

1865

FEVER

and

The Fevers of Growth and Decay
|| ||

John Fothergill

1855

Fever,
and the Stages of Growth & of Decay.

1.

Fever (a fever to grow hot). is so named from the increased heat - its most essential symptom. The generic term *Pyrexia* (a *πυρεσσω* to be / burnish) now generally adopted, as embracing all febrile disorders, is still founded on the increase of the animal temperature.

The definition of fever generally, does not differ much. Perhaps no more satisfactory one can be found than Dr Christison's, with a slight modification.

After a preliminary stage of languor, weakness & defective appetite, - acceleration of the pulse, increased heat, great debility of the limbs, & disturbance of most of the functions, without necessarily any local disease -

Fever generally runs its course in a certain fixed fashion, divisible into five periods, which are regular in their order; these five periods are, for the most part of writers, thus divided

1st A dormant period. - 2nd The cold stage. - 3rd The hot stage. - 4th The crisis. - 5th Period of decline & convalescence. - And these different periods are more or less marked in all fevers, whether they are of long or short duration. The 1st The dormant period, or the stage of

incubation, is the time intervening between the reception of the exciting cause, & the commencement of the fever proper, & is more or less marked in proportion to the activity & amount of the exciting cause. The symptoms which characterise this stage are general uneasiness & discomfort, sighing, oppression of the chest, a depressed pulse & derangement of the organic nervous system, passing on to an altered appearance of the countenance, a languid look in the eyes, headache, depression of the mental powers, & general implication of the animal nervous system, & frequently a marked feeling of anxiety - The duration of this period is variable according to the fever.

2nd. The cold stage. This is the commencement of the fever proper: in which there is aggravation of all the symptoms of the 1st period, & in addition a general want of animal heat, consequent upon the depression of the vital powers: the patient complaining of inability to keep warm, with shivering, & chills running over the surface of the body, the skin feels harsh & cold, with occasional flushes: the circulation is much depressed; a loss of appetites & desires: the intestines torpid; & from the inaction of the skin, increased activity of the kidneys.

The mental powers also become much affected. The duration of this period is also variable.

The 3rd or hot stage, also called the period of excitement, is the stage essentially constituting fever: during which the animal temperature is raised & secretion & excretion, previously checked, now become exceedingly active. The increased activity of the skin, though feeling hot & dry, reducing the amount of urine: the respiration is frequent & full, the breath loaded; the circulation also is altered, the pulse is more frequent than in its normal state, its strength varying with that of the patient; in strong robust people the symptoms run high, in the weak & infirm the symptoms are much lowered, the enfeebled system not being capable of active reaction. The pains over the body generally are much increased, being sometimes fixed in one part, especially the chest, more frequently varying, now in one part then in another. The thirst & anxiety much increased: the tongue loaded & furred: & great derangement of the intestinal tract. The affection of the animal or cerebro-spinal nervous system is now much more marked: the mental powers are much affected, partaking more or less of delirium. The

headache much increased: the sleep disturbed or altogether wanting: confusion of ideas. & in type has frequently a deep stupor, sometimes almost amounting to insensibility.

In this stage the liability to diseases of some organ especially is greatest, determined by previous disease, the amount of activity in it, or the opposite.

The complications are congestive & inflammatory & are, probably, the cause of the frequent slight hemorrhages observed from the nose, bowels &c., according to the part affected, which is probably relieved by it. During this stage there frequently occurs a partial collapse, from causes sometimes accidental sometimes idiopathic: the accidental causes are anything by which the already depressed system is further depressed: the idiopathic probably from the exhausted system being unable to respond to the calls upon it: excretion & secretion are checked, the temperature is much lowered & there is a general return to the 2nd stage: but with much greater nervous depression: death frequently occurring during these states of collapse, from the inability of the system to rally. The duration of the 3rd ^{stage} is also variable, in intermittent fevers it does not exceed a few hours, but in continued fevers lasting for some days.

4th. The crisis. This stage has been the subject of considerable argument, some practitioners denying it entirely, the majority however have recognised its existence, & many attempts have been made to particularise certain days on which it occurs, from the intermission, which it is stated by some writers are distinctly marked even in cases of continued fever. It consists of a sleep, almost natural, accompanied by a decrease of temperature, a moist state of the skin, lowered respiration, & general return to the normal state, that is in a favourable crisis. And on the patients awakening there is freedom from pain, a feeling of comparative calm, the mental anxiety gone, a return of perfect sensibility, & general marked improvement.

5th. Stage. Period of decline & convalescence. During this period the improvement commencing at the crisis, particularly if a marked crisis, is continued, the symptoms declining in the order in which they commenced. The circulation & respiration become normal, the weak, the disorder of the digestive organs ceases, the appetite

'The moist state of the skin is probably the cause of the decrease of temperature. See. Cooling effects of exhalation of aqueous vapour. Carpenter's Comp. Phys. § 332. Ed. 4-

returning generally with great vigour, with a most active digestion: the nervous system recovers its tone, the appetites & desires return, sometimes to a preternatural extent, as in convalescence from yellow fever: the secretions & excretions are natural, the appearance improved: the complications, such as congestions & inflammations &c. are much relieved: the bulk of the body however as yet not much increased. Some writers indeed are of the opinion that the emaciation even proceeds until convalescence is a long way established. The mental improvement is especially rapid.

Relapses are now liable to occur: either from too great eagerness on the part of the patient to exertion, indiscretion - or from exposure to new infection, or other exciting cause. During the period of convalescence from exanthematous fevers the liability to take infection from other fevers is exceedingly marked. A relapse is also much more liable to be followed by a fatal result, than is the original attack.

It is does, as has been supposed by some, one attack of fever prevent the liability to a second or more, though a second attack of exanthematous fevers, as small-pox, scarlatina &c. is very uncommon. Still cases are sufficiently numerous to show that one attack is not a certain protection: in all other forms one attack is no protection, - perhaps even the opposite.

27

The pathology of fever has not yet been explained.

It is not necessary here to allude to any other than the latest theories of the pathology of fever.

Prof. Polli of Milan supposes it to depend on a "morbific or specific ferment" the result of putrefaction. Virchow states: "Fever consists essentially in elevation of temperature, which must arise in an increased tissue change, & have its immediate cause in alterations of the nervous system."

Dr. Parker states the pathology of fever to be thus:

1st The entrance into the blood of a morbid agent, & the alteration of the blood under its influence.

2nd The change affects the nervous system, especially that connected with nutrition & organic contractility, hence depression, weakness &c.

3rd The different parts, especially the muscles, being deprived of nervous influence, commence to disintegrate.

4th The change is assisted by the condition of the vagus, increasing the action of the heart, & producing dilatation of the blood vessels.

5th The further contamination of the blood by the rapidly disintegrating tissues.

6th Various organs suffer.

7th From absence of food, various alkaline & neutral salts are no longer furnished to the economy.

D^r Inmarchison states it to be thus.

1st The fever poison enters the blood.

2nd The nervous system & particularly the sympathetic nerves & vagus are paralyzed.

3rd The retrograde metamorphosis of the muscles & of other tissues is increased, without being supplied by food.

4th The destruction of tissue is increased by the accelerated action of the heart.

5th The non-elimination of the products of tissue - metamorphosis gives rise to cerebral symptoms & local inflammations.

The whole of the pathology of the latter elaborate theories is founded on the physiological experiment of the division of the vagus & sympathetic nerves being followed by dilatation of the blood vessels & increased temperature & supposes, therefore, the fever poison to have an especial action on the nervous system.

The more probable pathology appears to me to be thus.

1st A particle or molecule undergoing atomic change, by oxidation, is respired.

2nd It communicates its own change.

3rd The waste matter in the blood is increased.

4th Respiration is increased, & with it the circulation is accelerated.

5th Increased heat.

6th. Waste of the body.

We will now proceed to examine each step of this process.

1st A particle or molecule undergoing atomic change is respired — The frequent allusions which are constantly made to decaying molecules in the air, render it as a fact highly ^{probably} though as yet there is no direct proof of their existence.

D^r Williams¹ in speaking of exciting causes of disease & of Typhotic poisons alludes largely to this "effluvia, miasm, malaria or bad air: an aerial poison inhaled with the breath & absorbed from the lungs into the system". D^r Watson² in the theory of contagious fevers says "In order, then, that a specific animal poison should effect its own reproduction in the blood, &c. Of their existence there can be no moral doubt, but the proof is yet to come: the increasing general use of the microscope & the advance of organic chemistry, it is to be hoped, will, ere long, clear up this point. See page 69. The sense of smell informs us that in putrefying matter there is a change, during which these oxidising molecules are given off: for it is not

¹ Principles of Medicine. 3rd ed. p. 66. ² Prim. & Prac. of Physic. 4th ed. p. 690

the smell of any of their inorganic constituents neither CO_2 , HO , nor yet HS pure. They ^{i.e. miasm} are destroyed by a temperature of 120°F . & below 33°F . Nor does it appear that they must be isomeric with the body to which the change is communicated. In normal health the constituents of the body are resolved completely into CO_2 , HO , &c. but in fever it is probable that this does not take place, but that particles undergoing oxidation are given off: & that this is the exciting cause of fever caught from infection: these particles when respired communicating their own change. This is rendered highly probable by the fact that meat kept in a house, where there is typhus, rapidly putrefies. Dr Williams states that ^{this is also the} fact when there is an offensive drain.

2nd It communicates its own change.

