prognostic point of view. It is no doubt to this form of diarrhoea that Graves<sup>2)</sup> refers; he describes it as purely nervous in origin. While by no means doubting the probability of this origin, the question may be raised whether there is any condition

1) Currie, *op. cit.*, vol. 7, p. 44; Trousseau, *op. cit.*, vol. 7, pp. 177, 196;

Thomas, *ubi supra*, pp. 264, 280, 289; Hensch, *op. cit.*, vol. 7, pp. 52, 228.

2) *Op. cit.*, vol. 7 p. 361.

of the intestinal mucous membrane to be found to account for it. This question has been answered very decidedly in the affirmative by Harley<sup>1)</sup>, among whose conclusions on "The Pathology of Scarletina" we find "that the condition of the biliary function is such as to lead to an outbreak of diarrhoea; that mesenteritis, and enteritis sometimes general but usually confined to the solitary and agminated glands, exist from the third day and onwards during an attack of Scarlet fever, both being at their acme during the height of the fever, i.e. from the third to the seventh day; that the enteritis is usually latent, but ready to declare its presence upon slight provocation; and that this inflammatory condition of the mesenteric and intestinal glands may persist to the sixty-ninth day." That the prominence of the solitary follicles and of the Peyer's patches, which he describes, is not merely that natural to young subjects is evident not only from its degree but also from the fact that several of his patients, in whom it was found, were adults.

This condition of the intestine ~~was~~ <sup>was</sup> not mentioned in a discussion on the subject in the Royal Medical and Chirurgical Society<sup>2)</sup> (London) in 1864 but it had been described at least as early as 1859 by Deiters<sup>3)</sup>, who is quoted by Thomas in v. Ziemssen's *Cyclopaedia*.<sup>4)</sup> Harley's pathological observations have been recently confirmed by Crooke<sup>5)</sup>

1) The Pathology of Scarletina, and the Relation between Enteric and Scarlet Fevers. Medico-Chirurgical Transactions, vol. LV, 1872, p. 103.

2) Medical Times and Gazette, 1864, vol. 7, p. 102.

3) Deut. Klinik, 1859.

4) English Translation, vol. 7, p. 227.

5) Birmingham Medical Review, 1886, vol. 7, p. 61.

See, also, West's Diseases of Infancy and Childhood, 7<sup>th</sup> Edit., 1884, p. 871

of Birmingham, who says with regard to the follicular enteritis that "in very early fatal cases it may constitute the chief anatomical expression of the disease." In a subsequent part of his paper,<sup>1)</sup> Crooke treats of the histology of the question.

Though we are dealing at present mainly with clinical facts, it may not be out of place to mention that, at Belvidere, appearances, similar to those fully described by Harley and Crooke, were frequently seen. It is to be added, however, that in one case, where the swellings were particularly prominent, there had been no diarrhoea; this is quite in keeping with Harley's<sup>2)</sup> and with Hensch's<sup>3)</sup> statements as to the significance of the swellings, though it rather contradicts Thomas's.<sup>4)</sup> Whatever the connection between the clinical and the anatomical facts may be, it seems to be determined, (1) that in severe cases of scarlet fever (especially such as come early to postmortem) the bowel is in an easily irritated condition; and (2), whether for that reason or not, that severe cases are liable, during the febrile attack, to a diarrhoea of the form above described.<sup>5)</sup> The importance of the latter fact in prognosis has been already indicated and the inference as regard treatment is obvious; purgatives should be avoided and the practice adopted has been to use an enema, if required, in any case whose severity suggested such diarrhoea as likely to supervene.<sup>6)</sup>

1) p. 207.

2) Cf. supra.

3) Op. cit., vol. 7, p. 229.

4) Ubi supra, p. 280.

5) Harley mentions the motions as yellow. Possibly some of the depth of colour at Belvidere may have been from tincture of steel, given with chlorate of potash as routine mixture, but the motions were distinctly green, and not black.

6) Compare caution as to purgatives in S. Quinlan's Clinical Medicine, p. 194.

Coming now to the general question of the treatment of scarlet fever, the first point to be raised is as to there being any "specific" which will neutralize the scarlatinal poison and nullify the disease. Some such claim has been made for various antiseptic drugs, administered internally; thus we find recommended carbolic acid, sulphurous acid,<sup>2)</sup> eucalyptus oil,<sup>3)</sup> salicylic acid,<sup>4)</sup> and biniiodide of mercury.<sup>5)</sup> The last-mentioned has received most notice and is usually associated with the name of Dr. Heringworth, who claimed it as a "true specific" for scarlet fever, capable of aborting the disease and preventing dissemination and sequelae. If all this were established there would be no occasion for other treatment but Heringworth's conclusions have been strongly disputed; a summary of the arguments on both sides may be found in the Medical Annual for 1892, p. 57. From one of Heringworth's later communications (British Medical Journal, 1889), it can be seen that the biniiodide, if used only internally, certainly does not prevent all complications; at Belvidere several of our cases were tried with the drug, following his rules exactly, and neither was the disease aborted nor dissemination checked in any way. Whatever may be the future of the "specific" treatment of scarlatina (by drugs or by an anti-toxine to be yet discovered) it is impossible to say. Meantime we have our cases to treat and we must look elsewhere for help; besides, it is particularly

1) Lancet, 1869, vol.  $\dot{\bar{7}}$ , p. 143; 1887, vol.  $\ddot{\bar{7}}$ , p. 732.

2) British Medical Journal, 1887, vol.  $\ddot{\bar{7}}$ , p. 753.

3) British Medical Journal, 1889, vol.  $\ddot{\bar{7}}$ , p. 921.

4) Keating's Cyclopædia of the Diseases of Children, vol.  $\dot{\bar{7}}$ , p. 574.

5) British Medical Journal, 1886, vol.  $\dot{\bar{7}}$ , p. 859, vol.  $\ddot{\bar{7}}$ , p. 817; 1887, vol.  $\ddot{\bar{7}}$ , pp. 67, 225, 508, 613; 1889, vol.  $\ddot{\bar{7}}$ , p. 1276.

to be noted that Illingworth expressly mentions "malignant cases" as inevitable for the biniodide.<sup>1)</sup>

It has already been stated that the great majority of our cases might be named "Scarlatina simplex"; as such they received "expectant" treatment, the only active interference being by some application to the throat when it was at all sore or even slightly ulcerated. In these simple cases antipyretics were not employed, the fever being of short duration though often sharp while it lasted; when, as often happens even in simple cases, restlessness was troublesome, sponging with tepid water were used with advantage, but about 400 cases can be counted, admitted early in the disease and making good recoveries without any treatment for the initial attack other than "expectant". "Complications" were, of course, treated as they arose and it may be remarked in regard to rheumatism that the only case, in which hyperpyrexia demanded special attention, was so complicated as to render active measures inadvisable. (See appendix, p. 13).

Returning, however, to the severer types of initial attack, it may be recalled that in both groups (named (A) and (B)) persistent high temperatures were noted. Before attempting to answer the question how these are to be met, the further question may be raised - How are they to be explained? This opens up the general subject of the pathology of fever upon which there has been so much varied expression of opinion within recent years. Among others, v. Recklinghausen<sup>2)</sup>

1) British Medical Journal, 1886, vol. i, p. 859; 1887, vol. ii, p. 614.

2) Handbuch der Allgemeinen Pathologie des Kreislaufs und der Ernährung (Deutsche Chirurgie, Lieferung 2 und 3), 1883, S. 469, 507.

M. Foster<sup>1)</sup>, Ord<sup>2)</sup>, Broadbent<sup>3)</sup>, D. Macalister<sup>4)</sup>, and Coats<sup>5)</sup> may all be quoted as teaching that in health and disease the degree of body-heat is, in part at least, dependent upon the action of a nervous mechanism; while even those, who lay stress upon the metabolic Theory as supplemental to the nervous in the explanation of pyrexia, are likely to admit that in hyperpyrexia we have a very serious upsetting of the thermal nervous system. It seems to be generally granted, too, that fever is commonly due to the introduction of a poison into the blood, whether that poison act directly on the tissues (and induce extra metabolism) as well as on the nervous centres, or act through the nervous centres only.

In anguinous scarlatina (group (A)), there is plenty of opportunity of absorption of poisonous matter from the throat, nose,<sup>6)</sup> and thus septic poisoning or even septic infection<sup>6)</sup> may occur; while there is besides in group (A) the specific virus of scarlatina itself, which seems to exist in forms of greater and less "intensity", the most "intense" of all being present in the cases described under group (B) and apparently tending there all along to attack, by preference, the nervous system. Thus it is not surprising, that, in group (A), prolonged pyrexia is a constant phenomenon, or that, in group (B) there is a marked tendency to

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1) Treat-Book of Physiology, 4<sup>th</sup> Edit., 1884, pp. 465, 468.  
 2) Lancet, 1885, vol. ii, pp. 760, 767.  
 3) Quain's Dictionary of Medicine, 1883, p. 510.  
 4) Gulstonian Lectures 1887, and Croonian Lectures, 1888.  
 5) Manual of Pathology, 2<sup>nd</sup> Edit., 1889, pp. 350, 355.  
 6) For distinction, see Coats, op. cit., pp. 285, 286.

hyperpyrexia at a comparatively early stage, especially if we adopt such a view as is expressed by MacLagan - that hyperpyrexia is essentially a "paralysis of inhibition of the functions of organic life, heat inhibition being one of them."<sup>1)</sup> Hyperpyrexia in "malignant" scarlatina might thus be regarded as just one of many nervous phenomena<sup>2)</sup>; but there is the other way of explaining the sequence - by supposing the thermal nervous mechanism to be that primarily attacked by the poison and other systems (nervous and otherwise) to suffer as a result of the high temperature. This latter view, in its application to scarlatina, is adopted by Henoche<sup>3)</sup> and, in its application to fevers in general, is hinted at by Currie<sup>4)</sup> and adopted by Liebermeister<sup>5)</sup>; it seems, however, to be opposed by Macalister<sup>6)</sup> and to be recognised only in a very modified form by Barr.<sup>7)</sup> But even by those of the authors mentioned, who allow as little as possible the direct evils of high temperature, antipyretic methods of treatment are recommended<sup>8)</sup> and, of course, these recommendations are even more strongly urged by the school represented by Liebermeister.<sup>9)</sup>

1) British Medical Journal, 1888, vol. i, p. 697.

2) Cf. Trousseau, Op. cit., vol. ii, pp. 177, 196.

3) Op. cit., vol. ii, p. 224. See also Medical Annual, 1893, p. 461.

4) Op. cit., vol. i, p. 243.

5) Ubi supra, p. 7.

6) British Medical Journal, 1888, vol. i, p. 1374, vol. ii, p. 6.

7) Op. cit., pp. 59, 67.

8) British Medical Journal, 1888, vol. ii, pp. 6, 68-71.

9) Ubi supra, p. 8.



Returning now to the question of the treatment of cases coming under groups (A) and (B), it will be admitted that in those of group (A), (anurians), attention should be specially directed to the conditions in and around the throat. All the assistance possible must be sought from the local use of antiseptics in the manner indicated in recent papers on the subject in the Archives of Pediatrics, to which it may be added, as a point of practical detail, that little bits of the ordinary urethral bougies of eucalyptus and iodoform were found very useful at Belvidere for introduction into the anterior nares. Quinine may be given internally, but not in heroic doses, and tepid spongings will give comfort and allay restlessness to some extent; <sup>more</sup> powerful antipyretic methods were, however, found of little avail - at least there are not the same successes to quote in their support here as will be found under group (B). [On treatment of group (A), see CASE XVI, p. 47].

