So there is not enough activity on one side, and too much activity on the other. All this would be unpleasant if we had not, to cut the matter short, the high authority of Dr. Seaton, which cannot be impugned. Dr. Seaton says: "Neither in the size of the vesicle, nor in the intensity of the local symptoms, nor in the length of period which the eruption takes to run its course, is there any notable difference" between animal and humanised lymph. And this is the truth. If any do not share in this opinion, it is because they have observed badly and have not understood, for example, that if very young animal lymph give rise to a luxuriant eruption upon which we must congratulate ourselves, it would doubtless be the same if human lymph equally well chosen were made use of, and that the contrary would take place under opposite circumstances.

Let us pass to the conclusions. Does animal vaccination preserve from small-pox as does humanised vaccination? Up to the present, no one has contested this, and we have no taste for fighting windmills. We confine ourselves, therefore, to what we wrote five years ago on this subject. "Out of more than ten thousand children vaccinated at Brussels with animal lymph, from 1865 to 1870, and who went through the terrible epidemic of small-pox which in 1870 and 1871 frightened the world, not a single one was, to my knowledge, reported as having been attacked by the disease. The same immunity was shared by those—a much larger number—whom I had revaccinated, and who, at the same period were living in epidemic centres." Three years later, in 1878, wishing to have a clear conscience, we appealed to our colleagues, at a meeting of the Belgian Academy of Medicine, in the following terms. "I have said before that no such case had been reported to me. I repeat it; and, up to the present, none of the numerous practitioners that I have questioned on the subject have contradicted me. Have there not been any? It seems to me impossible. However this may be, I appeal to the medical officers of hospitals and charities to clear up the point, which, on account of the deductions to be drawn from it, requires to be strictly verified." This appeal has remained, and still remains, without reply. Such a silence is what I hope to inspire in you as the most eloquent testimony in favour of the method of which I am the most confident defender.

In spite of all this, there are yet found men, high in scientific and public opinion, who, relying upon distant experiences, badly done and badly construed, and upon opinions which they maintain because they have not the courage to abandon them, persist in repeating, every time that they have the chance, that animal vaccination is a bad thing. Let us content ourselves with answering them—relying on the reasons that we have just brought forward—with this other formula, which is just as distinct and is perfectly true, that animal vaccination is a good thing.

I will conclude by stating precisely the position that I recommend should be assigned to animal vaccination. This position has not the exclusive character that might be inferred. In the recent report which I addressed to the Minister of the Interior of Belgium, and to which I have referred above, I have thus frankly explained it. The State Vaccine Institute, whilst being the supporting column of vaccination in the country, ought not to have any thought or claim of substituting itself for the traditional practices. Vaccination from arm-to-arm, strong in its ancient rights, is, and will long yet remain, the greatest strength against small-pox, and nothing ought to be omitted to encourage and regulate it. Animal vaccination ought now only to be its faithful auxiliary, but an auxiliary so useful, that it would be as unjustifiable to pass it by as to desire to upset suddenly the classical method.

These are, gentlemen, the considerations which I have had the honour of placing before you. If I am permitted to come from so far to bring them, it is not because I had great confidence in my feeble resources. But I have thought that your kindness would not fail me; and I remember especially that I am in the country where one of its greatest orators, I think, Mr. Gladstone, has said those charming words, which come so appositely to screen my insufficiency: "The success of the orator is in the feeling, not of him who speaks, but of him who listens."

TOTTENHAM.—This is a very practical little report, and shows much real progress. The death-rate for 1878 was 17.3, the total number of deaths being 590. Of these, 97 were from zymotic diseases, giving a rate of 2.8 per 1,000. Enteric fever caused 7 deaths, scarlatina 21, diarrhoea 26, diphtheria 9, whooping-cough 19, measles 13, and small-pox 2. One long-standing trade nuisance has been got rid of, and another is much less offensive. Hille's process of treatment of sewage, which has been in constant use for three years, is well spoken of, and the sludge is removed without difficulty. The water has been most favourably reported on each month by Dr. Frankland, though a constant supply is a desideratum. A disinfecting oven and a proper mortuary seem to be wanted in this rapidly-growing district.

RESEARCHES

ON THE TEMPERATURE IN PHTHISIS AND SOME OTHER DISEASES:

WITH REMARKS ON THE GENERAL VALUE OF THERMOMETRIC
OBSERVATIONS IN DISEASED CONDITIONS.