Of an oxidising molecule being capable of communicating its own change. Liebig states. "In the process of decay it has likewise been observed, that a substance undergoing this state of elementary transposition, exercises a remarkable influence upon the particles of an adjacent substance, which per se would not be capable of passing into the same state of change, decay, or transposition." ²"The state of the active

1.2. Liebig's Letters on Chemistry. 4th ed. p. 237.

absorption of oxygen, the combustion of the decaying substance is transmitted to the particles of other substances in contact with it: they assume its characteristic state of activity: they behave as if they formed part of the decaying body, & their combination with oxygen is effected in a manner not further explicable, just as it is by heat."

The tissues of the body must sooner or later unite with oxygen, in which state of union they are excreted: the inhalation of this oxidising molecule precipitates that union, "contact with a substance itself undergoing the process of decay is the chief condition of decay for all organic substances which do possess the power of combining with oxygen at common temperatures". How much more then, is this change likely to be communicated to substances which of themselves would soon unite with oxygen?

3rd The waste matter in the blood is increased.

In consequence of the increased union of the tissues with oxygen, the waste matter in the blood, the result of that union, is increased.

4th The respiration is increased, & with it the circulation is accelerated.

The venous blood is the stimulus to respiration. In speaking of respiration, Dr Carpenter says "The stimulus

to this action chiefly originates in the lungs, & is either the pressure of venous blood in the capillaries, or of Carbonic acid in the air-cells." & in the repression of breathing." For if the process be checked for a few seconds the demand for aeration becomes so strong, that the will can no longer resist the movements to which it prompts."¹ The influence is carried to the Medulla oblongata, "which as a nervous centre receives the impression of the "necessity of breathing." And further this "imperfectly aerated blood acts as a stimulus to all centripetal nerves, & in the cerebellum as well as in the Medulla oblongata."² The waste matter is the stimulus to breathing, else, why does it belong to venous & not to arterial blood. The increase, therefore, of this stimulus excites increased respiration: for if normal respiration is unequal to the office of removing the CO_2 & HO , the increase of this stimulus in the cerebral circulation would produce increased respiration, in addition to its presence, in excess, in the lungs.

Increased respiration produces an accelerated circulation. The effect of expiration in assisting the arterial flow, & of inspiration on the venous flow will account for the increased circulation, without having to seek for a semi-paralyzed condition of the sympathetic & par vagum.

1. Comp. Phys. 4th Ed. § 677. 2. Kirk's Phys. 4th Ed. p. 174.

5th. Increased heat.

Increased respiration produces increased heat. Animal heat is the result of the chemical interchanges in the body, & if these chemical interchanges are increased there must be increased heat. "The quantity of heat generated in the body is in direct proportion to the activity of the respiratory process."¹ "Whenever the temperature of an animal is quickly raised above that which it was previously maintaining, it is always in connection with increased activity of the respiratory movements & increased consumption of oxygen."² of the increase of chemical interchanges, in proportion to increased respiration. Liebig states from the observations of Vierordt, "According to experiments made on this point it appears that with 6 respirations per minute the expired air contains 5.7 per cent. with 12 respirations 4.1, with 24 respirations 3.3, & with 48 respirations 2.9 per cent. of Carbonic acid. The entire quantity of expired carbonic acid was for 6 respirations per minute 11 cubic inches for 12. 25.3 cubic inches, & for 48. 44.5 cubic inches of carbonic acid."³ From this the increase of heat evolved may be estimated. In severe bodily exercise, there is a rapid respiration, accelerated circulation, a large consumption of oxygen, & increased evolution of heat, with great waste, evidenced by the increase of salts in the urine.

¹ Kuile. p 135. ² Carpenter. Comp. Phys. § 452. ³ Letters on Chem. p 358.

6th Waste of the body.

The destruction of tissue is always produced by a union with oxygen. The hydro-carbons invariably unite with oxygen to form CO_2 & H_2O . & the constituents of albumen & the albuminoids, even, unite with oxygen, the carbon as carbonic acid, the hydrogen as water, the phosphorus as a phosphate, the sulphur as a sulphate, the nitrogen, even, though possessing such a feeble affinity for oxygen is excreted from the body in union with it, as urea ($\text{C}_2\text{H}_4\text{N}_2\text{O}_2$). And thus the constituents of the body seek, by their union with oxygen, a new equilibrium, which is only disturbed, when some vegetable vital force compels the atoms of Carbon, Hydrogen, &c. to combine in forming new tissues, leaving the oxygen free for another career of destruction.

The process appears to be thus -

An oxidising molecule is respired & borne along by the blood until ultimately located, it there communicates its change to the particles around it: a supply of oxygen is furnished by the blood, that portion of oxygen is taken up from the blood, which should not, & would not normally, have been consumed till a day later: the oxygen in

In fermentation the atoms seek a new equilibrium, but not necessarily by a union with oxygen as $\text{C}_{12}\text{H}_{12}\text{O}_{12} = 2\text{C}_4\text{H}_6\text{O}_2 + 4\text{CO}_2$. The fermentation theory, thus, does not satisfactorily account for fever.

the blood is reduced, & the waste matter is increased, & consequently the stimulus to respiration: the respiration is increased, & so much more oxygen taken into the system, to meet the increasing demand, i.e. the increased number of particles ready to combine with it: & thus still further chemical changes: this increased chemical union produces increased heat: & as the waste is not fully supplied by the digestive organs, the body is diminished — the changes going on until all the hydro-carbons are consumed, the nitrogenized compounds, by their incombustibility with oxygen, checking the process, or if not, — complete exhaustion & death.

To argue inversely, the increased heat, the essential symptom of fever, from which indeed it takes its name, must arise from the same causes that produce normal animal heat. (That is a union of the tissues with oxygen) & must be occasioned by increased chemical changes, & these, in their turn, involve an increased amount of oxygen, which alone can be furnished by an increased respiration: & this again can only be produced by an increase in the ordinary stimulus to respiration, that is waste matter, requiring for its production additional chemical changes which must have their origin either in some foreign substance undergoing oxidation, communicating its own change, as in malaria, fever caught from infection, &c. or

in a lowered vital force unable to hold the constituents of the body in their combinations, as in hectic, surgical fever, &c.

These facts are wholly inexplicable on the theory of fever being a disease of some organ specially, or of a single organ as is supposed by the followers of Brownes & Co. These organs are frequently diseased at other times, & these diseases are not styled fever, neither have they an approximation to its symptoms: we have enteric ulceration without any approach to fever: & again we have no more common accompaniment or complication of fever, than pneumonia, as a disease of a special organ: & yet we often have pneumonia, when we would never think of calling it fever. That we seldom have a fatal case of fever, but that the immediate cause of death is disease of some special organ, is true, but it is a consequence of the fever not its cause. Dr. Christison has given seven arguments against fever being a disease of a special organ, which certainly appear conclusive, he also states "At the same time it seems difficult for any one to survey dispassionately the whole facts without coming to the conclusion, that fever is essentially a primary disease, & that most, nay possibly all, of the local diseases which have been pointed out as its real source, are

nothing else but secondary affections " & again " Still in a genuine case of fever, no experienced physician can be at any difficulty to point out symptoms common to all, & not necessarily connected with inflammation of any organ. The conclusion seems inevitable, that there is something else in the disease independent of the local disorder." And Dr. Copland states " Fever is a disease of all the vital endowments, functions & faculties of the fluids & of the whole organization." ² The blood being the medium by which the morbid matter is conveyed into the system, & by which the waste matter is excreted, & circulating through all parts of the body, all these parts must be more or less involved. Neither is fever truly a disease of the blood: but in consequence of the excess of waste matter thrown into it, its characters become considerably changed from those of normal blood. Dr. Stevens went so far as to state that the blood itself was actually diseased. And all, who hold the so-called "humoral pathology" of fever, have more or less attributed fever to some "morbid matter or product".

1. Library of Medicine. vol. I. p. 120-21. ² Dict. of Prac. Med. p. 896.

This morbid matter, however, would appear not some especial poisonous product, never otherwise met with, but, in reality, only an excess of the ordinary waste matter, which necessarily accompanies animal life. The blood probably contains not only an excess of waste matter, completely converted into CO_2 &c., but also a number of molecules undergoing oxidation, & even capable of producing morbid changes. Dr Williams in speaking of typhoid fever, &c. says "The appearance of petechia & vibices on the external surface, the occurrence of more extensive hemorrhages in internal parts, the general fluidity of the blood, & frequently its unusually dark & otherwise altered aspect, its poisonous properties as exhibited in its deleterious operation on other animals & its proneness to pass into decomposition point out that the circulating fluid is the essential seat of disorder"¹. Fully decomposed matter can not produce the "deleterious operation" on other animals: it must be owing, therefore, to a number of imperfectly decomposed particles, which are capable of communicating their own change.

¹ Principles of Medicine. p. 553.