In group (B) the dangers which have to be combatted are due to the action of the scarlatinal virus on the central nervous system (directly, or as the result of hyperpyrexia, according to the particular view adopted). We know of no means of neutralising this virus; we must, accordingly, attempt to minimise its effects and to sustain the patient until the disease has run its course. Here antipyretic methods come to our aid for some of them at least are claimed to act, not merely by reducing the temperature (and thus removing any possible additional dangers) but also by their effect on the nervous system generally.

1) Lewis Smith, in volume for 1891, p. 909; Jacobi, in current volume, p. 149.

In discussing the applicability of antipyretic methods to scarlet fever, there are certain features of that disease which must be borne in mind. Of these the most important are:—<sup>1)</sup>

I. Tendency to Collapse:— This does not occur in "scarlatina simplex" but it does occur very strikingly in "malignant" cases and has already been mentioned in connection with CASES III & IV.

II. The Rash:— Mild cases of scarlatina have often very little eruption but at the same time authorities are agreed that a suppressed, or delayed rash, or one which is irregular in hue or distribution, is an unfavourable prognostic sign. There is a popular dread of doing anything to hinder the rash "coming out" and this dread does not seem to be without foundation; at all events, it has been adopted, as a rule of medical practice, that the development of the rash in bad cases of scarlet fever should be rather encouraged.

III. The Kidneys:— The renal complication is one of the most serious to which scarlatinal patients are liable but does not usually occur until the third week of the disease; it is, however, occasionally met with earlier, two of our own cases (both boys) having had hæmaturia on admission, on the second and third day of illness, respectively.

These features of scarlatina being, then, kept in view, there may now be considered the means at our command for the reduction of temperature.

They are —

(a) diaphoretics,

(b) "antipyretic" drugs,

and (c) various applications of cold and tepid water.

1) But cf. infra, pp. 31, 43.

(a) Diaphoretics act indirectly as antipyretics by increasing the perspiration and thereby the loss of heat by the skin. They are often very useful in moderately severe cases but as applied to well-marked instances of group (B) they are not only inefficient but may increase the tendency to collapse. Pilocarpine needs especially to be watched in case of its producing sickness (cf. CASES VIII and XIV), as well as on account of its general depressing effect, and should only be used in very small doses. With one of our patients a hypodermic injection of pilocarpine produced alarming collapse and post-mortem examination subsequently revealed a possible partial explanation in the presence of chronic endocarditis; the fact of the occurrence of cardiac disease as a complication of scarlet fever suggests a further reason for caution in the use of depressing drugs.<sup>1)</sup>

(b) Antipyretic drugs have been sometimes employed in scarlatina<sup>2)</sup> and are likely to be thought of specially in "malignant" cases, but they are open to the objection just mentioned for pilocarpine, that they tend to depress. With regard to one of them—phenacetine—I have had evidence, apart from scarlatina, confirming the fear of collapse expressed in a former paper.<sup>3)</sup> It is to be remembered, too, that the majority of scarlatinal patients<sup>are children</sup> and it is a significant fact that three different writers in Keating's Cyclopaedia<sup>4)</sup> all give antipyretic drugs a very qualified recommendation. They have this very obvious disadvantage, which also holds good for pilocarpine,

1) See appendix, p. 8.

2) Archives of Pediatrics, 1891, p. 917; Annals Univ. Med. Sciences, 1888, vol. iv, p. 432; 1891, vol. vA, p. 122.

3) Phenacetine as an Antipyretic, Glasg. Med. Journal, 1888, vol. ii, p. 64.

4) W. Pasteur, vol. i, pp. 434, 435; S. C. Bussey, vol. i, p. 576; R. Bartholow, vol. i, p. 977. See also Hemoch, Op. cit., vol. ii, pp. 237, 238.

that once swallowed they have practically to be left to do their worst, whereas external applications, such as are next to be treated of, can be easily removed <sup>and</sup> any ill effects remedied by warmth.

(c) Various Applications of cold and tepid water. It is essential here to remember that the body does not behave under these applications merely as an inanimate object; this was insisted on by Currie<sup>1)</sup> and has been demonstrated by Ord<sup>2)</sup> by experiments on artificially warmed cadavers, in which he found the reduction of temperature by the cold bath to be much less than the reduction obtained in a hyperpyretic patient. In Currie's<sup>3)</sup> and in almost all subsequent treatises on the subject, discussions may be found as to the action of cold and, as might be expected, there is a considerable variety of opinion expressed. It seems to be generally admitted, however, that the effect produced will depend to a large extent upon the "stage" of the fever, upon the exact temperature of the water, upon the length of time that it is applied and upon the manner of application. Further, it may be taken as determined that, during the fastigium, any cold application to the surface directly abstracts some heat from the superficial parts; that it produces a constriction of the superficial vessels, leading to a hyperæmia of internal parts; that, in spite of diminished frequency of the pulse (cf. infra) an increased "thermogenesis" may thereby occur; that the internal

1) Op. cit., vol. I, p. 70.

2) British Medical Journal, 1888, vol. I, p. 698.

3) Op. cit., vol. I, pp. 226-263, &c.

temperature may thus at first be rather elevated but that subsequent to the withdrawal of the cold, the equalisation of internal and external temperatures may result in a lowering of the body-temperature generally; that, in addition, the central nervous system is influenced, probably chiefly reflexly through the stimulating effect of the sudden chilling of the surface, the "thermotaxic" being stimulated along with other centres; that this stimulation is increased by repetition of the applications; that, in a single application (unless the water be agitated) the effect upon the superficial nerves comes to be rather soothing than exciting and thus that irritation, leading to restlessness, is lessened; that cold is "one of the most powerful of vascular and cardiac sedatives"; that too prolonged application of it will produce collapse and shivering; that, unless thus unduly prolonged, it is followed on its withdrawal by a "reaction" characterised by determination of blood (from the internal organs, perhaps including the central nervous system) to the skin, with increased perspiration. This last point is of great importance, whether it be due to the local action on the superficial nerves or to the stimulation of the "thermolytic" and "thermotaxic" centres. It is one which was especially insisted upon by Currie,<sup>2)</sup> who fully appreciated the importance of the action of the skin in the discharge of body-heat.

The effect of cold water treatment on metabolism seems

<sup>1)</sup> Landis Brunton, Text-book of Pharmacology, Therapeutics and Materia Medica, 3<sup>rd</sup> Edit., 1891, p. 339.

<sup>2)</sup> Op. cit., vol. 7, p. 247, p. 264 et seq., vol. 7, pp. 49, 238.

not yet to be exactly determined. It is true that Schröder<sup>1)</sup> says "that cold baths lessen the excretion of  $\text{CO}_2$  and of urea and delay metabolism as a whole", while Liebermeister<sup>2)</sup> quotes other observations which he construes as at any rate not contradicting this view. On the other hand, v. Richthausen<sup>3)</sup> mentions increase of  $\text{CO}_2$  in baths and suggests that it does not necessarily imply an increased metabolism but only a prodigal discharge (verschwenderische Ausgabe); Macalister<sup>4)</sup>, too, speaks of increased discharge of nitrogen as possibly being only an increased discharge of accumulated nitrogen and not the result of increased metabolism.

Returning, however, to less debatable ground, let us see to what extent cold applications can be considered as conforming to the special requirements of scarlet fever. The danger of collapse in "malignant" cases must not be lost sight of; cold sometimes produces collapse. The superficial anaemia produced by cold is also to be borne in mind as a likely hindrance to the development of the rash; while the determination of blood to internal organs requires special notice in connection with the liability to renal complication. We claim, therefore, that in scarlet fever the external use of cold must either be postponed altogether till the rash is mature or must be used in such a modified form

1) "Ueber die Einwirkung kalter Bäder auf die  $\text{CO}_2$ - und Harnstoffausscheidung beim Typhus", Deut. Arch. f. Klin. Med., Bd. VI, 1869, S. 385.

2) Ubi supra, p. 57.

3) Op. cit., S. 468.

4) British Medical Journal, 1888, vol. II, p. 71.

as to minimise the danger of superficial anaemia; even supposing the rash to be developed the application of cold must neither be so prolonged nor so intense as to lead to the premature disappearance of the rash, to the danger of collapse, or to serious internal congestion. We have thus, for scarlet fever, those very important limitations and it remains now to examine the various forms of application of cold and to see how they conform to the limitations.

(1) Baths—may be either cold ( $60^{\circ}$ - $70^{\circ}$  F.), or tepid (about  $85^{\circ}$  F.), or gradually cooled, according to v. Ziemssen's method.<sup>1)</sup> They have, of course, been specially studied in connection with enteric fever but their use is also recommended for severe cases of scarlatina. Thus, in the Practitioner (1886, vol.  $\bar{7}$ , p. 291) there is a quotation from a French journal recording the use of the bath at  $72^{\circ}$  but the temperature of the water had in subsequent baths to be raised to  $80^{\circ}$  F. Recommendations for severe scarlet fever are chiefly for tepid baths ("not under  $88^{\circ}$  F.")<sup>2)</sup> or for gradually cooled baths.<sup>3)</sup> Hensch expressly mentions the tendency to collapse as the reason for not giving baths at a lower temperature than  $88^{\circ}$  F. and he quotes cases<sup>4)</sup> in which he had known collapse to occur. Though I have had no personal experience of cold baths in scarlet fever, I have seen the cold bath treatment for enteric fever in operation at

1) Centraltbl. f. die med. Wissenschaften, 1866, No. 41.

2) Hensch, op. cit., vol.  $\bar{7}$ , p. 237.

3) Lancet, 1874, vol.  $\bar{7}$ , p. 653; 1875, vol.  $\bar{7}$ , p. 341; also Thomas, in his article in v. Ziemssen's Cyclopædia, ubi supra, p. 305.

4) op. cit., vol.  $\bar{7}$ , p. 238.

a university clinique in Germany, and witnessed the occurrence of very serious collapse, probably not altogether on account of the bath itself but because the authorities of the particular hospital did not employ any such apparatus as is figured by Cayley (at p. 660 of the third edition of Murchison's work), and because the patient was allowed to sit erect in the bath. Remembering, however, the class of cases of scarlatina in which vigorous antipyretic methods are chiefly called for, I can conceive no application of the cold or tepid bath (unless, perhaps, a mere plunge and that would act very much like affusion), which could bring about reduction of temperature without endangering the heart, the rash and the kidneys, though it must be admitted that the authorities quoted as using gradually cooled baths have very convincing cases to cite in support of their contention. On the other hand, v. Ziemssen himself is quoted in the Archives of Pediatrics<sup>1)</sup> as stating that "when patients are in an adynamic condition warm baths and alcohol will be specially serviceable, and cold affusions should be avoided".

(2) The Tank, as recommended by D. Barr for enteric fever<sup>2)</sup>, has not, so far as is known, been tried in scarlatina but it is to be feared that it would interfere with the rash, even though the temperature of the water is sufficiently high to prevent collapse.<sup>3)</sup> As to the kidneys, D. Barr has found their function unimpaired in enteric fever<sup>4)</sup> but it is doubtful

1) 1891, p. 217; reference is to Rev. Mens. des Mal. de l'Enf., Oct., 1890.

2) Op. cit. p. 62 et seq.