*An Address delivered at the Opening of the Session of the Liverpool
Medical Institution, October 1878.*

By A. T. H. WATERS, M.D., F.R.C.P.,

Physician to, and Lecturer on Medicine at, the Liverpool Royal Infirmary;
President of the Institution; etc.*

As a contrast to the oscillations of temperature in acute phthisis, let me call your attention to those of acute capillary bronchitis. Under ordinary circumstances in bronchitis attacking the larger tubes, the temperature does not rise high; but, in capillary bronchitis, the rise is often considerable. It rarely, however, reaches the elevation of acute pneumonia, or even acute tubercular phthisis. There is, in some cases, a difficulty in making a differential diagnosis between acute capillary bronchitis, and acute phthisis. I think the thermometer affords important aid in such cases; and I have been able, by its use—by recognising that the temperature did not reach a great height, although it was sustained for many days at a rather high level—to give a favourable prognosis, although the physical signs were such as might have existed in acute phthisis.

Let me call your attention to Table No. VIII, which represents the temperature-movements in a case of severe capillary bronchitis. The oscillations were very decided; but you will observe that, unlike that which occurs in phthisis, or typhoid fever, the temperature was highest in the morning—much higher, indeed at 9 A.M. than at 9 P.M.; and this is not an isolated case; in several others of a like nature, I have found the temperature highest in the morning.

TABLE VIII.—*M. C., aged 28. Acute Capillary Bronchitis.*

Date.		Morning.	Evening.
February 7		—	101.2
" 8		100.6	100.8
" 9		101.5	101.7
" 10		102.0	102.3
" 11		103.2	99.0
" 12		104.0	100.0
" 13		103.0	99.0
" 14		103.2	99.6
" 15		102.6	99.2
" 16		102.8	99.1
" 17		101.6	100.0
" 18		100.2	99.6
" 19		98.6	99.0
" 20		98.6	98.6
" 21		98.0	98.6
" 22		98.6	98.4

Table No. IX represents the temperature in the case of a woman who was admitted into the Infirmary under my care. Her condition for several days was such that I was unable to form a correct opinion of the nature of her disease. From the temperature, pulse, and general aspect, as well as the physical signs, I feared that we had to deal with a case of acute tuberculous of the lungs. Soon, however, the temperature began to assume oscillations, which made me hope that no tubercular disease existed. The temperature was highest in the morning. Gradually the patient improved, and made a satisfactory recovery. The case turned out to be one of acute capillary bronchitis, with probably some localised pneumonia.

The differential diagnosis between phthisis with cavities, and some cases of bronchitis with dilated bronchi is by no means easy. Without attaching undue importance to thermometric observations, it cannot be doubted that, while the physical signs may be such as to admit of hesitation as to the exact nature of the affection, the thermometer may afford valuable aid. I have referred to the fact that, in capillary bronchitis, I have found that the temperature does not have the afternoon, or evening rise so common in phthisis; on the contrary, the temperature is highest in the morning. In the following case, which simulated in a great measure one of chronic phthisis, but which I diagnosed—I believe correctly, as far as could be judged by the course which the disease took—as one of bronchiectasis, I was aided much by the thermometer. The temperature never rose high; and, instead of having an evening exacerbation, had almost invariably an evening remission.

* Concluded from p. 808 of JOURNAL for November 22nd.

TABLE IX.—*E. B., aged 25. Acute Capillary Bronchitis.*

Date.	9 A.M.	5 P.M.	9 P.M.
November 30	—	—	102.4
December 1	102.8	103.0	102.6
" 2	102.7	—	102.6
" 3	103.4	101.2	101.8
" 4	100.7	102.2	103.7
" 5	102.6	101.9	102.3
" 6	105.8	101.4	101.4
" 7	103.7	99.4	101.2
" 8	103.4	102.0	101.7
" 9	101.8	101.0	102.1
" 10	103.4	—	99.3
" 11	102.0	99.5	101.0
" 12	102.0	100.5	100.2
" 13	102.0	—	101.4
" 14	102.0	99.9	100.2
" 15	100.2	—	99.2
" 16	99.5	99.2	99.9
" 17	100.9	—	—
" 18	100.2	99.5	99.5
" 19	99.4	—	99.0
" 20	99.0	98.6	99.0

TABLE X.—*J. S. Bronchitis: Bronchiectasis*

Date.	Morning.	Evening.
October 17	100.2	98.6
" 18	99.6	99.0
" 19	99.8	98.6
" 20	100.4	99.3
" 21	98.9	99.4
" 22	100.0	98.0
" 23	99.2	100.2
" 24	99.0	99.5
" 25	100.5	98.6
" 26	100.0	98.6
" 27	100.1	99.0
" 28	100.6	99.2
" 29	100.3	98.6
" 30	99.6	99.0
" 31	100.0	99.3
Nov. 1	99.8	98.6
" 2	100.0	99.0
" 3	98.6	98.6

Very important indications of the existence of phthisis are often afforded by the use of the thermometer before any physical signs can be detected. As a remarkable instance of elevation of temperature in such a case, let me call your attention to the following.