This is most probably the process of infection: thus imperfectly decomposed p-particles are thrown off by the respiratory organs. inspired by some one in the neighbourhood, & sooner or later, communicate their own change. That this vitiated blood is connected with a depressed state of structures is certain, for the changes must take place, to a certain extent, at least, in the solid structures: & in fatal cases, as soon as the circulation ceases, that is as soon as the p-particle removal of the waste ceases, the body quickly undergoes putrefaction. "Molecular putrefaction ceases & at any rate much more speedily than in other modes. molecular death follows on somatic death, structures die & begin to run into decomposition, as soon as the pulse & breath are suspended, nay, a p-particle change of this kind occasionally even precedes the death of the whole body (somatic death of Dr. Pritchard). the fatal apthous patches in the throat, & the offensive colligative diarrhoea of persons in the last stage of various fatal diseases: parts running into gangrene, as instanced in the carbuncle of plague, the sphacelous throat of malignant scarlatina, & the sloughy sores of the worst forms of typhus, & in the large intestines in dysentery, the putrid ^{immortant} exhaled even before death by

the bodies of those who are the victims of certain pestilential diseases — there are all so many proofs of the premature triumph of death over vital chemistry." It is probable, however, that a fatal case of fever without an affection of some organ specially, is the exception & not the rule: it has been stated that Peyer's patches are always ulcerated in (typhus & typhoid: the other common complications are inflammations of the lungs, intestines & sometimes the brain. The implication of any organ more than others may be determined, probably, by its greater or less proportionate development: by preexisting disease: or disorder: & in some cases to a great extent by the peculiar nature of the malady, (the exanthemata invariably reproducing themselves on the skin: & some endemic attacks of fever have been accompanied by the affection of some one organ in all the cases in a manner which is totally inexplicable.

1. Principles of Medicine. p. 554.

2. Roditansky states that an atrophied & indurated condition of the abdominal ganglia, which follows typhus "forms one of the few causes which can be found by the knife of the anatomist for the sickly state succeeding typhus." *Archiv. Anatomie of Heres. Sy. d. For. Translation Vol. III. p. 459.*

In most cases of fever, the immediate cause of death is probably some complication, still the extreme state of weakness to which many patients who recover are reduced, without any complication, renders it more than probable, that death, sometimes, takes place from the fever properly, without complication. The variety of complications is great. Dr. Abercrombie says in speaking of "Tracing Causation": "In the investigations, for example, respecting the nature of continued fever, various morbid appearances have observed in internal organs: & each of these has, in its turn, been confidently assigned as the cause of fever. Thus, one has placed the seat & cause of fever in the brain: another in the spinal cord: a third in the gastro-intestinal membrane: & according to one of the latest doctrines, inflammation of the mucous follicles of Peyer & Brunner has been confidently stated as the cause of every modification of fever!"

M. Beau in his lectures on Clinical Medicine in the Hôpital de Charité on the pathology & treatment of typhoid fever remarks that he frequently has seen in attacks of typhoid fever, "pimples on the nates of the size of hemp seeds, terminating at the apex in a black speck, which suppurate & become the seat of ulceration. M. Beau states that it is caused by

'Intellectual Powers. 12th Ed. p 326.

contact with the poisonous matter discharged from the bowels, & that it is less frequent in private practice than in hospitals, as patients in easy circumstances can command greater cleanliness" (Medical Circular April. 1864). Mr. Beau is a determined opponent of chemical theories of fever, or of any alteration in the blood, holding to its full extent, the doctrine entirely originated by Bretonneau & upheld by Louis. It would be interesting to know how Mr. Beau explains the connection of the pimples on the nates with the poisonous matter discharged from the bowels, except on the theory of the communication of atomic change. He is in fact producing strong evidence in its favour: as he does not even suggest that it is owing to some vital action of the discharged matter on the neighbouring skin.

That fever is produced by communicated atomic change is more than probable, & that it is so we may arrive at in two ways. 1st Reasoning from analogy & 2nd Reviewing the facts & circumstances connected with its production.

1st Reasoning from analogy.

The presence of a putrid foetal head produces sloughing of the soft parts, & vesico-vaginal

fistula, in consequence of its putridity. & not from long-continued pressure, is now generally believed; poisoned wounds from decaying animal or vegetable matter, as seen in cooks, in whom the skin is punctured, in cutting meat that is "high"; & in carpenters whose arms or hands are punctured by splinters of decaying wood, when pulling down rotting timbers: dissection wounds terminating in abscess, &c! These instances, where the changes are only local, may be objected to as not strictly analogous, but — in the great constitutional disturbances produced in the mother, frequently terminating fatally, by a dead fetus remaining some time in utero: — in the familiar instance of vaccination, where from a minute portion of lymph, introduced into the cutis vera, so as to be absorbed, every cell in the body is supposed to undergo a specific change, in which its propriety & active power is supposed to exist: — & in the, almost as familiar but more fearful instance of syphilis, where the contact of an infinitely small amount of virus from a chancre, is capable of reproducing its own changes, not only

¹J. Hunter found that raw meat is dissolved in abscess, or even in pus, kept warm, out of the body. Pus being chiefly trioxide of protein, is formed from the tissues probably by a union with oxygen.

throughout the systems of the individuals themselves, but even tainting those of their descendants, perhaps for generations. — we have changes or instances which are surely analogous. It may be objected, how does each oxidising molecule reproduce its own change, such as typhus not producing small-pox, & the reverse. this can not yet be accounted for, except by saying there is some vital property, such as we see in pus from a chancre, whether soft, hunterian, or phagedenic, which do not differ chemically from one another, & yet are distinct in their reproduction; or vaccine lymph from the effusion of Erysipelas & yet these do not act promiscuously; or again gonorrhoeal mucus from ordinary mucus & ^{yet} they are not identical: but all differ in a something which is called specific.

2nd Reviewing the exciting causes.

Exhalations from decaying animal or vegetable matter, foul air, miasmata &c. & lastly infection. The connection of fever with the decay of organic matter is so constant, marked, & invariable, that their indivisibility has long been insisted upon. The institution of Sanitary Commissions, & of Boards of Health, speaks volumes for the impression on the minds of the public even. If there is

no connection betwixt decaying matter & fever.
 what a bitter satire is their institution on our
 boasted social advance & enlightenment.

The late frightful fever at Whitehaven was coincident
 with an astomishly filthy state of the town, never
 very clean; this has been remedied & the fever,
 as an endemic, has departed. The dales
 of Westmorland & the neighbouring countries
 were perfectly infested with typhus until a
 recent date. Some houses especially in each
 dale were notorious for fever, were indeed never
 free from it for years, so, at least, it is stated
 by old medical practitioners who remember it.
 Typhus fever has now departed as completely as small-
 pox, the one through vaccination, the other through
 cleanliness. In the old days fresh air was zeal-
 ously excluded from their houses: the windows
 could not boast even a casement of a single pane.
 such a thing as a cash-window was unheard
 of, the only breath of air, which could possibly
 enter, was by the doorway, immediately in front
 of which lay the dung-hill, with its exhalant
 vapours: the dwelling-house frequently over the
 cow-house: & in proportion as these were aggregated
 so was the prevalence of the fever. This

state of things is now remedied & typhus consequently it scarcely ever heard of.

It has been often noticed that one house, in an otherwise healthy locality, in a terrace for instance, is infected with fever. no matter how often the tenants change, the fever is always there: some hidden cesspool is discovered, which ^{had} not been removed on the erection of the house, it is cleared away, & with it the fever. In one instance, which came under my own notice, three children of a labourer, sleeping in one room, were seized with typhus, the father, mother, & other children (who could not be kept out of the room) never suffered. The conditions under which they were all placed, were identical, except that under the room, where these three slept, ran a drain, filled with decaying matter, causing fever in those constantly sleeping over it; the rest of the family remaining unaffected.

At malarial its origin from decaying matter, especially vegetable is more than probable. In the frigid zones it is unknown. In certain low & marshy districts of the temperate zones & more especially when flat & towards the sea, as Valchium, portions of Italy &c. it is frequent. But it is in

the tropics that its fearful malignancy is most frequently & constantly exhibited; from no other cause has Sierra Leone received the hideous sobriquet of "the white man's grave." To this the great mortality among Europeans in Guiana is chiefly attributed. Two districts combining eminently rapid growth & decay, from the great heat, moist climate & a free supply of oxygen from the sea-breeze. The ready causes of putrefaction. That malaria is dependent on putrefying vegetable matter is shown by the facts, that "while crops are growing, malaria is not generated; but when the harvest takes place & large quantities of vegetable matter are left on the ground, there upon undergoing decomposition, give rise to destructive diseases, as is often the case, where rice is steeped in stagnant water. & in India after indigo has been extracted from the plants, & the detritus thrown into large masses: & indeed a whole family has been ~~thence~~ attacked with intermittent & remittent fever, produced from malaria generated in a small basin of water in which vegetable matter has undergone decomposition." And that it is

produced from decaying organic matter is rendered certain, by the facts, that when these marshes are drained, the malaria & its consequences are removed, moisture being a material assistance to putrefaction; & that when a steady continuous breeze is blowing its presence is evidenced by its effects to the seaward but not to windward. Dr Copland in the Article "Endemic Influences & Diseases" demonstrates these facts, showing also that drainage, or even flooding the marshes completely with water, preventing indeed in any way the access of oxygen, is effective in staying the process consequent upon this putrefactive change! The fatal fever of Hindoostan, of which an account was given in the "Times" of May 30th. 1864, was thus occasioned. From these & other similar facts it would appear that the deleteriousness of miasm. Malaria &c. is owing to the decomposing molecules present in the atmosphere.

Majendie experimented on dogs, by exposing them, narrowly confined, to the emanations from decaying animal matter, by which a disease resembling typhus was induced. And why not? In were not organic molecules, undergoing oxidation, as likely to be met with there, as in the heaps of filth, decaying

¹ Dictionary of Practical Medicine.

matter, &c. in towns, whose presence is, sooner or later, productive of typhus. Dr. Christian states that a disease "apparently identical with typhus," is occasionally generated in the neighbourhood of large collections of animal matter insufficiently buried. (Library of Medicine p. 163).