3) Ibid., pp. 36, 59, 63, 69.

4) Ibid. p. 74.



if this would hold good for scarlatina.

(3) Affusion. Of this method also I have had no personal experience. It is, of course, the form specially described by Currie<sup>1)</sup> who himself recognised its risks in severe cases, when collapse was threatening or already established.<sup>2)</sup> It is, however, described by Frouse<sup>3)</sup> as being an effective and suitable means for subduing the "serious nervous complications - formidable ataxic symptoms, which occur in "malignant" scarlatina. Although it rather tends to increase the rash<sup>4)</sup>, it is not a form of treatment which recommends itself to patients and their friends and would accordingly be rather difficult to introduce to a ratio-supported hospital. [For local affusion to head, see under (6).]

(4) Packs. Cold wet packs are often recommended as a suitable method of reducing high temperature in young patients and even Liebermeister with his strong leaning towards baths says that "for children particularly, if repeated often enough, the cold pack is perfectly sufficient."<sup>5)</sup> When their mode of action has been considered, it will be apparent why they should be more suitable for use in scarlatina than the forms of application already discussed.

The plan of cold-packing adopted at Belvidere does not differ materially from that described in books on nursing and may

1) Op. cit., vol. 7, pp. 63-67; vol. 7, pp. 40-76.

2) Ibid., vol. 7, pp. 44, 76.

3) Op. cit., vol. 7, p. 206.

4) Frouse, Op. cit., vol. 7, p. 199.

5) Ubi supra, p. 36.

be stated as follows:-

Two beds (m & n) are required and it is best that they should be placed parallel to one another but with their "heads" pointing in opposite directions. Upon one (m) should be laid a Mackintosh sheet and upon that a blanket. The patient, occupying the other bed (n), has all the night-clothing removed without exposure to the air. Meantime a sheet is wrung out of cold water ( $50^{\circ}$  -  $60^{\circ}$  F. according to the season of the year) and then spread quickly upon the blanket lying on bed m. A nurse, standing between the beds, then lifts the patient in her arms, turns to the "right-about", and lays him, naked, upon the cold wet sheet, which is quickly folded over so as to envelope his whole body, except face and neck; the arms may be outside one fold of the sheet and inside of the other; the lower end of the sheet is folded up under the legs and the free edges of the blanket are then rolled round the body and tucked in at each side and at the foot; a second blanket is then laid loosely on the top. Bed n is now prepared; a blanket is spread over it and ~~kept~~ kept warm and a warm bottle is put at the foot. After the patient has lain in the pack for about half an hour, his coverings are quickly removed and he is lifted by the nurse back on to bed n, covered loosely with a blanket and rubbed beneath it with a warm towel; the blankets are then tucked moderately closely round him.

The result of such packing it is hoped to show, from cases to be quoted, is to produce a lowering of the temperature (rectal) and of the pulse, with a marked improv-

ment of the nervous system, the most restless patients almost always going to sleep in the pack. Even though the temperature rises soon again and the symptoms return in all their violence, a repetition of the pack is again followed by favourable results and by continuing the series the tendency to hyperpyrexia is often overcome and the patient makes a good recovery.

How are such results to be explained? Cold packs must act, up to a certain point, just as cold applied in any other way (cf. supra, pp. 22, 23) but there are these special points to be noted; -

The direct abstraction of heat from the surface can be but very slight because the sheet soon becomes warm. "Reaction" occurs very early (while the patient is still in the pack) and perspiration results, the "reaction" being aided by the rubbing which follows. A certain amount of evaporation of the perspiration and of the water on the sheet may take place through the blankets. We have, thus, besides any direct abstraction, increased "thermolysis"; as regard "thermogenesis," it is probable that the restraint of movement will account for a slight reduction as will also the withdrawal of the blood from the muscles and internal organs by the early "reaction." Such at any rate are the explanations given by Hander Brunton <sup>1)</sup>. As regard the lowering of the pulse (as great a drop as from 180 to 130 having been noted), that is commonly acknowledged to accompany a favourable

1) Op. cit., p. 463. See also Stallard in Brit. and For. Med. Chir. Review,

{ Jan. 1847, p. 269.

reduction of temperature and we need only, further, on that point and as regards the nervous symptoms, refer back to p. 23.

How then does cold-packing conform to the conditions laid down for scarlet fever?

Collapse may occur in the pack though it seldom does so; but, if the patient is already collapsed or tending to collapse, his condition will certainly not be improved by cold-packing (compare CASE IV). The possibility of collapse ensuing, especially in "malignant" cases, can never be overlooked and the nurses were always instructed that, if the patient became livid, or sick, or shivery, or faint, he must be at once removed from the pack and have warmth and stimulants.<sup>1)</sup> If in any case the circulation in the legs and feet is defective, they can be left out of the wet sheet. As regards the rash, it is to be noticed that the superficial anaemia produced is of very short duration, so that if the rash has already developed there is not much chance of interfering with it; but if the rash be still undeveloped it would not be wise to risk even a temporary anaemia and the best results have been obtained when, in such circumstances, cold-packing has been postponed.<sup>2)</sup> The kidneys do not run much risk as "reaction" takes place so early and the determination of blood to the skin is so active.

- 1). Instances of this having been required will be found in connection with CASE IV (p. 10) & CASE VIII (p. 38 — see pack marked thus [⊗] on his chart); also CASE IX (p. 39 — see chart, on Jan. 12<sup>th</sup> at 3.15 a.m.).
- 2) Cf. CASES VII (p. 36) and IX (p. 40).

Great care must, of course, in all cold applications be taken against the patients being chilled (rheumatic and respiratory complications being among those of scarlet fever) and it is to be mentioned that in one case (CASE IX, p. 39) laryngitis developed during a course of cold-packing and was possibly to be attributed to it. The disadvantages of packing, however, are not so great as those mentioned for the previous methods and it is not surprising that in scarlet fever it has been found a very useful antipyretic method, especially as that disease is so much one of childhood. There is the other point to be said in its favour, as is ~~pointed out~~<sup>indicated</sup> in Hilton Jaffe and Pegg-Smith's text-book<sup>1)</sup> that there are no practical difficulties in its use such as sometimes come into play in connection with baths.

(5) Spongings are usually given with tepid water (80°-90°F), acetic acid (3℥ to the quart) or something else being <sup>usually</sup> added to assist evaporation. The sponging is done under the bedclothes, without exposure to the air; one limb is sponged and dried, before proceeding further; then another limb, and so on. The direct abstraction of heat by the water cannot be great and there is little time for evaporation; probably the gentle rubbing will be followed by increased loss of heat from the skin but in any case the antipyretic action is not very powerful. At the same time this method has been very strongly recommended by Trousseau<sup>2)</sup> among others, especially for cases

1) Text-book of the Principles and Practice of Medicine, 3<sup>rd</sup> Edit<sup>n</sup>, 1891, vol. 7, p. 172.

2) *Op. cit.*, vol. 7, p. 198.

where it is not politic to adopt stronger measures. There is with sponging practically no danger of producing collapse or of harming the kidneys. Indeed, Hare gives it as one of the "conclusions" of his Essay<sup>1)</sup> on Fever; its pathology, and treatment by Antipyretics that "for wide spread application, to be put in the hands of the inexperienced, to be efficacious and yet quite harmless, cold sponging is the antipyretic remedy par excellence; but even this must be used carefully and with intelligent ideas of its objects and results."

The scarlatinal rash is said to be increased even by the use of plain water sponging<sup>2)</sup> and its development is certainly very much assisted if sponging with tepid water and mustard (one to two table-spoonfuls to the quart) be employed. The obvious advantage of the mustard is that it detaches the blood to the skin.

Besides any antipyretic action, one great advantage of sponging is its soothing effect. The patients often drop off to sleep during its progress; those who are old enough tell of the comfort it gives them and younger patients give indirect testimony of the same nature by their demand to be "washed". These demands are often very wearing out to the attendants but yielding to them was always found to be followed by good results and "every half-hour" was well considered too often at Bellevue to have sponging repeated if the patient was wakeful.

1) Boylston Prize Essay, Harvard University, July, 1890.

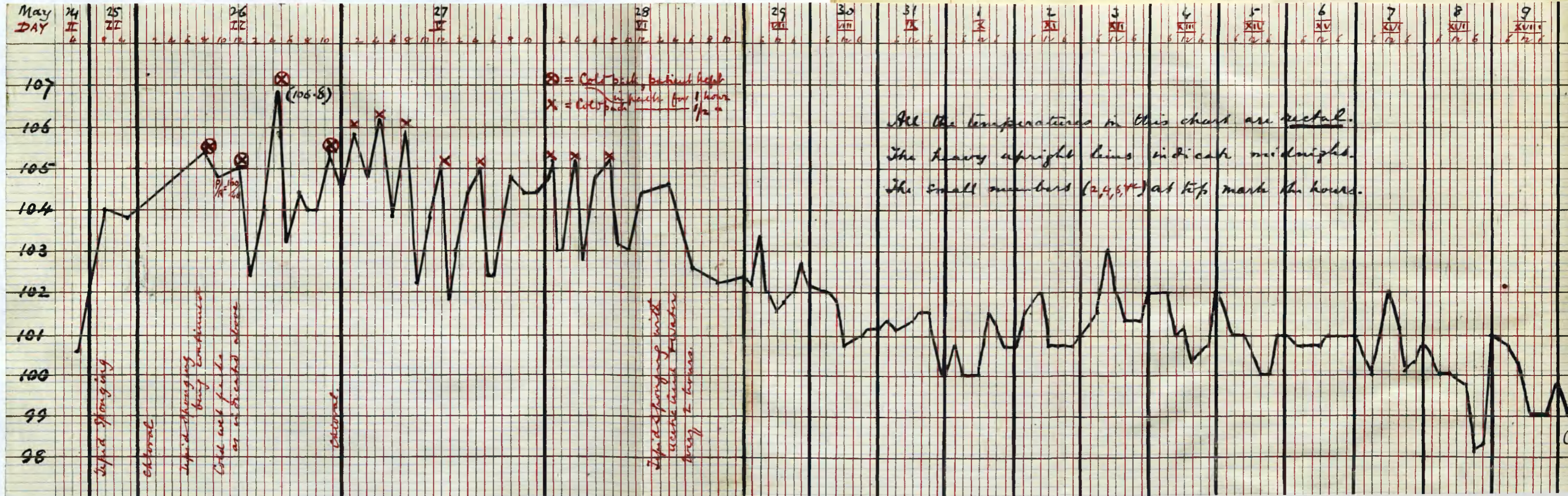
2) Trousseau, op. cit., vol. ii, p. 199.

(6) More local applications of cold. These are used not so much for the purpose of reducing the body-temperature generally, although they may have that secondary effect, as to meet some special symptom. Thus, ice may be given to suck to relieve the throat; iced-cloths may be applied to the neck to relieve the throat and, through the carotids, to act upon the cerebral circulation; evaporating head lotions or local affusion of cold water to the head may be used for headache; ice-bags, or caps, fitted with tubing for circulating iced water, may be applied to the head on account of specially manifested nervous symptoms, for in some cases of scarlatina these symptoms are such as to suggest meningitis." Besides the direct abstraction of heat, it is to be remembered that any improvement of the central nervous system might be expected to include an improvement of the thermal nervous mechanism. All the children patients (unless adult females) have their heads shaven on admission and the air must have a certain cooling effect upon the scalp. We have, besides, two cases (CASES XIII & XIV) to record in which apparatus was used to the head such as is mentioned above. These local applications are attended with no risk to the rash or kidneys and any slight chance of collapse is easily guarded against and may be at once overcome by removal of the applications.