M. C. (Table XI) was admitted into the Infirmary under my care on February 12th, 1878. She complained of having had shiverings, and of feeling generally ill. Her temperature on the day after admission was 101 deg. in the morning, and 102.4 deg. in the evening; and the following morning it had fallen to the normal. A careful examination of the patient was made, and no physical signs of disease could be detected in the lungs or elsewhere. There was neither cough nor expectoration. On the evening of this day, the temperature rose to 102.8 deg. at 5 o'clock, and at 9 it had fallen to 100.2 deg. The following day, at 2 P.M., it rose to 103.8 deg., and at 9 P.M. it was down to 100.2 deg.; the next day two rises occurred. These elevations of temperature were accompanied with shiverings, almost approaching to decided rigors, so that the case presented very much the aspect of an irregular quotidian ague, or one of septicæmia.

TABLE XI.—*M. C., aged 40. Phthisis.*

February 13	Morning	101.0
" 13	Evening	102.4
" 14	9 A.M.	99.0
" 14	5 P.M.	102.8
" 15	9 P.M.	100.2
" 15	9 A.M.	101.7
" 15	1 P.M.	101.0
" 15	2 P.M.	103.8
" 15	5 P.M.	101.5
" 15	9 P.M.	99.2

The diagnosis at which I arrived was, that the case was one of phthisis; but for several days, although the chest was carefully examined from day to day, no physical signs of lung-mischief could be detected. After a time, however, slight crepitation was noticed at the right apex, and the nature of the case became clear. I considered it one of catarrhal pneumonic phthisis of a subacute form.

For some days, the temperature was irregular in its elevations and depressions; but, as the disease became pronounced, the alterations of temperature assumed a form which is, I believe, the most frequent type in phthisis—namely, that the temperature is highest at or about 5 to 6 P.M., that a fall begins from 5 to 7 P.M., that at 9 P.M. there has been

a considerable fall, and that a low level is maintained during the night and forenoon.

And it is to this part of the subject that I now wish to call your attention.

In a large number of cases of phthisis—whether acute, subacute, or chronic—I have found that the temperature has been highest at or near five o'clock in the afternoon; that, as a rule, there is a decided fall of temperature before 9 o'clock P.M.; and that the temperature is low in the morning. There can be no doubt, I think, that there are different types as regards temperature in phthisical cases. There are some cases in which it is highest late in the evening, nine o'clock or so. There are other cases in which the temperature is highest in the morning. These are, however, very exceptional cases; indeed, I think this kind of temperature only occurs under exceptional circumstances—circumstances of a passing character. Then, again, there are some cases of phthisis which have two exacerbations, and two remissions in the twenty-four hours, simulating, in this respect, cases of septicæmia. But of a series of cases, now amounting to a large number, and including several thousand separate observations, the main results are as I have stated.

I must now call your attention to a series of tables in illustration of the point to which I have referred.

Table No. XII shows the temperature of the patient already referred to, as having a very high temperature before any physical signs of lung-disease could be detected. The temperature in this case, and also in those which follow, was taken at 9 A.M., 5 P.M., and 9 P.M.

TABLE XII.—*M. C., aged 40. Phthisis.*

Date.	9 A.M.	5 P.M.	9 P.M.
March 8	98.5	101.6	100.5
" 9	100.8	—	102.0
" 10	98.6	103.5	101.0
" 11	98.6	101.5	100.8
" 12	101.5	102.7	102.0
" 13	99.0	102.8	102.0
" 14	100.6	102.7	101.0
" 15	99.7	101.8	100.0
" 16	101.8	103.0	101.0
" 17	99.7	103.8	101.6
" 18	98.4	102.6	100

Table No. XIII gives the hourly variations of temperature for an entire day in the same patient.

TABLE XIII.—*Hourly Variations of Temperature in the case of M. C.*

March 15	7 A.M.	97.2
" 15	8 "	97.6
" 15	9 "	98.0
" 15	10 "	99.0
" 15	11 "	99.6
" 15	12 "	99.6
" 15	1 P.M.	99.6
" 15	2 "	99.7
" 15	3 "	100.0
" 15	4 "	100.6
" 15	5 "	101.6
" 15	6 "	102.0
" 15	7 "	101.4
" 15	8 "	100.4
" 15	9 "	100.0
" 15	10 "	99.8
" 15	11 "	99.6
" 15	12 "	98.8
March 16	1 A.M.	98.5
" 16	2 "	97.4
" 16	3 "	97.4
" 16	4 "	98.3
" 16	5 "	98.3
" 16	6 "	97.6

Table No. XIV shows the temperature of a case of phthisis in the third stage (active), taken three times a day.