Infection, lastly, is a great source of Fever: that is of those fevers which communicable by infection. And that frequently a slight communication with fever, tho' unknown to the individual has produced fever in those, who from previous existing circumstances or conditions were more than ordinarily fit subjects for infection, that is in those living in the midst of filth, respiring foul air, &c. Infection from the observations of Dr. Welsh was the cause of fever, in those in whom a cause could be traced, in no less a proportion than 80 per cent. in the Coimbra fever of 1819. Infection of all causes is likely to be most effective, as the unresolved & only oxidising particles given off are the direct result of febrile eremacausis in one, & most calculated to communicate their change to similar particles in another. And that the greater ^{the} proportion of these oxidising particles respired the more certain the infection; & from the more numerous centres of eremacausis, the more severe the fever resulting

In confirmation of those views I propose to quote from the experience of Dr. Christian: he states "Nothing tends to promote the spread of an infectious disease, more than crowding together many people who are suffering under it. Each is then a separate source of contagion: & as the sources are multiplied in an apartment, the contained becomes contaminated in proportion. This is the chief reason why medical attendants & nurses escape infection much more rarely in fever hospitals & wards, than they do in hospitals, where the fever patients are widely distributed among persons suffering from other disorders" The same authority states that long continued exposure to the poison of infection, invariably almost, ends in seizure. He states that no nurse, who staid long enough at her post, ultimately escaped. It appears as if the vital power of resistance is gradually sapped, until it is no longer capable of a successful resistance. In the convalescent, where the vital power is not quite re-established, be exposed to contagion, they are invariably attacked. He further states, That students, who had caught fever in the wards, on returning to their lodgings, seldom

communicated their disease, amidst purer air & greater cleanliness. That the clerks & students who were much in the fever wards, suffered much more than those who were only casually & occasionally present in the wards.

Of fifteen gentlemen who held betwixt 1817 & 1820 the office of house-surgeon or resident clerk, in the Edinburgh Infirmary & Genl Hospital, two only escaped attack, & during seventeen months of the period, when the epidemic was at its height, there occurred sixteen cases of fever.

among ten of these, of whom five had it once, four twice & one thrice¹. This last part of the paragraph does not furnish confirmation of the fermentation theory, part of which is "that certain contagious disorders furnish a protection, temporary or permanent, against their own return".

Long-continued exposure however is not required in every case, some individuals being very susceptible to infection: so that casual exposure is sufficient to cause it. The whole history of fever, indeed, informs us, that this is the case: almost momentary exposure in the constitutionally weak, or casually depressed has been quite sufficient

¹From the article "Continued Fever" in the "Library of Medicine".

32.

to produce fever: though, perhaps, not such severe attacks as those caught from long-continued exposure. The poison of fever will also lurk concealed among clothes &c. though this is a much more uncommon occurrence. Yellow fever, however, has notoriously been frequently propagated in this manner: but even in these more temperate parts of the globe, a single garment, preserved by vanity or greed, from a fever-polluted mass, condemned to be burnt, has been known to produce, even after a considerable lapse of time, not only an isolated, but even an endemic, attack of fever. That this does not take place to the length the public imagine, is certain enough; but that it does take place, occasionally, is more than probable, & is certainly theoretically possible. These oxidizing particles wrapped up in the folds of cloth, &c. are shut off from any further combination with oxygen, their old equilibrium is disturbed, & when the cloth is unfolded, & a supply of oxygen at last furnished to them, the chemical change goes on, & if respired, previous to complete resolution, they communicate their changes.¹

¹ As to the passage of a molecule, when respired, into the blood: no^{one} doubts the expiration & respiration of Carbonic Acid

This view of fever is strongly born out by the observations on Ozone; it having been generally remarked, that an attack of fever, in communities, is accompanied by a deficiency of ozone: & in places where the proportion of ozone is high, there is a proportionate freedom from fever. Ozone is an allotropic condition of oxygen, & is possessed of the power of uniting chemically with substances to a much higher degree than even oxygen, & this too specially in the case of organic substances. Thus decomposing molecules, in the atmosphere, slowly combining with oxygen, in the presence of ozone, become, at once, decomposed into Carbonic acid, water, &c. So that when there is a high amount of ozone in the atmosphere, there are comparatively few decomposing molecules to communicate their change. Thunder storms are productive of a large amount of ozone, to the union of which, ^{with} the decomposing matter is attributed the agreeable freshness of the atmosphere after a thunder storm: & to the same cause the decided effect they have on fever, can alone be attributed.

(CO_2) & the inhalation of Chloroform (C_2HCl_3) to & from the blood, as such, & yet they can only exist as molecules, in a molecular form, that is as a combination of atoms.

On the other hand, the filthy state of the Neapolitan Hospitals; occupation at Mont Laveon, the foul state of the Thames, & of the Water of Leith, as being followed by no fevers, have been adduced as examples against this law. It can scarcely be allowed that these few instances can overthrow the mass of evidence accumulated on the other side, so great, indeed, that the author of "The Laws of Shoung Kt" has given the connection betwixt an open drain & fever, as an instance of a law only lately discovered. Indeed it inclines one to think, that there must be some other forces in action, which counteract it. For instance during the intense heat of last July, there was considerable astonishment that the state of the Thames was not followed by fever &c. an observer of ozone, named Allnatt, wrote to the Times (Aug 6th) showing that there was an excess of ozone in the atmosphere. ---

There is probably a considerable depression of the vital power, caused by the introduction of this decomposing matter, as well as the production of communicated atomic change. "The depression of the vital power" says Dr Copland (p. 894) "is evinced from the commencement, in all the functions, & does not the less exist

because vascular excitement a reaction becomes great or excessive during a part of the disease." The great nervous prostration in some fevers, & more particularly the deep stupor of typhus, is, however, more probably caused by the excess of waste matter in the blood. & is identical with carbonic acid poisoning, or perhaps, as has been stated by some, with uræmia.

As to the depression first produced, most writers state that the organic nervous system is much affected; Dr. Murchison considers it to consist of a "semiparalysed condition of the sympathetic & par vagum". & indeed without this, or some similar explanation, it is difficult to account for the extreme rapidity & weakness of the pulse, in some cases of fever.

The animal temperature in fever varies considerably from the normal temperature of the body; the temperature of the hot stage of fever has been stated at 104° or 108° F.; later observations have found it to be nearer 105° F. In intermittent fever it has been observed in Britain $110\frac{3}{4}^{\circ}$ F. & it has been found in the tropics to mount to 112° F.. the height at which fever heat has generally been

marked on thermometers. Silliman states that it should be marked at 108°F . (Principles of Physics. p. 400). In the cold stage of fever it falls considerably below the normal standard, in continued fever it has fallen to 92°F ., in some cases of Asiatic cholera it has fallen to 77°F . & in the cold stage of intermittent fever to 90°F . In intermittent fever there is a succession of small fevers. The system is exposed constantly to causes productive of waste & fever. "The fit of ague is the reaction of the vital powers against the cumulative influence of the poison in the blood: if the vital powers are strong & the dose of the poison not overwhelming, the fit successfully removes the internal congestion & partially restores the purity of the blood, through increased excretion, but some poison being still in the system, similar effects are again produced, after a longer or shorter interval: & so alternate attacks of ague & intermissions appear in succession" says Dr Williams. It appears, rather, that it is not some of the poison left still in the system, but that the same causes which produced the first attack are in operation to produce a second

in a system, whose vital power of resistance has proved incompetent effectually to oppose them. In puerperal fever, perhaps more than in all others, is the fact of this communicated change most forcibly apparent. The minute particles, of whose presence the accoucheur is perfectly unaware, under the nail or matrix, may be carried about for some time, & when introduced in the system of a parturient patient, where a large mass about to undergo resolution, forms a favourable nidus, the infection is taken with the utmost certainty, & produces, almost always, a fatal result.

Fever is always severe in a parturient patient, but, in this case, where the infection is introduced so as to be taken up in the immediate neighbourhood of the resolving mass the effect is proportionately severe. Dr. Churchill states that typhus is convertible into puerperal fever in parturient women!

And Dr. Simpson states that puerperal fever may be produced from dissections, erysipelatous effusions, or any "inflammatory secretion" Thus showing that these particles may have various sources.

¹ Diseases of Women. 5 ed. p. 764.

¹ Obstetric Works. vol II. p. 20-33.

In fever not occasioned by infection, or any oxidizing molecules, or indeed from any extrinsic cause, such as hectic, surgical, remittent &c. which arise from intrinsic causes: the process appears to be thus. The vital power holding the chemical constituents of the body in their combinations is reduced, by pain, irritation or other cause; the resistance to the respired oxygen is reduced, an excess of waste matter is produced in the blood. & then the same afterchanges as in fever produced from an extrinsic cause, i.e. increased respiration, accelerated circulation, still greater chemical changes, heat, & waste. In fever thus produced, the question of where does the process cease, is more applicable even than in fever from other causes.

The same answer alone satisfactorily explains it: it ceases with the combustion of the hydrocarbons: the comparative incombustibility of the nitrogenized constituents checking the process, & enabling the system to recover itself.

! This is now supposed to be intimately connected with the nervous system, though how? is not easily demonstrable.