We have now considered the various antipyretic methods in detail, in so far as they are likely to be used in scarlet fever, and before tabulating the conclusions arrived at, it remains only to submit some additional illustrative cases. When estimating

1) Cf. Henoeh, op. cit., vol. 7, p. 212; also, CASE XIV, p. 45.

Chart of Case V





the effects of external cold in the reduction of temperature, it is necessary to avoid the fallacy of regarding a mere cooling of the surface as equivalent to a lowering of the body heat. Rectal temperatures will, accordingly, be given when available; in some instances it was more suitable that the thermometer should be used in the axilla and then any drop was checked, either by additional records taken by myself in the patient's mouth or by delaying the taking of the temperature in the axilla until "reaction" was so thoroughly established as to render the observation trustworthy.

**CASE V** Severe scarlet fever, with slight affection of the throat but with serious nervous phenomena and temperature  $106.8^{\circ}$  (rectal) on the 4<sup>th</sup> day; treated by cold packs and tepid sponging; recovery.

Agnes C—, aet. 2 years, admitted May 24<sup>th</sup>, 1889.

History:—Became ill yesterday, with sickness & vomiting; rash seen today.

(May 24) On admission:—“Scarlet” rash, patchy on legs, but otherwise characteristic; throat congested; glands of neck felt; chest clear.

May 25:—Was restless during night; the throat is still congested but there is no nasal discharge and only slight glandular enlargement. Pulse is steady and not very quick. Urine free from albumen.

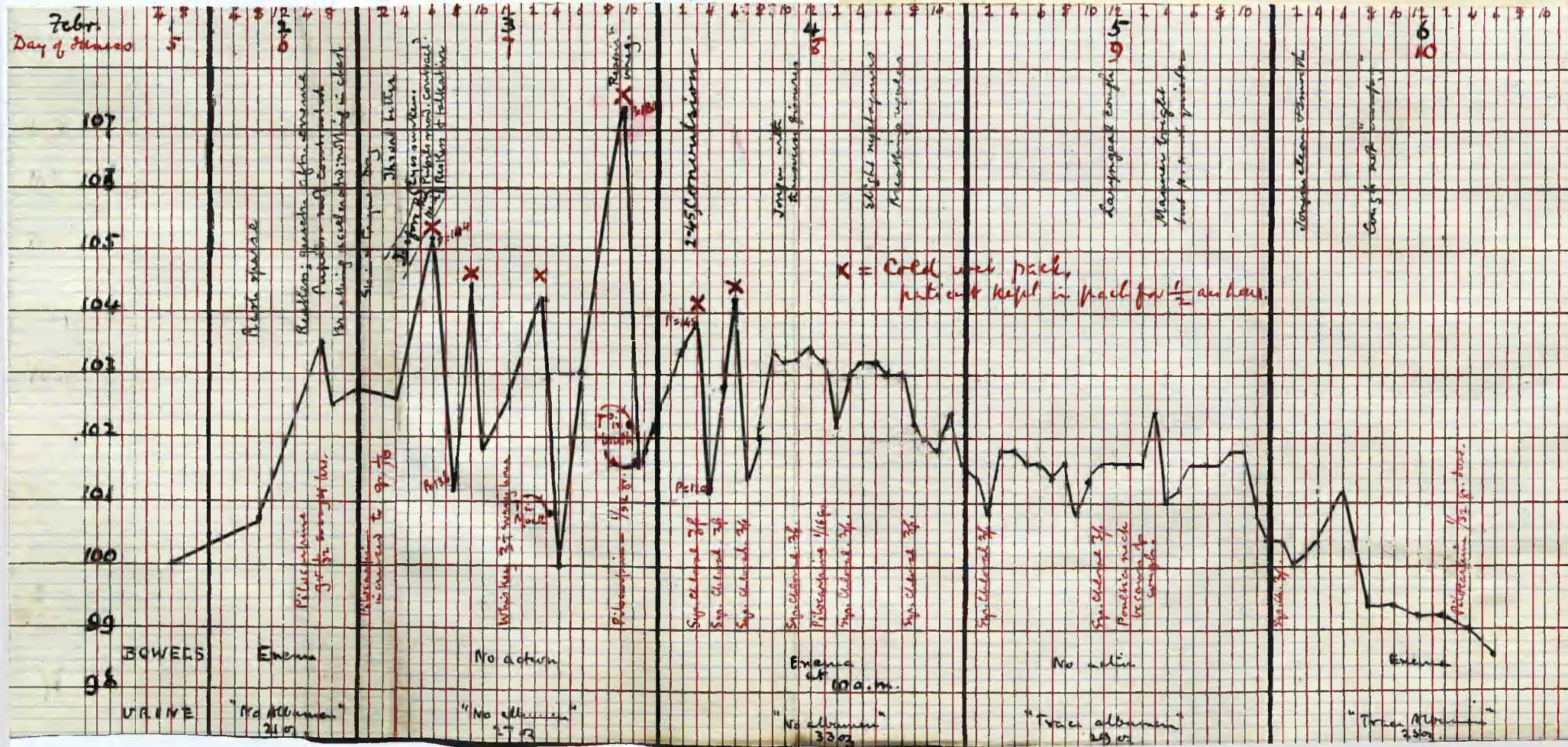
Is having simple local treatment to throat; sponging with tepid water and acetic acid (to use mustard, if skin is dry).

May 26:—Urine is in fair quantity and free from albumen; skin acid well.

(4<sup>th</sup> Day.) Was sleepless again during night and had chloral suppository; was quiet but sleepless. Screaming this morning; inversion of thumbs noticed.

1) In his Medical Thermometry (English Translation, New Sydenham Soc.?, 1871, p. 348), Wunderlich says of the temperature in scarlatina that it “seldom in cases which terminate favourably exceeds  $41^{\circ}\text{C.}$  ( $105.8^{\circ}\text{F.}$ .)”

# Chart of Case VI



Feb 9. Pilocarpine to get tension

1. Slope into machine decreasing
2. Temperature is inhibited around the body.

Nov 90-4: explained by atrophy

Major food recovery & resumed well.

The heavy vertical lines indicate midnight

The hours may be found by reference to the small numerals (2, 4, 6) on top-most line

(May 26 cont.). Throat less congested; glands not enlarging. Bowels are loose: foul, green motions; to have lime water with the milk.

Temperatures and cold wet packs are indicated on the chart; <sup>opposite page 34</sup> the temperatures were taken very frequently (about every 1 1/2 hours) and are all rectal; the antipyretic action of the packs is thus here well illustrated and they exerted also a soothing influence.

Small doses of brandy were begun today (26<sup>th</sup>) and throat treatment stopped.

May 27:- Packs found more soothing when patient kept in them only 1/2 hour.

May 28:- Last pack today; tepid sponging continued; skin acting well.

May 29:- Improvement continues

June 4:- Disquainting.

(19<sup>th</sup> Day) June 10:- Temperature normal for 24 hours.

July 20:- Dismissed well.

CASE VI Scarlet fever with slight affection of throat but with development of serious nervous phenomena on 7<sup>th</sup> day; temperature 107.3° (rectal); convulsion; treatment by cold packs, pilocarpine and chloral; recovery.

Ann M<sup>ch</sup> —, aet. 7 years, admitted 1<sup>st</sup> February, 1889.

History:- Illness began on 28<sup>th</sup> Jan. with headache, sickness and vomiting, sorethroat and pains in the chest; rash seen same day on legs and chest.

(Feb. 1<sup>st</sup>) On admission:- Scarlet rash on body and limbs; tonsils enlarged & congested; glands of neck not much enlarged; chest clear.

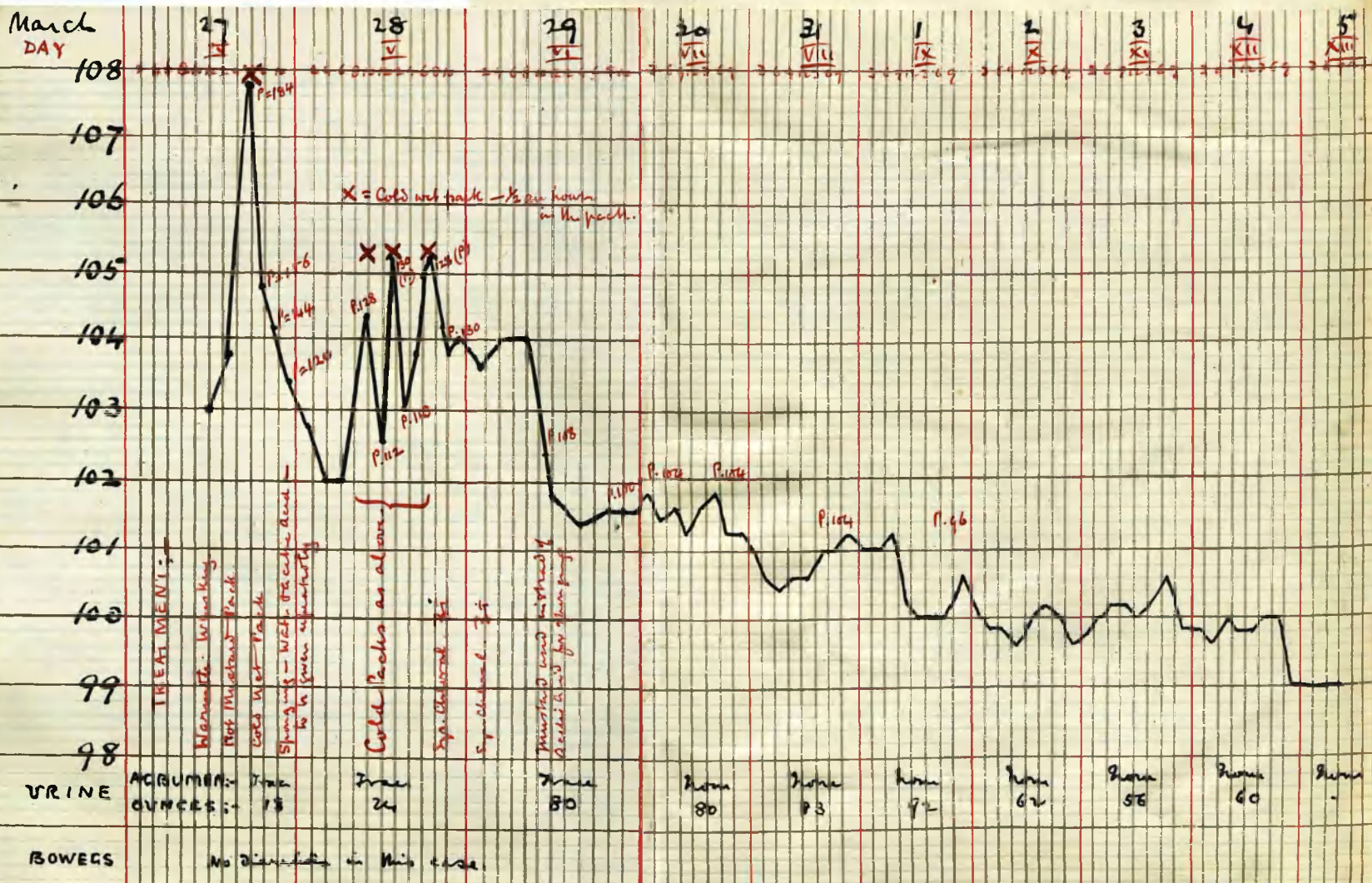
To have local application to throat; iced milk.