TABLE XIV.—*R. T., aged 35. Phthisis.*

Date.	9 A.M.	5 P.M.	9 P.M.
March 10	101.2	101.8	100.4
" 11	100.0	102.0	101.0
" 12	101.0	102.4	101.5
" 13	101.0	102.5	101.6
" 14	100.0	101.0	102.0
" 15	99.2	101.6	101.0
" 16	100.0	102.4	101.0
" 17	102.0	102.6	101.0
" 18	102.0	102.7	100.9
" 19	102.6	103.0	100.2
" 20	101.0	102.6	101.0
" 21	102.0	102.5	101.5
" 22	102.5	103.0	101.0
" 23	101.0	102.5	101.7
" 24	99.0	101.2	101.0

Table No. xv shows the variations of temperature in the same case for one day, at 4, 5, 6, 7, 8, and 9 P.M.

TABLE XV.—Hourly Variations of Temperature in case of R. T.

March 28	4 P.M.	100.7
" " " " " "	5 " "	101.5
" " " " " "	6 " "	102.0
" " " " " "	7 " "	102.0
" " " " " "	8 " "	101.4
" " " " " "	9 " "	101.1

Table No. xvi shows the temperature in the same patient when the disease had advanced further, when both lungs were riddled with cavities, and the patient was extremely emaciated. You will observe that the temperature was irregular. I have little doubt that, if it had been taken hourly every day, it would have been found that there was more than one exacerbation followed by remission during the day. Profuse perspirations occurred at various times—sometimes in the middle of the day; these were attended occasionally with high temperatures. On April 20th, at 1 P.M., the temperature was 103.6 deg., and the patient was perspiring freely.

TABLE XVI.—R. T., aged 35. Phthisis.

Date.	9 A.M.	5 P.M.	9 P.M.
April 20	—	101.0	100.5
" 21	100.0	101.2	102.0
" 22	103.0	103.8	103.5
" 23	102.0	101.0	101.9
" 24	103.0	101.0	100.9
" 25	100.6	99.0	99.4
" 26	100.2	101.8	102.0
" 27	102.5	101.0	100.3
" 28	99.6	102.0	101.8
" 29	102.6	101.5	101.0
" 30	102.8	103.3	102.7
May 1	101.4	103.2	103.3
" 2	102.0	103.6	103.6
" 3	103.2	102.0	101.8

Table No. xvii shows the temperature in a case of phthisis running a somewhat acute course.

TABLE XVII.—E. T. Phthisis.

Date.	9 A.M.	5 P.M.	9 P.M.
April 24	102.0	104.0	103.2
" 25	102.4	103.8	103.3
" 26	100.0	103.6	102.7
" 27	100.0	103.6	102.6
" 28	99.0	102.4	101.3
" 29	100.0	101.8	101.7
" 30	101.0	103.0	102.5
May 1	100.8	102.7	102.8
" 2	101.0	102.7	102.6
" 3	101.0	103.4	102.8
" 4	102.0	103.4	103.0
" 5	101.4	102.5	102.6
" 6	100.3	103.0	102.0
" 7	99.8	102.5	102.0
" 8	100.4	102.3	102.0

Table No. xviii shows the temperature in a case of phthisis in the third stage attended with diuresis.

TABLE XVIII.—E. W. Phthisis, third stage.

Date.	9 A.M.	5 P.M.	9 P.M.
March 25	100.0	102.4	100.0
" 26	99.5	101.5	100.7
" 27	100.0	102.4	101.0
" 28	100.0	101.8	100.7
" 29	99.5	102.0	101.5
" 30	100.7	101.7	100.1
" 31	99.0	102.0	101.0
April 1	99.5	101.8	101.2
" 2	100.0	101.0	100.7
" 3	99.8	102.1	101.7
" 4	100.6	102.3	101.6
" 5	100.9	102.0	100.9
" 6	99.9	102.4	101.4
" 7	100.0	101.6	100.9

Table No. xix shows the temperature in the same case for one day, taken at 5, 6, 7, 8, 9 P.M.

TABLE XIX.—Variations of Temperature in the case of E. W.

April 11	5 P.M.	102.0
" " " " " "	6 " "	102.0
" " " " " "	7 " "	101.4
" " " " " "	8 " "	100.0
" " " " " "	9 " "	100.0

Table No. xx shows the temperature in a case of phthisis in the early stage.