In the production of fever the before-mentioned causes are prominent. long-continued, severe pain is followed, as a result, by an increased temperature & most rapid waste. Surgical fever, consequent upon operations, is similar. The irritation, conveyed to the nervous centres, produces through the nervous system of the body, whether cerebro-spinal or sympathetic is not clear, its effect on the animal vital force, which is no longer sufficient to protect the tissues from the action of oxygen. The nervous fever produced by long mental anxiety & bodily fatigue, as seen in females who have been assiduously nursing some relative or friend seriously ill, is of a similar nature.

How frequently this falls short of an absolute pathological state, is shown by the common expression "feverish excitement" so readily produced, especially in a nervous diathesis, by any cause of either mental or physical excitement; which is accompanied by hurried respiration, flushed cheek, accelerated circulation, indeed all the symptoms of transient fever, without muscular exertion to account for it. While if the excitement

of business, or otherwise, be continued for some time the reduced appearance of the individual is proof that the destruction of the tissues has gone on to more than a normal extent. & this too when the appetite has not been affected, at least visibly.

It is impossible, or at least difficult, to agree with Dr Murchison, & other late writers, that it is the nitrogenized tissues which are chiefly consumed in fever. 1stly from the difficulty with which nitrogenized compounds are oxidised. & 2ndly from the analyses which have been made of urine during fever. 1stly of the combustibility of nitrogenized compounds. Liebig states, "Of all the elements of the animal body, nitrogen has the feeblest affinity for oxygen. & what is more remarkable it deprives all combustible elements with which it combines, to a greater or less extent, of the power of combining with oxygen. That is of undergoing combustion." & "Without the powerful resistance which the nitrogenized constituents of the body in consequence of their peculiar nature as compounds of nitrogen, oppose, beyond all other parts, to the action of

the air, organic life could not subsist."¹ The slight amount of heat evolved by the oxidation of nitrogenous compounds² further negatives their special combustion in fever, where there is such increased heat. The albuminous walls of the fat cells, being absorbed along with their contents, may account for a portion of the excess, as far as it exists, of the nitrogenous waste in the urine during fever. Analogous states of combustion furnish results adverse to that theory. The hibernating animal on waking, in spring, its exit from its winter quarters, is found to have consumed all the fat stored up during the previous summer & autumn; having consumed in fact, the hydrocarbons, not the plastic constituents of its body. The Esquimaux, to counteract the action of oxygen, & to maintain animal heat, are described by writers to consume large quantities of the blubber, but not of the flesh of captured whales. In speaking of starvation, Liebig states that the fat is consumed first & then the albuminous constituents of the body, "by degrees all such of the solids as are capable of being dissolved"

^{1, 2.} *Lectures on Chemistry* pp. 394. 396.

^{3.} *Ibid.* p. 350.

A certain waste of the nitrogenized tissues may, & probably does, take place along with that of the hydro-carbons: but as long as those hydro-carbons exist, it must be only to a limited extent. And that this nitrogenous waste is not very evident in urine during fever is strongly supported by Dr Owen Rees in his article on urine in the Cyclopaedia of Anatomy & Physiology.

He quotes from Francis Simon "Assuming as the mean of numerous analyses, that the urea constitutes 39 per cent of the solid residue of normal urine. I have found it as high as 46.8 in inflammatory affections. (In abdominal typhus, with a quick, small pulse, I have seen it as low as 22)." In giving Becquerel's division of diseased constitutions of urine. In febrile urine he speaks of a diminished amount of urea &c. certainly not an increased amount. Scherer's experiments furnished him with a similar result: he gives the analysis of urine, in a case of fever, on the 8th, 12th, & 15th days. The urea on each day being 8.6, 10.4, & 11.4 in the 1000 parts; the amount in normal urine being 30. The uric acid never reaching 1, the normal amount. S. Hentier in the analysis of urine in intermittent fever, gives in the cold stage, 9.845, in the hot 9.015.

& in the sweating 7.624 of urea in the 1000 parts.

Uric acid .660, .980, & 1.029.

On Scherer's case, Dr Owen Rees remarks, "It will be observed, that as the disease progressed, the urea increased": that is as the hydrocarbons became exhausted, the oxygen preyed upon the albuminous constituents of the body. On the other hand Dr Harley in his Lectures on Urine &c.¹ in speaking of the amount of urea eliminated, in disease, says, "Thus in all febrile affections, with one exception, namely, yellow fever, it is increased. In typhoid, for example, Parkes found as much as 57 grammes (883.5 grains) passed in the twenty-four hours: & Vogel, in one case, the enormous quantity of 78 grammes (1209 grains), all, or nearly all, of which, seeing that the patient was on low diet, must have come from the tissues. In typhus, febrile & remittent, the urea is likewise found to be increased, though not to such an extent as in typhoid." It is reasonable to suppose that the quantity of urea will be increased, as some of the increased amount of oxygen respired will unite with the nitrogenized tissues: but it is to a limited extent, as compared to its unin-

¹ Medical Times & Gazette. April. 1864.

with the hydrocarbons. Dr. Harley also states, "that all nitrogenized foods augment, & all non-nitrogenized foods diminish, the amount of urea eliminated by the kidneys"; the reason of that alone can be that the non-nitrogenized foods unite more readily with oxygen & thus protect the system.

Taking the highest amount mentioned by Dr. Harley, 1209 grains or nearly 300 per chem., as an average even of urea in fever, it will not account for the many pounds lost in a week, or even a fortnight; the amount of nitrogenous waste in fever probably bears about the same relation to the non-nitrogenous waste, as is found in normal waste, that is 270 grains, or rather more than $\frac{1}{2}$ an oz. of urea, to 8 oz of CO_2 & 27 oz of H_2O by the lungs, & 9 oz of CO_2 , & $2\frac{1}{2}$ lbs of H_2O , by the skin, the kidneys giving off 35 oz (Poult) of H_2O in twenty-four hours. After making every allowance for the water swallowed as water, the amount of water occasioned by the union of H & O in the body, is at least equal to the amount of Carbonic acid given off. Dr. Harley states that Bon Granque passed 1416 grains of urea (207 grains more than in Vogel's case of typhoid) in 24 hours, when

in a state of health. And in Baron G.'s experiment with coffee, which increased the elimination of urea from 267.84 to 382.25 grains in 24 hours, also increased the amount of water eliminated from 41 oz. his normal amount, to 60 oz. (of the carbonic acid excreted there is no account). Dr. Spanton who has lately made observations on the urine in typhus & typhoid has found no great increase of urea or uric acid. On the whole, it appears probable that the nitrogenous waste is to the non-nitrogenous waste, in fever, much in the relative proportion they bear to one another in health.

In rheumatic fever, no foreign cause can be assigned, though exposure to cold &c. checking the excretions may precipitate an attack: the intrinsic cause is probably an excess of uric acid in the blood, either from increased formation, or, more probably, deficient excretion: the uric acid, as a waste product, increases respiration, to further its conversion into urea. the respired oxygen unites more readily with the non-nitrogenized tissues, & thus increased chemical changes heat & fever. It appears certain that the lithates disappear from the urine previous to an attack of

gout. & Dr. Garrod has shown its excess in the blood. & in rheumatism also it is probably so. During acute rheumatism the urine contains large deposits of uric acid & urates¹, & with their elimination the fever probably ceases. Its entire dependence on the state of the blood is contended for by Dr. Watson.

Predisposing causes.

Fear of the disease has always been considered one of the greatest predisposing causes of fever, especially of fever capable of being communicated by infection. Fear too is increased to its highest intensity, when in the neighbourhood of the disease, where the liability to infection is greatest: & thus the union of the two make its communication almost certain. Fear probably owes its predisposing power to the great depression of the vital powers which it occasions, thus reducing the vital power of resistance. The opposite feeling, confidence, is described as almost protecting the person so endowed, from infectious fever. A constitution broken by intemperance, &c. naturally weak, or reduced by long severe mental or bodily exertion

¹ Copland's Dict. of Prac. Med.: art. Rheumatism. § 65.

fatigue &c. is supposed to be especially liable.

Long continued attendance on fever patients has been found to result in fever in almost every case.

Another great predisposing cause is famine.

Starvation, or any similar means by which the vital power is lowered. "It has been observed that pestilential diseases of the most destructive kinds ensue after a period of famine. It is the ill-fed of the population that mainly succumb to epidemic, endemic, & infectious disorders.

Dr Carpenter well suggests that this may be at once explained when it is remembered that in the body during starvation there is not merely that general depression of vital powers, which may be a predisposition to almost any kind of malady, & pre-eminently to such as are of a zymotic nature - but also the presence in the blood of an unusual quantity of disintegrating matter, which forms the most favorable medium for the reception & reproduction of miasmatic poisons! The explanation of this is, probably, that very little, or no, change, but that of degree is required to convert this state into fever. Fever is noticed to be especially communicable & more in cases where a large amount of

disintegration is going on, as in fever communicated to parturient women. where a large body as the uterus has to undergo resolution, that oxidising or decaying particles find a favourable soil, where the changes they communicate are already commenced in a considerable portion of the system, & the vital power considerably exhausted by the previous fatigue. Youth appears to predispose to fever, or more properly, the liability to infection is much greater in the young than in the mature. The resistance of the vital force is less in youth than in adults, accounting for this otherwise inexplicable fact; for youth is especially the season of mutation, not of waste. Long residence in a damp locality, surrounded by large quantities of decaying organic matter, appears to sap the vital power of resistance. Preexisting disease, especially of a febrile or inflammatory character, predisposes, strongly, to fever. Patients in eruptive febrile disorders, during convalescence seem exceedingly liable to infection. Predisposing causes compose in fact every cause by which the vital power of resistance is lowered, until the system can no longer successfully oppose the immediately exciting cause, whether the oxidising particles arise from infection, malaria, or, indeed, any origin.