Feb. 2:- Temperature rose in evening without evident cause;

pilocarpine, 1/32 gr. every 4 hours.

Feb. 3, 6 a.m.:- Still further rise; throat better; child talkative and

# Chart of Case VII



restless; eyes sunken; pupils moderately contracted. Cold wet pack.

Evening (Feb. 3.) - Other cold packs have been given as shown on the opposite page 35.

The actual numbers relating to that between 9 and 10 p.m. are interesting, as showing the antipyretic action.

Thus at 9-45, rectal temperature was  $107.3^{\circ}$  ( $P=180$ );

10-10-30 - cold wet pack;

10-15, temperature in mouth, =  $102.2^{\circ}$ ;

10-30, temperature in mouth, =  $101.6^{\circ}$ ;

11, temperature in rectum, =  $101.8^{\circ}$ .

Feb. 4. - Convulsion at 2-45 a.m. At 3 a.m., temperature =  $103.8^{\circ}$

and pulse = 145 and feeble. At 3-5 put in cold wet pack. Kept in pack for  $\frac{1}{2}$  hour, pulse becoming steady and falling to 120.

Feb. 5. - Laryngeal cough (slight).

Patient is much quieter today and her manner is bright.

Other details as to symptoms and treatment are noted on the chart, (opposite page 35).

CASE III. Severe scarlet fever, with collapse, ill developed rash  $V^c$ ; treated at first by warmth and mustard; rise of temperature to  $107.8^{\circ}$  F.; cold wet packs and tepid sponging; recovery.

Jane J —, <sup>years</sup> aet. 13<sup>years</sup>, admitted 27<sup>th</sup> March, 1889 (at noon).

History:- Became ill on 24<sup>th</sup> and has been sick since that date; has also had sorethroat; rash on 25<sup>th</sup>

(Mar. 27) On admission:- Collapse; scanty livid rash; throat congested; glands of neck enlarged; chest clear; cardiac action feeble and rapid. To have - blankets; hot bottles; hot toddy (whiskey  $3\frac{1}{2}$  every hour).

\* While re-writing the reports of some of these cases I am astonished at the amount of stimulant used. Although at the time none of the symptoms present were referred, by others or by myself, to over stimulation, I feel confident that if I had the patients to treat over again I would endeavour to manage with smaller quantities. With regard to the temperature, however, the alcohol ought to have had a certain antipyretic action.

(Mar. 27) 3 pm. Conjunctivae injected; pupils moderately contracted; face still livid; pulse rather better; skin very dry; no restlessness.

To have hot mustard pack.

6 pm. Skin acted well after the mustard pack but the temperature rose. Cold pack for  $\frac{1}{2}$  an hour as shown on the chart (Opposite page 36).

11 pm. Not sleeping, but quiet; skin acting; urine contains a trace of albumen. Do have sponging repeatedly with tepid water and acetic acid.

March 28:- Was restless and sleepless during night; tongue is red & dry; pupils moderately contracted; conjunctivae normal; rash on legs tolerably distinct but on arms mainly red blush. [Packs - see chart opposite p. 36]

Midnight:- Has been sleeping since 10 pm. when had 10 gr. chloral.

March 29:- Pulse steady; tongue dry but clean; enlargement of neck glands slight; rash less distinct; skin acting well; pupils moderately contracted; conjunctivae slightly injected.

Use mustard instead of acetic acid for the spongings.

Evening:- Has been much quieter today; has lost the sunken look; tongue not so dry; no more rash; there has been no diarrhoea.

April 1:- Keeps well; beginning to dyspnoeate; only complaint is of tongue, which is eroded on surface. Reduce whiskey.

April 4:- Stop whiskey.

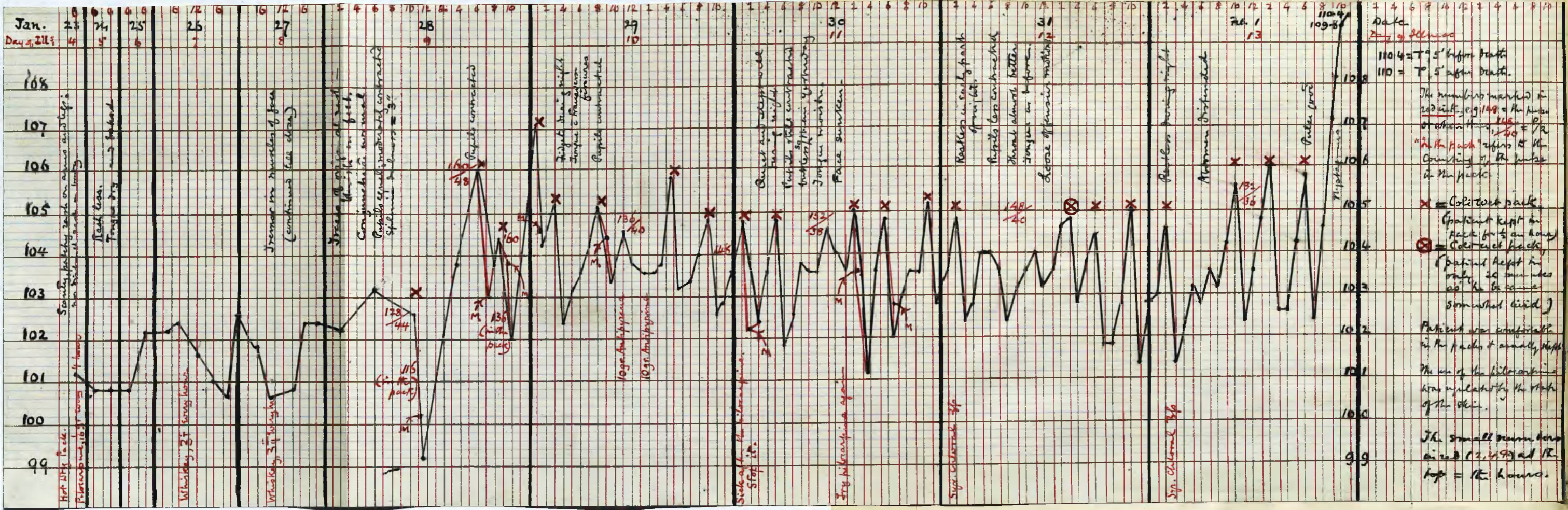
May 18:- Has made excellent recovery; dismissed well.

CASE VIII. Severe scarlet fever with moderate affection of throat but with delayed and ill-developed rash and serious nervous symptoms; temperature 106° (axilla) on 9<sup>th</sup> day; series of cold packs &c; persistence of tendency to hyperpyrexia; death, without complication, on 13<sup>th</sup> day; post-mortem exam<sup>n</sup>.

David B —, aet. 8 years, admitted 23<sup>rd</sup> January, 1889.

History &c (over)

# Chart of Case VIII



In this case, from 28<sup>th</sup> Jan. onward, the temperatures were taken almost every hour; they were taken in the axilla and thus, in respect to the antipyretic action of the packs, the chart is not such a convincing one as that of CASE V (opposite page 34).

Attention may, however, be drawn to the facts —

- (1) that in the 3 packs of Jan. 28 } the drop of temperature was checked
- in 2 of the packs of Jan. 29 } by records taken in the mouth
- & in 3 of the packs of Jan. 30 } (M on chart);

& (2) that, even though the axillary temperatures taken first (1/4 - 1/2 an hour) (i.e. 3/4 hour - 1 hour after the application of the cold sheet) after the packs be discarded, there was always an interval of 3 or 4 hours before the temperature mounted again to its former level.



History:- Illness began on 20<sup>th</sup> with headache, sickness and vomiting, and sore throat; rash seen third day.

(Jan. 23) On admission:- Scanty, patchy rash on arms and legs; no distinct rash on body; throat congested and tonsils enlarged & ulcerated; glands in neck somewhat enlarged; chest clear; urine with trace of albumen.

There was no suppression of urine at any stage; on the 11<sup>th</sup> day the trace of albumen was more distinct; thereafter no specimen was obtainable on account of the diarrhoea.

Other details as to the progress of the case are indicated on the chart (in black ink, above the temperatures) with notes as to treatment (in red ink, under the temperatures).

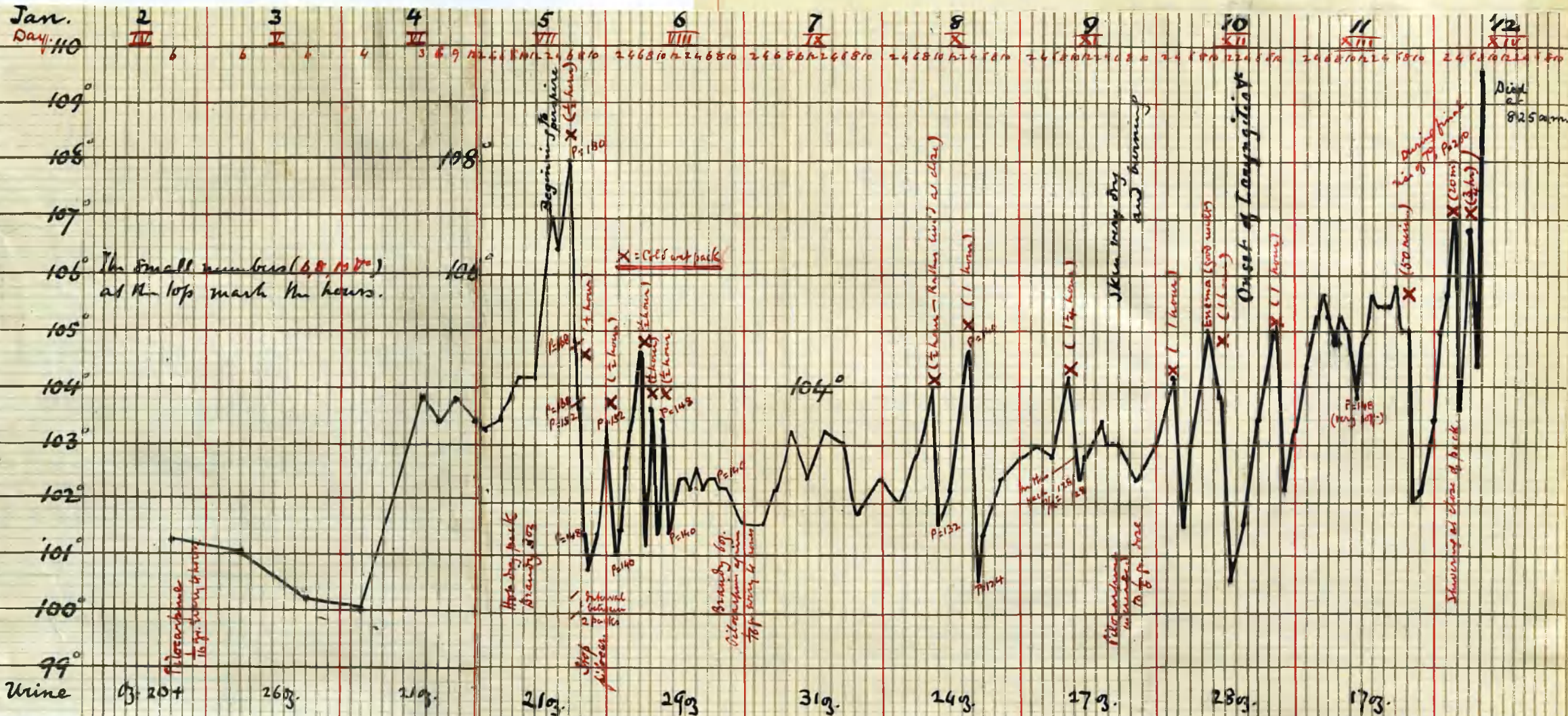
Summary of post-mortem:- Pale cardiac muscle; hypertrophic pulmonary congestion; large spleen, but not friable; large mesenteric glands; Peyer's patches and solitary glands of ileum prominent but not ulcerated; congested kidneys.