TABLE XX.—M. McG., aged 17. Phthisis: Early stage.

Date.	9 A.M.	5 P.M.	9 P.M.
April 2	99.2	100.7	100.0
" 3	99.1	101.0	100.6
" 4	98.6	100.8	100.0
" 5	99.0	101.0	100.0
" 6	98.6	101.0	100.0
" 7	99.0	101.0	100.0
" 8	98.6	100.9	100.0
" 9	99.5	101.0	100.1

But, in giving illustrations of what I have found to be the most frequent form of temperature-oscillation in phthisis, I must also add that there are many exceptions to the rule. In some cases, the temperature is highest late in the evening, about 9 o'clock, even to the extent of a degree or more; whilst, again, the usual fall which comes before that hour may be delayed, so that the temperature at 5 and 9 o'clock varies very little. (See Table No. XXI.)

TABLE XXI.—E. M. Phthisis.

Date.	9 A.M.	5 P.M.	9 P.M.
September 16	100.2	102.0	101.7
" 17	98.8	102.5	103.0
" 18	99.0	102.6	103.0
" 19	100.0	102.5	103.0
" 20	101.0	103.0	102.9
" 21	100.3	103.0	103.2
" 22	99.0	103.0	103.1
" 23	100.8	102.6	102.0

I have already mentioned that in some cases more than one exacerbation followed by remission occurs. It is chiefly, I believe, in the later stages of the disease that this takes place. Table No. xxii shows the variations of temperature (in a case of phthisis in the third stage) during one day, taken every third hour. In this case, there were two distinct exacerbations.

TABLE XXII.—Variations of Temperature. A. M. Phthisis.

February 8	6 A.M.	101.0
" " " " " "	9 " "	101.6
" " " " " "	12 " "	99.0
" " " " " "	3 P.M.	97.2
" " " " " "	6 " "	100.0
" " " " " "	9 " "	103.0
" " " " " "	12 " "	100.5
" " " " " "	3 A.M.	99.8
" " " " " "	6 " "	100.5

As the result of these observations, it would appear that, whether phthisis is in an early or a late stage, if active mischief be going on, there are, as a rule, important variations of temperature, and that in a majority of cases—I believe in a very large majority—the highest temperature is marked about or near 5 o'clock P.M., and that there is a very decided remission in the morning. I need not insist on the importance of this fact in reference to the diagnosis of phthisis, and on the great error we might commit in estimating the condition of a patient by a single thermometric observation, made, for instance, in the morning in our own consultation rooms, just at the time when the temperature is lowest. No temperature-observations can be relied on in forming a diagnosis in a case of incipient phthisis, unless made at least twice or thrice a day; and, if only one observation can be made, the worst time for it is the morning.

I cannot stop to consider at any length the question as to how far phthisis may be progressive without there being any elevation of temperature. It is quite certain that some cases are met with where there is little or no elevation, but these are exceptional.

In considering the facts which I have brought under your notice, one cannot help asking whether this particular form of temperature-oscillation is a characteristic of phthisis, or whether it may not be so of all forms of allied diseases. I have endeavoured to ascertain what is the usual course in other forms of tuberculous affections, as of the bones, peritoneum, etc.; but at present my facts are not sufficient to warrant me in coming to any definite conclusion, and I must wait for further inquiries. I will, however, refer to some cases which have a bearing on the subject.

In lumbar abscess and caries of the bones, I have found a more elevated temperature in the evening than in the morning. In one case of pelvic abscess with diseased bone, the temperature was for a few days taken at nine, five, and nine, and it was always highest at five.

In a very interesting case of peritoneal inflammation, which was for

a long time very obscure as to its real nature, the observation of the temperature led me to infer that there was some tuberculous condition. The most careful examination of the lungs revealed no disease, and the physical signs observed in the abdomen were such as might be consistent with the formation of a tumour. In the progress of the case, the temperature assumed the type which I have referred to as existing so often in phthisis; and I was led to express an opinion that there was some tuberculous condition present. The temperature-oscillations are represented in Table No. XXIII. The patient died, and the necropsy revealed the existence of tubercular peritonitis, and a very few tubercles were found in the lungs.