Prognosis. The prognosis is affected by all those collateral states mentioned under predisposing causes, such as a broken constitution, starvation, &c.

The most interesting, however, on the theory of fever here adopted, is, that as many systems can resist infection unless it is extremely concentrated, & where there has been long exposure, so is the prognosis affected.

The system which could withstand successfully so many oxidising particles respired, able to excrete them without great difficulty, is powerless under an increased number: & also, in proportion to the number of particles respired, are the different centres of waste, the effect upon the system, & in fact, the severity of the fever.

And this view is borne out by the abundant evidence, that in proportion to the probable number of these oxidising particles respired is the chance of infection, & the prognosis unfavourable.

Dr. Williams says "Epidemic, endemic, & infectious disorders are mostly serious in proportion to their cause. Thus the endemic of a hot climate is more dangerous than that of a cold climate: an infectious disorder propagated in close habitations is more severe, on account of the concentration of its exciting poison, & of other co-operating influences, than one

that arises from more diluted & simple infection. Some estimate may generally be formed of the probable severity of a disease, if the character of its source be known"¹. This passage leaves no doubt of the result of his experience on the mind of Dr. Williams. Dr. Christison, also, says "It is not improbable that, on the average, the severity of the disease bears some proportion to the amount of exposure. This cannot easily be settled with any precision. But the affirmation is rendered a reasonable presumption by the fact, that hospital nurses, clinical clerks, & others similarly exposed, undergo, with few exceptions, a much more violent attack than the average."² The amount of hydrocarbons in the body seem to have a decided effect on the prognosis: where there is abundance of fuel the combustion will be great, & the effect upon the system in proportion. In stout people the symptoms of fever run high, frequently terminating fatally in a few days. One old practitioner informs me that his experience has been, that all stout people die in fever. On the other hand extreme leanness seems to be almost a protection, at least from a

¹ Principles of Medicine. p 540.

² Library of Medicine. p 150.

severe attack. Lord Nelson said that all the fevers in Naples had tried him, but found nothing on him. Further, Rokitsansky states that typhus "very seldom attacks tuberculous individuals". If this is really so, it must be on account of the absence of hy dro-carbons. He also states that tuberculosis is a frequent consequence of fevers, which again must be from the consumption of the hy dro-carbons by the fevers, producing a highly fibrinous state of the blood.

Age seems to have a decided effect on the prognosis of fever. the proportion of sufferers declines as age advances, but the prognosis becomes unfavourable in a more than proportionate rate.

Sex has apparently, also, an important influence: from Dr Cowan's tables in Glasgow, in 2259 patients the mortality among males was 1 in 6.75, but in females, only 1 in 11.2.

In pregnant women, however, it is widely different, the mortality being large.

¹. Sydenham Society's Translation. Vol. 1. p 314.

Treatment of Fever. The treatment of fever may be divided into 1st. General treatment. & 2nd. Curative treatments that is the treatment of cases of fever when actually commenced.

1st. General treatment: this again may be subdivided into a. Removal of exciting causes. & b. Means of raising the resistance of the vital power.

a. The removal of the exciting causes comprises, drainage, ventilation &c. The effect of drainage on the fevers of marshes is of the most salutary character: moisture exhalting many substances to unite with oxygen to a much greater extent than when dry. Ventilation, in affording a supply of pure air to the much increased wants of the system, instead of respicing the already respiced & contaminated atmosphere, especially in infectious fevers, is of the highest importance & value: as well as in diluting the polluted air, a matter of great moment, as all writers on fever are agreed that the more highly charged the atmosphere is with these decomposing particles, the greater the chance of infection: & particularly inhaling the breath, or the air that has been confined under the bed clothes, when these are raised or removed.

The re-infection of the patient from respiration the incompletely resolved particles given off by his own breath. when again respired, is more than possible. The great liability to infection, which is experienced in narrow, confined & ill-ventilated apartments, point to the reverse as a great prophylactic agent.

The removal of all decomposing matter is now strongly supported. the "Nuisance Removal Act" is the result of this conviction on the mind of the public, & the success, in all quarters, which has resulted from its having been effectively enforced, is a practical proof of its efficiency.

The connection of fever with heaps of filth & of decomposing vegetable matter, as well as animal, points to its probable cause, decomposing molecules; & the freedom from fever as an endemic in places where the sanitary regulations are enforced, & these heaps removed, is still further proof of the connection between them & fever.

Antiseptics, have finally, been found of great service; fumigations have always been a favourite method of exhibiting them. Chlorine, Chloride of Lime, Iodine, hy drochloric, sulphuric, & sulphurous acids, & in deed all the mineral acids, have been found

of great service, when sprinkled over the apartment, or allowed to stand in saucers, or, indeed, in any way in which they may be brought into contact with the surrounding atmosphere. The important action of mineral acids, when administered internally, will be considered in an after division. Their efficiency, when thus exhibited, as antiseptics, has not been very plainly demonstrated: it is now, however, supposed, that they exert their peculiar action, by means of a chemical action on, or even, union with, the decaying body. Many metallic salts also, especially those of Mercury, have a very powerful action on decaying particles, or indeed any particles capable of communicating changes, as in fermentation, which is readily checked by them. How far further experiments, on this interesting subject, may negative or substantiate the present impression, it is impossible to state: but from the advance of scientific research, in this direction, having always added to, & not diminished them, it is reasonable to suppose, that some effective method of destroying infection, at least to a great extent, may, ultimately, be discovered. Though until the pathology of fever be cleared up, it can only be empirical.

Prof. Poggi, of Milan, has been most successful in his treatment of Lymotic diseases, by sulphites & hyposulphites: sulphurous acid being the most powerful of all acids, as an antiseptic.

B. Means of raising the resistance of the vital power. Of all methods for the prevention of fever the raising of the vital power of resistance is probably, the most effectual. The slightest causes of fever, which are, still, too powerful for a frame either naturally weak, or from any cause reduced, are powerless to affect those, whose vital power of resistance is high. The means, therefore, to be adopted, are, in all ways, & by all means, to raise that power when deficient, & to keep it unimpaired where it already exists. For those who are in attendance upon fever patients whether in the capacity of medical men or of nurses, it is equally necessary, above all, that the waste of the body be fully supplied by a generous diet, not however to be carried to excess. A system capable of resisting infection has been overcome, after a single debauch or dinner out. A free & even full, diet, with a certain amount of exercise in the open air, especially for an hour or two in the country, when possible, each day, has been most successful in preserving those

whose time is much occupied among fever. An avoidance for some hours a day, at least, of the atmosphere of fever is absolutely required.

The invariable, almost, occurrence of fever in those who are attached to a pure fever hospital, as compared to a mixed one, is strong proof of the power of these decomposing molecules, to sap, in time, any resistance. All exercise, of whatever nature, mental or bodily, is to be encouraged, as long as it does not become excessive or exhausting: the calls thus made upon the internal organs, to supply the waste. Keep them in full action, & enable them to throw into the system an increased supply of nutriment. The effect of mental exercise in keeping the mind employed & not allowing it to brood over the risks & chances of infection, to which the body is exposed, is a great means for its avoidance:

& confidence has frequently supplied to a weak frame that power of resistance which it did not physically possess, & has often protected it, when frames much stronger, from want of that confidence, or from the opposite feeling, fear, have succumbed.

A great deal of speculation as to the probability of any thing being capable of warding off infection & thus preventing fever has been indulged in - it has not.

however, as yet, been productive of any amount of convicting evidence. Camphor, Ammonia, & other drugs of a like character have been much vaunted. Their strong & stimulant smell has, probably, been the cause of their adoption. An emetic, taken after exposure to the infection of fever, has been much extolled by many, whose experience of fever entitles their opinion to be listened to with attention, though its adoption is far from general among the members of the profession. It is difficult to see how an emetic can have any such action, but this, in time, may be explained.

It has, always, been deemed advisable that exposure to the infection of fever, should not be practised when fasting, or when the vital powers are reduced by fatigue, the poison which, otherwise, could be successfully resisted, now meeting with a much slighter resistance. An improved diet, with an occasional glass of wine, or any stimulant, where the reaction is not too great, is very beneficial: & a full allowance of sleep to thoroughly resuscitate the fatigued body is of the highest importance.

2nd The curative treatment. On this subject as many different opinions have been held, as on the pathology of fever. Our predecessors adopted a lowering plan of treatment, which, on the theory that all diseases were of a 'sthenic' character, was logical enough. Now, however, the opposite & undoubtedly more correct view of fever, is of its asthenic character. Dr. Graves wanted, as his epitaph, this only "He led fevers"; & the necessity for it & similar remedial agents is now fully acknowledged. The agents that have been most extensively & effectively employed, have been Acids, vegetable tonics, especially Cinchona & its preparations, & Arsenic. And in considering the action of these agents, it is best to look fully into their physiological action, as far as this is yet known, for without it as a clue, we can come only to an empirical knowledge of their action.

Acids. The mineral acids have always been held in high esteem, for the treatment of fever, & more particularly of continued fever: in many instances administered alone, but when in connection with other medicinal agents they are esteemed of great importance. These acids do not it is supposed act in the body as antiseptics, at least they are not administered with that intent; but have a

peculiar action, of a cooling nature: that is the animal temperature is reduced by their exhibition: & many & many experiments have been, at times, tried to discover the rationale of this.