Microscopic examination of kidneys shows granular condition of the epithelium of the tubules with leucocytes in the Malpighian bodies and between some of the tubules!

1) Note. September, 1893:-

In this case it is of some importance to exclude the possibility of death from renal complication (death on 13<sup>th</sup> day). S. L. R. Sutherland has kindly examined sections of the kidneys; he agrees as to the above histological details and as to there being nothing at all to suggest the presence of nephritis.

# Chart of case IX



The small numbers (6, 8, 10, 12) at the top mark the hours.

X = Cold wet pack

Skin very dry and burning

Onset of Laryngitis

Diap. at 8:25 am

CASE IX. Severe scarlet fever with dusky, petechial rash, and alarming nervous phenomena; temperature 108° on 7<sup>th</sup> day; series of cold wet packs with marked temporary benefit; laryngitis on 12<sup>th</sup> day; death on 14<sup>th</sup>.

Clara G—, aet. 9 years, admitted 2<sup>nd</sup> January 1889.

History:- Illness began on 30<sup>th</sup> Dec. with headache, sore throat, and "ringing in the ears"; no vomiting; rash seen on same day.

(Jan. 2) On admission:- Rash diffuse, but rather dusky, on trunk; on the limbs patchy, papular, and in parts petechial. Throat congested; tonsils and glands of neck enlarged. Chest clear.

To have local treatment for throat; pilocarpine  $\frac{1}{16}$  gr. every 4 hr.

Jan. 3. Urine with trace of albumen; 26 oz. in 24 hours.

Rash not more petechial.

Jan. 5, 11.30 a.m.;- Skin dry; to have hot dry pack; brandy,  $\frac{3}{4}$  every hr.

Throat better; modify treatment there.

Evening:- Hyperpyrexia this afternoon (see chart), treated by cold wet packs. Before the packs, pupils were contracted and patient made no response to questions. After the first pack pupils dilated - the right more than the left - and she answered questions. She went to sleep in the second pack.

Jan. 6:- Rash still mottled on arms.

Jan. 7:- Chest free; heart's sound normal; throat better; tongue dry; no pain.

Jan. 8:- Patient had her 6<sup>th</sup> cold pack at 10.10 a.m. on Jan. 6. The temperature has been taken frequently since but has not again reached 104° till

(almost 48 hours)  
9 a.m. today. Two cold packs today.

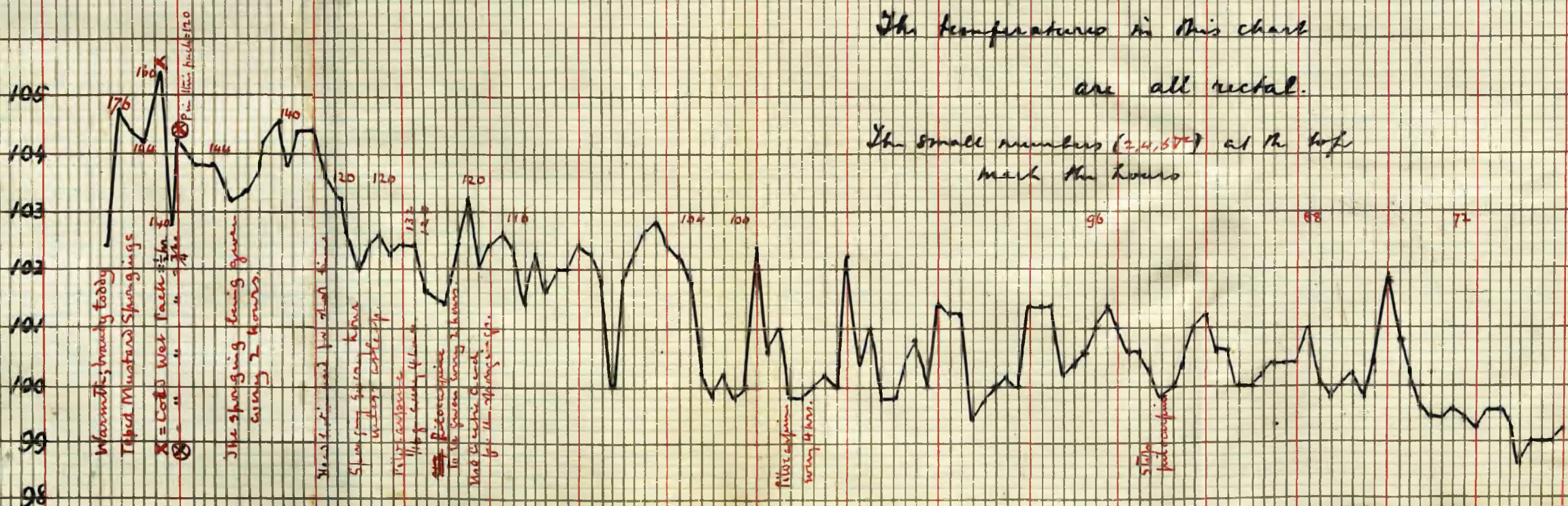
Still faint mottled rash on legs; tongue dry and with brown crust.

Jan. 9:- Temperature reached 104° only once today.

Blotchy indistinct rash on body & limbs; glandular swelling (neck) moderate.

# Chart of Case X

Feb. 7 21 22 23 24 25 26 27 28 March 1 2 3 4 5 6 7 8  
 DAY V VI VII VIII IX X XI XII XIII XIV XV XVI XVII XVIII XIX XX  
 26820 24680 22445 10 2468 1022468 11 197269 191306 242344 312366 352369 3152369 2492369 269249 2692369 2692369 2692369 2692369 2692369 2692369 2692369



Jan. 10: - Rash less marked. Temperature tending higher again.

Evening: - Cough - harsh and laryngeal; neck to be poulticed and inhalations with steam and compound tincture of benzoin given. Foul discharge from left nostril. Slight ophthalmia.

Jan. 11. Still sleeps and drinks well; skin acts better; in afternoon both pupils contracted; in evening, right larger than left. Temperature almost constantly over  $105^{\circ}$  but cold packs postponed (laryng.<sup>18</sup>)

Jan. 12. The packs yesterday and today have been arranged so as to omit the upper part of the trunk. After the last pack, patient did not seem so well as usual and, very shortly, breathing became accelerated and pulse (at 7.15) rose to 200. Patient rambled and died at 9 a.m. No post-mortem allowed.

CASE X Severe scarlet fever with slight throat affection but with collapse, vomiting, unsatisfactory rash, marked delirium<sup>17</sup>; apparently great benefit from frequent mustard spongings; two cold wet packs given when temperature threatening; subsequently pilocarpine internally; recovery.

Maggie M - , aet. 9 years, admitted 21<sup>st</sup> February 1889, about 11 a.m.  
History: - Illness began 5 days ago with sore throat, sickness and vomiting; rash seen second day.

(Feb. 21) On admission: - Sunken and livid; tongue dry; throat congested; glands of neck not much enlarged; chest clear; pulse extremely feeble; itchy rash ("scarlet") on limbs, in patches, and in parts petechial; on body, more diffuse but dusky.

Warmth applied; brandy toddy.

Vomited soon after admission; to her milk ~~and water~~ <sup>and water</sup> and brandy, iced (Brandy, 603).

2 p.m.; Pulse = 176. Skin now acting; to have lipid mustard sponging.

7 p.m.:- On arms and body, the skin is now brightly red; on legs, rash still very blotchy. Patient very restless; attempting to get out of bed. Loose green offensive motions. Urine passed in sufficient quantity but albuminous.

To have 3i "Scarlatina mixture"<sup>1)</sup> frequently; milk boiled and with lime water.

9 p.m. Pulse much fuller (T° = 106.4° rectal). Cold wet pack for half an hour (9.55 to 10.25).

Before the pack, P = 160; pupils contracted; great restlessness.

In the pack, P = 140; pupils dilated; patient slept.

Feb. 22, 10 a.m.:- Another cold pack from 12.10 a.m. to 12.55 a.m.; pulse fell in it to 120; no lividity; patient slept in the pack ~~but~~ and was quiet when taken out but very restless all night afterwards.

One motion - partly formed and not green or offensive. Throat no worse. Skin acting. Rash on chest as yesterday; on legs more diffuse but of <sup>same</sup> blotchy appearance and rather livid; partly petechial. No general lividity. Conjunctivæ injected. Face not so sunken.

Evening:- Bowls moved once during day; loose green offensive motion. Urine with trace of albumen. Is quiet after the sponging (mustard) which is given every 2 hours.

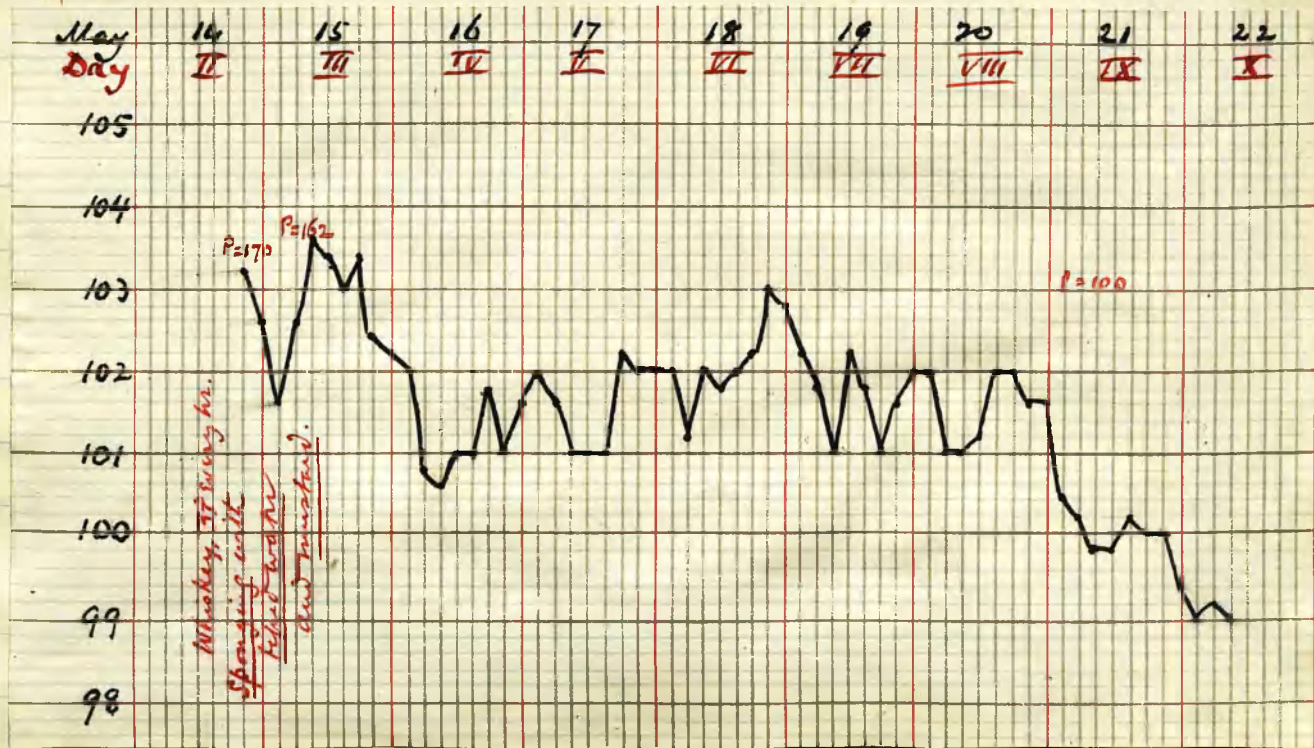
Feb. 23:- Quieter last night and today. Sponged (mustard) every hour unless asleep. Head lotion (evaporating) also used for short time.