TABLE XXIII.—*M. C., aged 28. Tuberculous Peritonitis: a few Tubercles in the Lungs.*

Date	9 A.M.	5 P.M.	9 P.M.
April 26	99.0	102.0	102.6
" 27	101.0	102.0	101.6
" 28	98.6	103.0	102.3
" 29	98.6	102.0	101.9
" 30	100.3	103.0	102.5
May 1	99.8	104.0	102.8
" 2	99.0	104.6	103.9
" 3	99.4	103.6	101.3
" 4	98.6	103.7	102.0
" 5	98.3	103.0	101.8
" 6	98.3	102.6	102.0
" 7	99.0	102.0	101.3
" 8	98.6	101.4	100.6
" 9	99.3	101.0	100.8
" 10	99.0	100.8	100.8
" 11	98.3	100.3	100.0

In considering these temperature-oscillations, it is impossible not to note that, to a certain extent, they seem to be exaggerations of the normal changes. In the healthy, there is a fall in the evening and early morning. So in phthisis; but, then, in the healthy, the late morning temperature is fairly high, whilst in phthisis it is often very low.

But I must now pass on to consider another subject. How important becomes the use of the thermometer in the early days of a typhoid fever, when, perhaps, there is no definite symptom to attract attention; but yet the thermometer reveals an abnormal temperature with evening exacerbations and morning remissions, thus enabling us to surmise, if we cannot absolutely diagnose, the existence of the disease. Here, however, I must say that conditions are often met with which must warn us not to attach too much importance to mere temperature. Whilst many a so-called feverish cold has shown itself by its development to be an attack of typhoid, the existence of which might have been feared had the temperature been taken, so, on the other hand, cases are by no means infrequently met with in which no inflammatory conditions can be recognised, where the temperature is so high and the general state such as to give rise to the fear that typhoid may exist, but where, after the increased heat has been maintained for a few days, defervescence occurs, and the real nature of the case becomes apparent. As an illustration of what I mean, let me call your attention to the Table No. XXIV.

I was called to attend in consultation a gentleman aged 23, who, living in a house in which the drainage was by no means satisfactory, was seized with feverish symptoms. There was no evidence of inflammation, no sore-throat, no catarrhal symptoms; but the pulse was quick, and the temperature 101 deg. The following morning, it was 103.2 deg.; and, in the evening of the same day, it rose to 103.6 deg. The case went on with the alternations of temperature depicted in the table XXIV. There was slight delirium at night, gurgling in the right

TABLE XXIV.—*R. G., aged 23. Jaundice.*

Date.	Morning.	Evening.
September 22	101.2	—
" 23	103.2	103.6
" 24	102.6	—
" 25	—	102.4
" 26	103.6	103.2
" 27	100.2	101.5
" 28	99.3	101.0
" 29	100.0	98.6
" 30	98.6	—
October 1	98.6	—

iliac fossa, slight looseness of the bowels, but no tenderness of the abdomen. We hesitated as to the diagnosis. In the face of these symptoms, there was a fear that typhoid existed; and we insisted on a treatment of absolute rest, strict regimen, etc. On the sixth day of the attack, there was a decided defervescence, and, at the same time, a

slight icteric tint appeared. On the following morning, the temperature was still lower, and now the case resolved itself into one of jaundice, doubtless due to a catarrhal condition of the bile-ducts.

There are several points in connection with the temperature of typhoid fever to which I should like to call your attention, but time forbids. One subject I will, however, refer to, viz., how far the pyrexia of typhoid simulates that of acute phthisis. It is well known that there are considerable oscillations in the temperature of typhoid, the evening temperature being higher than that of the morning; and, indeed, towards the end of an attack, there is a very marked morning defervescence, almost amounting to an intermission. But, in the early days of the fever, this does not obtain.

It has been usual with me to have the temperature of my fever cases taken twice a day only—at 9 A.M. and 9 P.M.; but of late I have had it taken three times daily, as in phthisis, at nine, five, and nine. My numbers are not yet enough to enable me to speak decidedly on the point; but I have found that, as a rule, the temperature is higher at 9 P.M. than at 5 P.M.; but this is not always so. In some cases, the temperature has been highest at 5 P.M.

Amongst the many interesting questions in connection with our subject is: What is the highest temperature which is consistent with the maintenance of life in the human economy? All observations hitherto made tend to show that, when the temperature of the body in any case of pyrexia reaches eight or ten degrees above the normal, there is grave danger unless the heat is speedily reduced. Wunderlich says that the highest recorded temperature in a living man was 112.55 deg. Fahr. Brodie found the temperature 111 deg. in a case of injury to the spinal cord. But this temperature was far surpassed by that which is said to have occurred in the remarkable case recorded by Mr. Teale of Scarborough, in which a lady, who suffered an injury whilst riding, is reported to have had a temperature which on one occasion reached 122 deg.; and Mr. Teale says that, during seven weeks, the temperature never fell below 108 deg., and rarely below 110 deg., and yet the patient recovered.