Dr Stevens, as the result of his experiments, states, "when acids are used internally some of them enter the circulation, darken the colour of the current, & reduce the force of the vascular organ: or when we add a weak acid solution to healthy blood out of the body: we make it quite as dark as it is either in scurvy, cholera, or the last stage of climate fever."¹ Dr Pereira thinks these statements hypothetical, they are however corroborated by the researches of Schultz on the subject: & as they are the only experimenters he mentions, we must accept them until some other experiments are performed. In speaking of Schultz's experiments Dr Pereira says, "²They have, he says, an extraordinary faculty of abstracting the colouring matter from the corpuscles, & of rendering it soluble in the plasma. When thus decolorized, the corpuscles possess a very inconsiderable respiratory power: & the more they are decolorized by the use of acids & acid drinks, the weaker is the pulmonary respiration, & therefore

1. 2. Pereira's Materia Medica. pt. 172. 173.

after the use of acid medicines, vital excitation & calorification. Hence the reputed cooling effects of acids. The blood therefore, continues Schultze, always becomes black, after its intermixture with acids, as well as by their use." These experiments explain the cooling action of acids, as reducing the carrying power of the red corpuscles & thus their great efficiency in fever, where there is such increased chemical changes. I point to their exhibition more during the hot stage of fever, than at other periods. Whether we set aside these experiments, or adopt them, the facts remain the same, that acids do certainly reduce the temperature, which they can only effect by checking the chemical interchanges, & that by the same action the waste of the body is also to a great extent prevented. Their exhibition in cases where the fever runs high & there is great increase of heat, with great thirst, seems especially desirable.

Cinchona. The physiological action of *Cinchona* explains too its efficacy in fever, especially of the intermittent variety. Dr. Adair Crawford experimented largely on the effects of vegetable tonics, & came to the conclusion that they promoted cohesion of the animal tissues: *Cinchona* especially. Dr. Pereira thought that they had this property from some antiseptic acid: which he

does not explain. The experiments of Sundelin, corroborate those of Dr. Adam Crawford: among the operations of cinchona bark he found "general augmentation of the cohesion of the organic mass." (Peruvia. p. 1669). This accounts for the peculiar property of cinchona in warding off an attack of ague, & the benefit received from a course of it on intermittent fever generally. The vital force holding the constituents of the body in combination being reduced, it is raised & assisted by the administration of cinchona, so as to resist the action of their decomposing particles: the efficacy of the administration of cinchona, & its preparations, previous to an expected attack of fever is thus easily accounted for, as also its value in convalescence! Dr. Copland advises a small quantity of quinine & camphor, to be taken in pill by those who are exposed to the infection of fever, or in deed to any of its exciting causes.

A dose of quinine, occasionally amounting to a drachm, is administered to abort an attack of African fever. Its especial efficacy in intermittent fever, where the

¹ During the early period of convalescence there is frequently the greatest reduction of bulk: & that the communicability by infection is then greatest, i.e. the greatest number of unresolved ^{are given off} particles.

system for some days resists, & then for some hours succumbs, is easily explicable: & in supplying that cohesion, in which the system is deficient, we have an explanation of a well-known empirical fact.

Arsenic, or more properly arsenious acid, has a decided action on the putrefactive process: it is very similar to that of cinchona. & in the treatment of fever has been found superior to cinchona, but not equal to quinine: though it has occasionally been successful in putting a stop to ague even when sulphate of quinine has failed. Dr. Pereira gives, at length, an account of its action & *modus operandi*! It has, from these experiments, a most decided action in checking putrefaction, that is the union of the tissues with oxygen. Liebig also states "Arsenious acid does not prevent the putrefaction of the blood, but that of the skin & gelatinous tissues is entirely suppressed".² It has a peculiar special action on the alimentary tube, which has been found little changed or decomposed, although other parts of the body had been completely mummified. The frequent affection of

¹ Pereira, p. 661.

² Liebig's Letters p. 215.

the alimentary tract. & the enteric ulceration, found in (typhus &) typhoid. & the action of arsenic upon it. point to its use as a great curative agent. in these fevers. It has also a considerable action as a nervous tonic, an additional reason for its exhibition in fever. where the nervous system is always more or less affected.

Cinchona & Arsenic, thus, do not exert their beneficial action in ~~typh~~ fever by reducing the chemical interchanges, by lowering the carrying power of the blood corpuscles, as is the case with mineral acids. but in increasing the tonicity of the tissues. & thus enabling them more effectually to resist these changes. whether communicated by decomposing particles, or from the action of the increased amount of oxygen respired, as in fevers arising from intrinsic causes.

Emetics, & more especially tartar emetic, have been much advocated in the treatment of fever. From their lowering action on the circulation, reducing its rapidity, their use in the hot stage of fever might seem indicated, preventing those increased chemical changes, by retarding the carrying power: any further benefit may be a matter of question: while their depressing action would indicate their non-ad-

Administration in fever. where the powers are always depressed. Opium has been found useful in the treatment of the restlessness & sleeplessness, so frequently found in fever. It has been thought by some to have a therapeutic action in intermittents, peculiar & distinct from its narcotic action: but of this further proof is required. Bloodletting has been more or less practised, from invariably in every case of fever at one time, to scarcely even in high inflammatory fever, at the present. The sole good can alone be in reducing the bulk of the blood, & thus the number of red corpuscles, so retarding the chemical changes: in doing this, however, it sinks the vital powers so far, that it is now justly considered unjustifiable.

Alcohol. The use of alcoholic stimulants in fever has been extensively dis-cussed: perhaps not with the same impartiality that other remedial agents have experienced. During the states of collapse, & in great exhaustion after the crisis, its opponents even allow its efficacy. In the form of wine it is chiefly administered, though when a more immediately stimulant action is required, brandy, with or without water, is decidedly preferable. Its stimulant action on the nervous system is the chief reason for which it is administered, &

through the nervous system, the system generally, particularly the circulation, which in those states of collapse, is very weak: at the same time it supplies in itself the hydro-carbons requisite for the union with oxygen: thus producing a renewed temperature, without further waste of the body: which is not the case with the more diffusible stimulant ammonia. And by its stimulant action on the digestive organs, when not taken to excess, assists the assimilation of the more solid food.

Sponging the body generally has been found a most effectual means of procuring sleep in the restlessness so frequently seen in typhoid fever. Cold drinks of many descriptions are now found of great service, their use having survived the strenuous opposition presented to them by earlier practitioners. By requiring so much heat from the body, until raised to an equal temperature with it, they produce a temporary cooling effect of the most grateful character.

One of the most important of the curative measures, is the regulation of the diet, particularly during the period of convalescence, both to assist a perfect recovery & prevent a relapse. During the 1st & 2nd stages of fever, the digestive system is largely affected by the general depression: the appetite

being almost entirely lost, & the capability of digesting such aliment as is swallowed, is of the weakest character. During these stages the only food which can be retained or assimilated is of a farinaceous description: of whatever kind it may consist it must contain a large proportion of hydrocarbons, or hydrates of carbon, as being much more easily assimilable, & in addition, largely resisting the assimilation of the nitrogenous substances. The preference shown for them by the appetite is a salutary choice of nature.

These hydrocarbons, too, when assimilated furnishing in the blood a material easily oxygenized & thus protecting the system from the excess of oxygen respired. That this action is possessed by the hydrocarbons taken into the system is shown by the reduction in the amount of urea excreted, when the stomach could retain some of this food. When an improvement however, commences the digestive system is one of the first to recover its tone, & as convalescence proceeds exhibiting an activity sometimes almost incredible.

In the early period the diet must be of much the same description, as that preferred during the prior stages, namely a light farinaceous diet,

as being most easily assimilable. & containing the
 in two equal & non-in two equal constituents in the
 most suitable proportions. Milk at this time
 is an excellent food, containing all the constituents
 required & in most systems easily assimilated.
 There are a few, however, whose digestive apparatus
 rejects milk at once.

As convalescence proceeds the demand for aliment
 increases, & a little animal food in the shape
 of beef-tea, at first, may now be added with
 manifest good effect. The appetite soon demands
 a larger allowance of animal food, eggs &c or
 a thin slice of mutton or beef, broiled before the
 fire, as a method of cooking which seems best
 to suit a weak stomach. The flesh of mature
 animals has been proven by experiments to be
 much more digestible than that of young
 animals, as beef mutton, than veal or lamb.
 This is directly opposed to the vulgar opinion
 on the subject.

During the later stage of convalescence the
 food taken may be nutritious & even stimulants
 not to be too highly seasoned as interfering with
 digestion, & all indigestible food as pastry &c
 should be carefully avoided. The addition

of malt drinks, not only as beverages, but as food, is now generally approved, provided it be not carried to excess, nor be of too stimulant character: generally being easily assimilated, & assisting digestion, by their stimulus: of all forms of malt liquors porter is now generally preferred. When malt liquors do not agree with the system, a little wine may be substituted. In the country, patients frequently exhibit a preference for milk, with a little spirit added to it.

The method of administering food is a matter not to be overlooked: it should be frequent, & in small quantities: when convalescence is well established, the patient's time is chiefly occupied in eating & sleeping, eating being quickly followed by sleep & waking by an immediate demand for food. The digestive organs having an almost incredible activity, the food taken in such considerable quantities being almost perfectly digested.