Bowls still loose. Tongue less dry; lips abraded and sore. Rash brighter on body; paler on limbs. Face not sunken now.

1) This stock mixture is made up thus:-

174 Pulv. Pot. Chlor. ʒiij.  
Tinct. Ferri Mus. ʒiij.  
aq. ad ʒLXXX  
septid.

# Chart of Case XI



Feb. 24:- Quietly last night. Still diarrhoea, but motions not now offensive.  
Pilocarpine ( $\frac{1}{16}$  gr. doses) begun last evening; acetic acid to be used now,  
 instead of mustard, for the spongings.

Feb. 25:- Trace of albumen less. Bowels moved once - a formed motion.  
 Rash fading.

Feb. 27:- Rash faded; no new symptoms.

Feb. 28:- Reduce pilocarpine

Mar. 4:- Stop pilocarpine.

Mar. 6:- Temperature (see chart) <sup>opposite p. 40</sup> not yet normal for whole period  
 of 24 hours but urine in good quantity and never <sup>with</sup> more than a trace  
 of albumen. Desquamating very freely for some days. Drinks  
 and sleeps well. Pain in left ear.

(20<sup>th</sup> day) Mar. 8. Temperature normal.

Mar. 9. Temperature 100.4 (rectal) at noon; left storrhoea.

(23<sup>rd</sup> day) Mar. 11. Urine more distinctly abnormal; to have milk only.

Pain in right ear.

Mar. 12. Temperature, 101.2 (rectal) at 6 a.m.; right storrhoea.

Mar. 15. Urine free from albumen.

Apr. 4. Allowed up.

May 4. Dismissed well.

CASE XI. Moderately severe scarlet fever; benefit from mustard spongings;  
recovery.

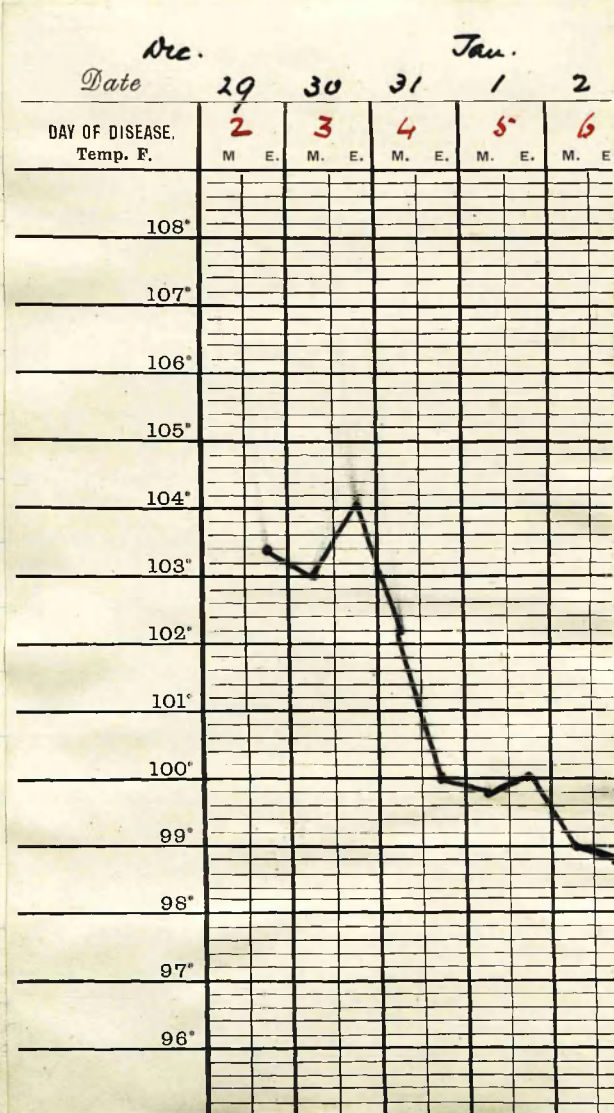
Mary Jane P., aet. 15 years, admitted 14<sup>th</sup> May, 1889.

History:- Yesterday had sickness, vomiting, headache & sore throat; rash today.

(May 14) On admission:- "scarlet rash well out on trunk; not so well out on limbs.  
 Throat congested; tonsils ulcerated; glands not much enlarged; tongue



Chart  
of Case XII



moist and almost clean. Pulse 170 in the minute; lividity; chest clear. Urine in good quantity but with trace of albumen.

Local treatment to throat; teaspoonful doses of whiskey.

Midnight:— Pulse still very high and skin not more than moist.

May 15:— Has been having sponging with tepid water and mustard; sleeps after the sponging. Rash coming out on legs. Pulse still over 160; throat better.

May 21:— Pulse 100; temperature now falling.

May 22:— Stop the whiskey.

July 10:— Dismissed well.

CASE XII illustrating advantage of sponging even in simple cases.

Elizabeth B —, aet. 20 years, admitted 29<sup>th</sup> Dec. 1888.

History:— Yesterday had sickness, vomiting, headache, and sore throat; rash today.

(Dec. 29) On admission:— Bright "scarlet" rash on arms and trunk; slightly also on legs. Throat congested; left tonsil ~~enlarged~~ and enlarged, and with white exudation on its surface; gland on left side of neck much enlarged and tender. Tongue, "strawberry."

To have local treatment to neck and to throat.

Dec. 30:— Rash very profuse; patient restless this evening.

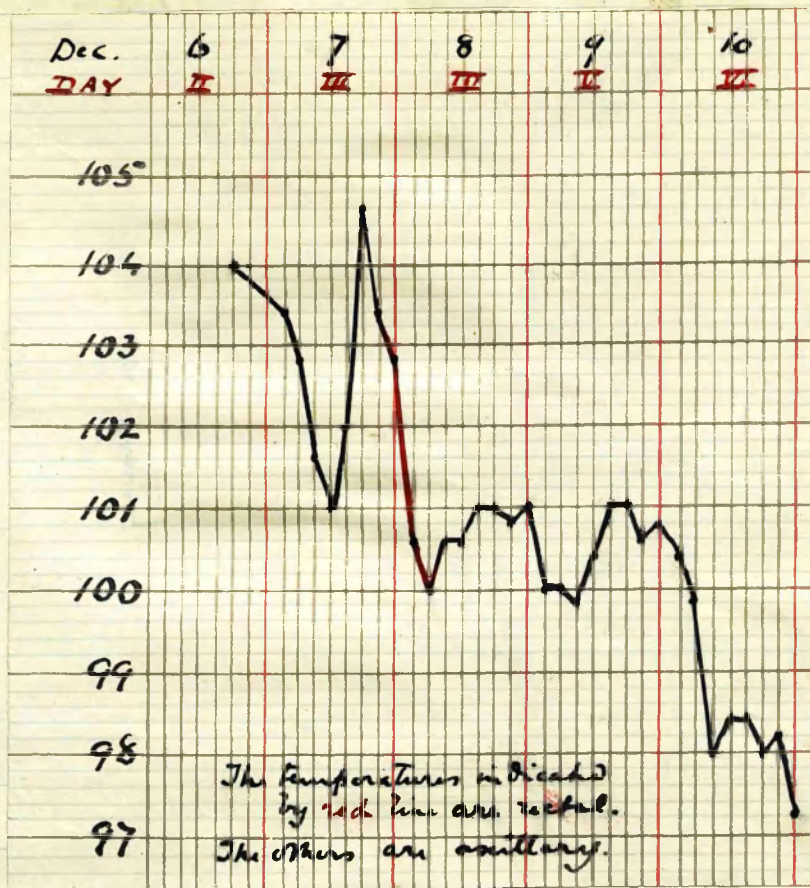
Sponged; hereafter much more comfortable.

Jan. 3:— Slight rheumatism<sup>1)</sup>

Feb. 23:— Dismissed well.

1) The occurrence of rheumatism in this case, although it is most improbable that it had any connection with the sponging, affords an opportunity of insisting upon the necessity for great care already mentioned at p. 31.

Chart of  
Case XIII



CASE III. Severe scarlet fever with delayed rash, persistent vomiting, violent delirium & apparent advantage of ice-application to head, associated with cold and tepid spongings; recovery.

Joseph H —, aet. 10 years, admitted Dec. 6<sup>th</sup>, 1889.

History:— Became ill yesterday with headache, sickness, vomiting, and sorethroat; no rash has been seen.

(Dec. 6) On admission:— Skin is hyperaemic but there is no distinct rash; tongue furred; throat congested; with enlarged tonsils and neck-glands. Face flushed; eyes injected.

Mustard bath given on admission and patient wrapped in blankets. Very restless in evening. Enema given and loose green, offensive motion resulted. Sick several times

Dec. 7:— Rash beginning on chest, between shoulders, and on fore-arms; eyes not so injected; urine in fair quantity and with a trace of albumen. The sickness stopped only this evening, after some poultices over the stomach and small drinks of whey had been given. Since admission patient has been very restless, in spite of frequent hot mustard spongings, a trial of pilocarpine, and pretty constant poulticing over the kidneys; one cold wet pack was given and he slept while in it but it did not seem to agree otherwise; a hot mustard pack also was followed by only temporary benefit.

D. Allan, who has been seeing the patient in consultation, now (9 p.m.) recommended ice to the head and "tepid, or even cold, spongings with simple water". For the head Robertson's cap, with tubing for the circulation of ice-cold water, is adopted.

Dec. 8, 10 a.m.— Patient slept some hours during night; his skin is moist; vivid rash general; tongue dry this morning but now moist, red and clean; complaints

of being sore all over - in particular his head. Urine passed in bed except 1 oz. which contains no appreciable quantity of albumen.

(Dec. 8)

1:30 p.m.: - Removed cap from head as face is livid and nose cold. The cold sponging has been continued every hour but is to be omitted next time he complains of its being cold.

Dec. 9: - Has had a good night; quieter and sleeping at times; skin moist; rash fading on legs; still present on trunk and arms; face flushed; tongue moist and paler; throat not bad; no sickness.

Having kidney poultice and tepid sponging every 2 hours; iced milk and iced water; to have fewer blankets.

Dec. 10: - Had a quiet night. Stopped the kidney poultices last night; only having occasional sponging with tepid water; skin moist.

Dec. 21. Onset of nephritis.

Mar. 1 Dismissed well.

CASE XIV. Severe scarlet fever with nervous symptoms so extreme as to suggest meningitis; ice-bag to head and spine; death on 5<sup>th</sup> day; p.m. exam<sup>n</sup>.