This case is so remarkable and so exceptional that I think we may set it aside as having no applicability to ordinary cases of fever; and we must, I think, in spite of it, conclude that a temperature of 110 to 112 deg. is not compatible with anything like a prolonged maintenance of life.

Cases of intermittent fever sometimes have a very high temperature. I have myself known a rise to 107 deg.; but Dr. Macintosh states that he has known a rise to 110 deg.; but, then, this high temperature soon subsides, a very rapid defervescence takes place.

In pneumonia, the temperature rarely rises above 106 deg. In a series of one hundred and six cases of the acute form of the disease which have occurred in my hospital practice, there is only one case in which the temperature reached 106 deg. in the axilla, and the case was not fatal. In only a small proportion of cases did the temperature (taken in the axilla) pass beyond 105 deg. The highest recorded temperatures in cases ending favourably that I am acquainted with are 106.7 deg. by Ziemssen, and 107 deg. by Kocker. In fatal cases, a temperature of 108.9 deg., 109.4 deg. has been reached before death.

An examination of the temperature-charts of cases of acute pneumonia affords interesting evidence of the nature of this pneumonic fever. It runs, in some cases, a very definite course; a high temperature is maintained for some time, a so-called crisis comes, and there is a very rapid defervescence. But this is by no means always the case. There are often two, or three decided remissions, followed by exacerbations, before the final defervescence comes. Tables No. XXV and XXVI illustrate these points.

TABLE XXV.—*R. T., aged 17. Pneumonia.*

Date.	Morning.	Evening.
January 17	—	106
" 18	104.8	104.3
" 19	104.3	105.4
" 20	102.0	99.5
" 21	97.5	98
" 22	99.1	99.8
" 23	99.2	99.4
" 24	99.4	—
" 25	99.0	—
" 26	98.6	—

In cases of septicæmia, the temperature has risen to 109.6 deg., and yet life has been maintained; but apparently this has resulted from the fact that the heat has been quickly subdued by the external application of cold. Again, in typhoid fever, when the temperature has risen to an alarming height to over 107 deg., a rapid cooling has followed the use of the tepid bath, and life has been apparently thereby saved.

TABLE XXVI.—*J. W., aged 14. Pneumonia.*

Date.	9 A.M.	5 P.M.	9 P.M.
April 10	—	105.0	103.7
" 11	101.7	102.0	102.8
" 12	104.0	104.0	102.0
" 13	100.5	103.0*	104.0
" 14	99.0	—	98.6
" 15	98.0	98.6	98.6
" 16	99.0	98.6	99.0

* Same temperature at 1 P.M.

In injuries and diseases of the nervous system, very high temperatures have been recorded. I have referred to Brodie's and Teale's cases. But, in speaking of nervous diseases, I have never found, in my own experience, that life has been maintained when a temperature such as would be probably fatal in other diseases has been reached. Table No. XXVII shows the temperature of a man who was the subject of cerebral hæmorrhage, and also of a slight fracture of the internal table of the skull. He was admitted into the Infirmary under my care with apoplectic symptoms. For several days, the temperature was low; but, during the last three days of life, it rose considerably, and reached, shortly before death, 107.4 deg.

TABLE XXVII.—*Cerebral Hæmorrhage.*

Date.	Morning.	Evening.
November 11	98.6	98.6
" 12	99.0	98.6
" 13	100.0	98.0
" 14	98.6	98.6
" 15	99.0	99.0
" 16	98.6	99.0
" 17	98.6	99.0
" 18	99.0	99.0
" 19	98.6	99.0
" 20	98.6	99.0
" 21	100.0	103.0
" 22	103.0	103.5
" 23	105.0	106.0

Shortly before death, 107.4

Table No. XXVIII shows the temperature-ranges in a case of delirium tremens complicated with pneumonia. The first rise indicates the pneumonic fever from which the patient convalesced, but the delirium continued; and, before death, there was a decided rise in temperature, reaching 107.4 deg. shortly before dissolution.

TABLE XXVIII.—*S. S., aged 32. Delirium Tremens, with Pneumonia.*

Date.	Morning.	Evening.
November 7	—	98.6
" 8	99.0	—
" 9	100.8	99.7
" 10	104.0	101.0
" 11	101.0	100.4
" 12	100.0	100.0
" 13	99.0	100.7
" 14	99.6	100.0
" 15	99.0	100.0
" 16	99.0	100.0
" 17	99.0	101.0
" 18	—	101.0
" 19	99.0	100.0
" 20	99.2	—
" 21	102.4	104.5
" 22	107.4	—

It would be very interesting, if time permitted, to consider the causes of increased temperature in pyrexia; but, perhaps, in the present uncertainty of our knowledge, it would not be very profitable. Although increased heat constitutes one of the most prominent symptoms of fever, it is assuredly only one of its factors, or one of its results; and yet it is impossible to shut our eyes to the great importance of carefully attending to it as an indication for treatment. When we see, in cases of septicæmia, of acute rheumatism, of typhoid fever, etc., the temperature rising to 107, 108, 109, or 110 deg.; and when, apparently as the direct result of this increased heat, we witness the gravest disturbances of the functions of the nervous centres, and dissolution threatened; and when, under the influence of external cold, we see the temperature rapidly fall, the coma disappear, the delirium subside, and the patient restored to a condition of comparative comfort and real safety, it is impossible not to come to the conclusion that this high temperature, whatever may be its essential nature, has been, in these cases, a main cause of the alarming symptoms which were present. Were the coma or the de-

lirium due in either case to the poisoned or altered condition of the blood, the mere reduction of heat would scarcely afford the marked relief which we witness. Were the phenomena the result of some impression on the nervous centres produced by organic change, however slight, it is difficult to understand how this lowering of temperature could give rise to the rapid and striking alterations which are sometimes seen; and thus, I think, in our present state of knowledge, we must admit that temperature plays an important part in the phenomena of the pyrexial state; and, in studying the therapeutics of fever, we may well give a large share of our attention to those measures which have the effect of diminishing heat. This part of the subject is one on which I cannot enter now, although I hope on some future occasion to lay the results of my observations before the Society, and to speak of my experience on the use of cold applied externally, of quinine, of alcohol, of digitalis, of aconite, of salicylic acid, and of free nutrition as temperature-depressors in various forms of fever.

In estimating the rise and fall of temperature in disease, it is obvious that we cannot trust to our unaided senses; and that, in the thermometer, we possess a guide which, if properly used, can scarcely deceive us. The rapid rises of temperature which sometimes occur can only be recognised and appreciated by the application of this instrument of precision; and it cannot be doubted that it has in many cases rendered most valuable service, and been the means of saving life by pointing out the necessity for prompt and decided action.

THE BACTERIC ORIGIN OF TUBERCULOSIS, AND ITS ANTISEPTIC TREATMENT.

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I HAVE now before me a private letter from Dr. Max Schüller of Griefswald, and a copy of a short article by him, on the Treatment of Tuberculosis, extracted from the *Berliner Klinische Wochenschrift*. They both refer to a question of so much interest and importance, that they merit something more than a passing notice.

The substance of Dr. Max Schüller's letter is as follows. Some months ago, he published a paper describing experiments he had made on tuberculous or scrofulous rabbits, in order to study the effects of a treatment based on the theory of the bacteric origin of this disease, or rather of the artificial disease in his animals. These animals were infected by the throat with tuberculous matters, and so made tuberculous. Then he derived from the tubercular matters a small form of round bacterium or coccus by a process of Professor Klebs of Prague, which he names "*fractionirte Cultus*"; and with these he made the same experiments, and with the same results—viz., tuberculosis of the internal organs and a tuberculous inflammation of an injured knee-joint. He was thus convinced that tuberculosis in his animals was a disease caused by living elements or special organisms (*Monas tuberculös* of Klebs). He then tried certain drugs which he believed would have an inimical effect on the said organisms, and he found that, of the similarly infected animals, those that were not treated all died, in variable times; while those submitted to treatment not only remained alive, but recovered their health and increased in weight. He thought the results of his experiments justified him in appealing to medical practitioners to give a trial to what might prove a causally indicated treatment for a disease hitherto without any remedy. Professor Rokitsansky of Innsbruck was one of the first to accept this invitation to make observations on man, and he is stated to have obtained good results. Dr. Max Schüller regrets that the newspapers should have published paragraphs with such sensational titles as "No more Tuberculosis": and he believes that the application of this mode of treatment to human subjects is attended with many more difficulties than in the case of animals, and that it requires to be continued for several months.

The drug he especially recommends is the benzoate of soda: this is inhaled in solution (2 to 5 per cent.) in distilled water, and by means of a spray-producer. For a man of average weight (sixty *kilogrammes*), the daily dose is from thirty to sixty *grammes*. If the stronger inhalation be not well borne, the drug can be given internally for several months, five to ten times a day, in *gramme* doses, in milk, and then weaker inhalations may be used. He considers it most important that the inhalations should be persisted in as often and as regularly as possible, through weeks and perhaps months; and the patient must "*devote his life to his cure*".

As, in order to give the smaller daily dose, viz., thirty *grammes*, it would be necessary for the patient to inhale the spray of twenty ounces of a five per cent. solution in the twenty-four hours, an ordinary