Georgina R., aet. 7 years, admitted 27<sup>th</sup> Sept. 1889.

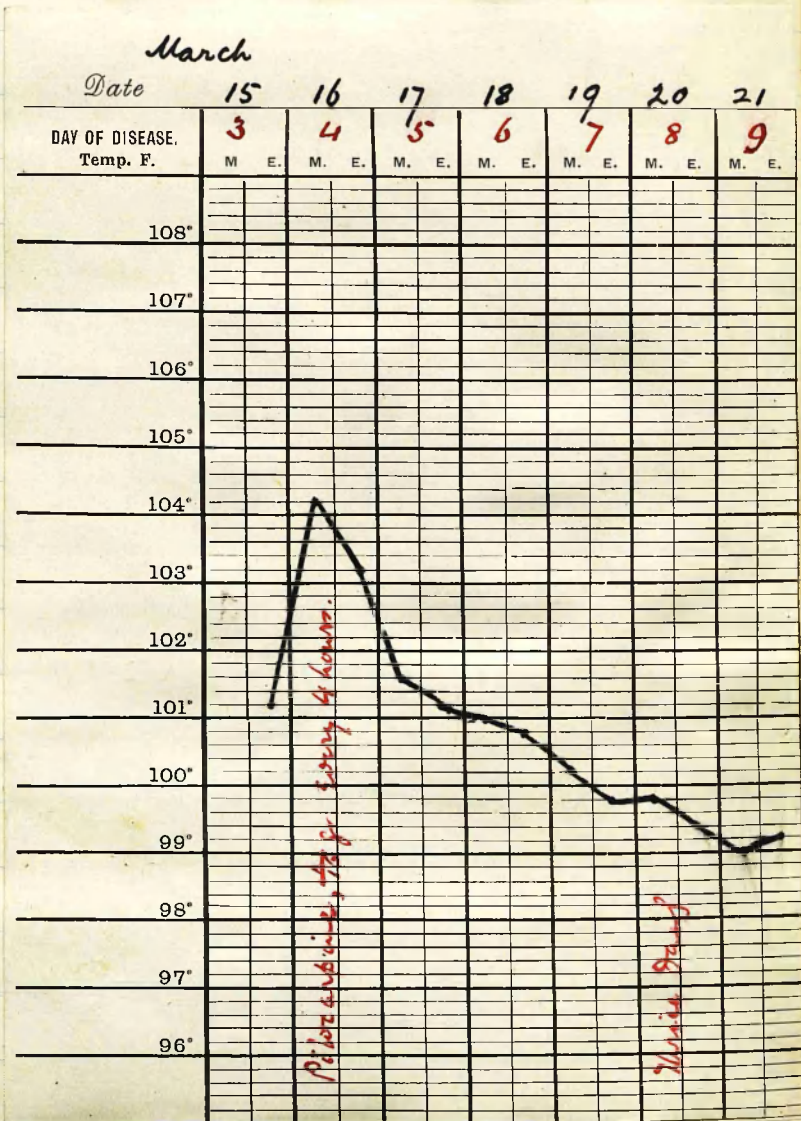
History: - Became ill on 25<sup>th</sup> with sickness, vomiting, and sore throat; rash on 26<sup>th</sup>.

(Sept. 27) On admission: - Very restless; scarlet rash of good hue but badly distributed; glands large; tonsils large; throat "dirty"; no nasal discharge;  $T^{\circ} = 101.4^{\circ}$ .

To have mustard sponging; chloral if necessary.

Sept. 28: - Restlessness last evening was extreme. Had 10 gr. chloral during night, as well as sponging. The restlessness continues; movements are very erratic. Skin this morning is dry; rash patchy on limbs; dusky on trunk; to have  $\frac{1}{16}$  gr. pilocarpine every 4 hours. Bowel not moved; urine in fair quantity and with only a trace of albumen.

Chart  
of Case XV



(Sept. 28)  
cont.

Ulceration of tonsils; to have equal parts of glycerine and tincture of steel applied. Temperature at 2:30 p.m., and at 6 p.m., = 104°; pulse at 6:30 = 160.

7 p.m. Bowels moved in afternoon by enema; constipated.

Still very restless, though sponged every hour and given 5 gr. chloral twice today. Vomited after pilocarpine so stopped it. Have at once.  
Just tried a cold wet pack and patient went to sleep in it ~~at once.~~

Sept. 29: Restlessness returned very soon after patient came out of the pack and was only temporarily relieved by a series of cold packs given during night; latterly, one given every hour, for 10 minutes; temperature kept about 103°. She has also had whiskey or brandy during night but nearly everything has been vomited, the vomited matter being sometimes "bilious."

Today, tried ice-bag to head and ice wrapped in gutta-serena tissue to cervical and dorsal spines but patient was not much quieter. She became livid and died at 6:20 p.m.

Post-mortem examination showed no special congestion of the cerebral meninges nor indeed any naked-eye change there.

CASE XV, illustrating advantage sometimes obtained from small doses of Pilocarpine.

Ellen Mack —, aet. 70 years, admitted 15<sup>th</sup> March, 1889.

History: — Illness began on 13<sup>th</sup> with sickness, vomiting & sore throat; rash today.

(Mar. 15)

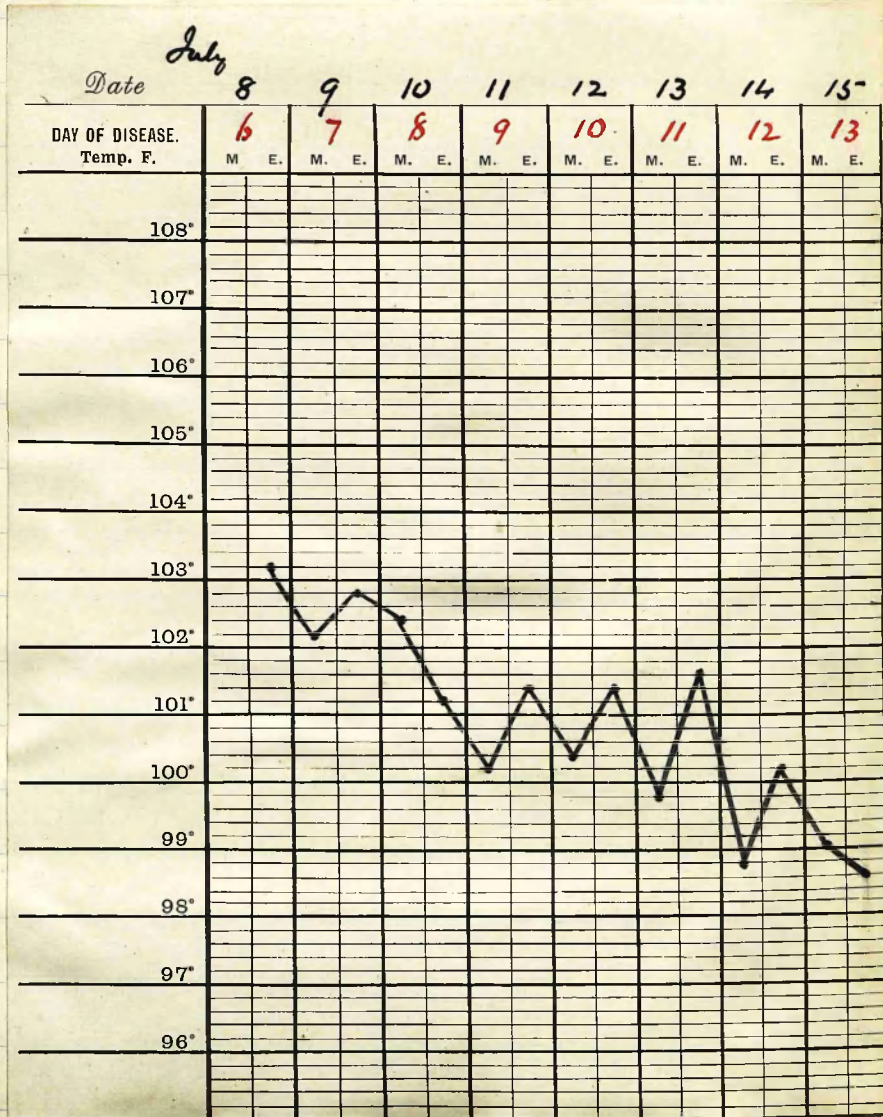
On admission: — Rash still present, though faint, on body and limbs; throat congested; tonsils much enlarged and superficially ulcerated; gland of neck felt.

Had warm bottles, after which skin acted well. Local throat treatment.

March 16: — Urine with trace of albumen; bowels not moved. Throat

(over)

Chart  
of Case XVI





(Mar. 16) cont. not worse except that ulceration more distinct.

Pilocarpine ordered in  $\frac{1}{16}$  gr. doses every 4 hours and skin acts well.

Mar. 18:- Dyspnoeic on face; still trace of albumen.

Mar. 19:- No albumen

Mar. 20:- Pilocarpine to be given thrice daily

Mar. 22:- Pilocarpine to be stopped.

May 8:- Dismissed well.

CASE XVI Scarlet fever with severe attack upon throat (discharging nose  $\nabla$ ); treated antiseptically; recovery.

Maggie F., aet. 3 years, admitted 8<sup>th</sup> July, 1889.

History; Ill six days; has had sickness, cough, discharge from nose, sore throat; } no rash seen.

(July 8) On admission:- Tongue with fur, dry in centre.

Glaucous discharge from nostrils; glands of neck much enlarged; ulcerated tonsils. Chest clear. Pulse feeble (60; wine).

To have - neck poultice; throat painted with Carbolic Acid and Glycerine (1-40); nose syringed with boracic acid solution and iodoforn tincture plus bougie used.

July 9:- Slept well; drinking well; skin acting.

July 10:- Very restless during night; skin acting.

July 11:- Temperature falling; neck not enlarging (poultice stopped); throat better; still nasal discharge. Has had loose green offensive motions; gets milk boiled and with lime water. Urine - albumen; quantity good.

July 13:- No discharge from nose

July 16:- Dyspnoeic

July 18:- Wine stopped

Aug. 20:- Dismissed well.

## Conclusions

as to use of antipyretic methods in the treatment of Scarlatina.

With regard to Diaphoretics and antipyretic drugs I have only to refer back to pages 21 and 22.

With regard to the external use of applications of cold and tepid water, I hope to have shown :-

- (1) That in the large majority of cases they are not required.
- (2) That even in simple cases and in anginous cases, tepid spongings are useful in allaying restlessness and giving comfort, if the rash has not developed, the addition of mustard being an advantage.
- (3) That mustard spongings are particularly useful during the earlier stages of an attack in which nervous phenomena are prominent.
- (4) That for the hyperpyretic of such (nervous) attacks, especially if the rash has developed, repeated cold wet packing is a convenient and efficacious method of treatment, general improvement often following its use.
- (5) That local applications to the head may sometimes be of assistance.
- (6) That, in <sup>all</sup> cold applications, there is need for the exercise of the greatest care.

Lastly, I would acknowledge my indebtedness, for many helpful suggestions as to treatment, to S. Allan and to my colleagues at Belvidere - in particular to S. Donald J. Mackintosh, who was acting, in S. Allan's absence, as Physician-Superintendent during the time when a number of the above cases were under observation. I would also express my thanks to the staff of nurses, without whose hearty co-operation the management of the patients and the recording of their condition from day to day would have been an utter impossibility.

(over)