Well regulated exercise, not too severe, or prolonged, when the patient is sufficiently recovered, assists the digestive process, & removes any torpidity of the intestinal tract. Premature exposure, however, frequently is followed by a relapse.

The treatment of the complications will be much the same as when fever does not exist.

From page 9. " That particles of organic matter are constantly floating in the air no one can doubt who has seen the ingenious contrivance of M. Pouchet put in practice, & the substances so suspended in the atmosphere collected, by drawing a current of air through a funnel with a very small opening. Immediately below the opening the covering glass of a microscope slide is placed, with a drop of glycerine spread over it. Upon this the current of air impinges, & any solid or corpuscular bodies floating in the air may in this way be arrested & examined with the microscope. Dr. Parkes has detected by this method unequivocal epithelium cells, in several instances; and Eiselt, in a ward containing thirty-three children with acute purulent ophthalmia, was able to detect pus cells floating in the air. (Aitken's Science & Practice of Medicine - 2nd Edition. Vol. I. pp 458-459.

The dew of marshy districts, when examined, gives traces of organic matter, - Volta - De Lisle - Julia - Boussingault - Prof. Henderson's Lectures on Pathology - This organic, as organic, matter, especially if deprived of vitality, must be, more or less slowly, uniting with oxygen -

Fever of Growth & of Decay.

70

Fever of Growth

In introducing, thus, to public notice, an addition to the already long list of fevers, an apology, or at least, an explanation is requisite. My attention was drawn, in the earlier period of my medical studies, as a student, to the fevers of growth & of decay, by a remark of my father's, an old country practitioner, to the effect that he thought he had observed a febrile conditions accompanying rapid growth & accelerating the decay of the aged, which as yet had not been described, & urging upon me the desirability of making further observations, as to their existence &, if existing, to their nature & pathology, & also their treatment. In fever of decay, from the unfrequency of its occurrence, my observations have been restricted to a few cases, so well marked, however, as to leave no doubt of its existence: of fever of growth, on the other hand, so many cases, amounting to some scores, have occurred, though unfortunately no record has been kept of any but those occurring during the spring months of this year (1864), that no doubt is remaining on my own mind not only as to its existence, but, also its symptoms as compared to any, as yet described, in a malady of childhood: Though from inad-

equateness for the task. I may be unable to prove them to the satisfaction of others, if the ensuing remarks may be sufficient to direct the attention of some able individual to their observation. & prove or disprove their existence, it will suffice for the purposes for which this is written.

Fever of Growth is a pathological phenomenon observed betwixt the ages of three & twelve years. at least, such cases as have fallen under my own notice: in being found during the same period as Infantile Remittent fever & resembling it much in its symptoms, it has as yet been compounded with it: though all practitioners, who have had much experience among children, must have observed cases, which have essentially differed from the usual Remittent or Worm fever: both in their duration, mildness, & in the results. It is generally, also, most marked in healthy, robust, children, in this being the reverse of remittent fever. In children weak or starved, it has scarcely any more marked symptoms than great languor, with capricious appetite & occasional pain: but with the temperature not perceptibly raised, the tongue being slightly coated with fur, an occasional shining papilla

being observable. In children strong, healthy & robust, the symptoms are well marked: the little patient is dull, languid & incapable of exertion, can neither ^{learn} at school, nor play energetically when out. the symptoms at this time being not unlike the earlier stages of Hydrocephalus, or Hydrocephalus (of Dr Watson). its duration soon demonstrates that it is not so: the eyes begin to sparkle with an abnormal lustre. the face is flushed, the tongue becomes thickly coated, the appetite is capricious or absent. marked increase of temperature. pains are much complained of through the limbs, & more occasionally through the abdomen. at times, too, in the head; the bowels are not much deranged, the urine natural. This continues for some days, never more than six or seven, sometimes only three, then a decided improvement, in most cases, only lasting two or three days. & then a relapse. In those cases where it lasts for six or seven days, the improvement lasts probably for a week or a fortnight, occasionally more: in the other cases where the febrile condition has only lasted two or three days, the improvement is proportionately short, the relapse occurring in a few days, with precisely similar symptoms.

In many instances this improving & relapsing continues for some time, perhaps months, more particularly in spring, the period when it is most frequently met with: in such cases, the child is never very ill, & get never well, the parents naturally getting anxious & afraid of serious mischief. On the occurrence of the mild weather of summer the symptoms all disappear. The child is lively & active, mentally & bodily, soon making up any ground lost at school, & most energetic among its companions in the play ground: & it is observed to have grown considerably in height, as compared with its companions. The commencement of the process in fever of growth may be either from the waste matter in excess in the blood, from secondary digestion, the materials for the new changes are drawn from the system, in consequence of the loss of appetite preventing a supply from primary digestion, the absorbents taking up what is useful, the waste is taken up by venous absorption. This excess of waste matter in the blood would be productive of increased respiration, further increased chemical changes, & accelerated circulation. & thus all the symptoms of fever: the great proportion of free

nuclei scattered through the tissues of the young & growing, possessed of a peculiar vital force by which cells, fibres &c are formed & thus the changes in growth brought about, favour this supposition. - or these changes of growth may have the effect of lowering the vital force holding the constituents of the body in their combinations, & thus producing fever, by the tissues being unable to resist the respired oxygen, as in hectic, surgical fevers, &c. The waste accompanying fever of growth, especially in stout, strong children, where the symptoms run high, is well shown; the plumpness, from all hollows being filled with fat, is lost in a few days: the full rounded muscles, feeling previously firm &c, are now flaccid & runy, the general weight of the body is reduced sometimes some pounds, by computation, in a single week: all show the waste produced in the body by the changes of structure, induced by growth. The lengthening of the bones, necessarily accompanied by elongation of the muscles, ligaments, nerves, & blood vessels, all require so much formative material, which if not supplied by food, which children take in large quantities & perfectly digest, to admit of these changes & adjustments.

must be drawn from the system generally, with what effect upon the reduction of bulk can easily be conceived. In many cases the fever has a distinct intermission of one, two, or three days, during which there is a complete suspension of all febrile symptoms, the appetite being perfectly natural, & the food apparently quite digested, & thus the changes, less active than during the febrile period, are carried on without drawing upon the system.

It is now largely believed & strongly supported, that all fevers follow remissions or intermissions, more or less distinct, even in cases of continued fever, the febrile symptoms, however, sometimes running so high that they become imperceptible, these remissions or intermissions being marked by the days of crisis, when not more marked. In fever of growth these intermissions are frequently well marked, occurring at regular intervals & of an equal duration, in cases, where they are met with. The varying temperature seems to have some action, as is easily conceivable, on these intermissions: a few cold days, with a denser atmosphere, more oxygen being respired, the symptoms are all aggravated, on a milder change of temperature

The symptoms are all relieved, the little patient being lively, playful & free from all pain, the appetite returning, the tongue clean, the skin cool, the heat having lost its fœtor. & altogether a return to convalescence. Contrasting markedly with the hot skin, flushed cheek, the unguit. or languid, look in the eyes. the mental & physical oppression, the listlessness & pain, which had previously existed. during the colder weather. On the approach of summer, with its higher temperature, the more chronic cases of fever of growth are much improved: & by the end of June, a perfect recovery is found with a considerable addition in height: very frequently followed by a similar attack in the ensuing spring. In some cases, that is when it occurs in its mildest form, the symptoms are much more similar to those of ordinary cold. its most severe form, on the other hand, never equalling ordinary remittent fever.

The idio-diagnosis (1810s. peculiar. distinct. & Siayirwōkwō to distinguish!) It is distinguished from cold, by the absence of any rales on auscultation, & by the occasional pains in the limbs, head, &c. & by the intermissions.

It is distinguished ^{head} from infantile remittent fever, by 1st The entire absence of those daily remissions,

from which remittent fever takes its name.

2nd The slight amount of gastric & intestinal disturbance, & consequently picking of the nose. i.e.,

3rd Its duration.

4th The mildness of its symptoms.

5th The less frequent pulse.

1st The absence of daily remissions, from which infantile remittent fever takes its name - These remissions have been thus described. D^r Joy¹ states them to be three, one in the forenoon, one in the afternoon, & one, the most severe at night. D^{rs} Maunsel & Evanson² also state them to be three, remarking also, that the febrile condition is much more marked in the evening than in the morning.

D^r Copland³ also states that there are three remissions daily. The remissions, therefore, in infantile remittent fever are well marked, more so in mild cases, than in severe ones, where the remissions are almost imperceptible: as fever of growth resembles, only, the milder cases of remittent fever, the absence of these symptomatic remissions is a most marked symptom -

¹ Cyclopaedia of Practical Medicine. p. 241.

² Maunsel & Evanson on the Diseases of Children. 1st Ed. p. 320.

³ Dictionary of Practical Medicine. p. 958.

98.

2nd. The slight amount of gastric & intestinal disturbance. In infantile remittent fever this disturbance is generally well marked. It was supposed to be occasioned by worms, whence Dr. Butler named it "Worm Fever," the name by which it is now familiarly known. It is sufficient to cause severe vomiting, on the introduction of food, & is almost always productive of griping & diarrhoea: It is evidenced in all cases by picking the nose &c.

In fever of growth this is not observable, the disturbance of the alimentary tract being either nil, or very slight, & the consequences of it, as vomiting, purging, &c. being wanting. Occasionally in fever of growth the patient complains of pain in the abdominal region, but this is by no means common; neither when it does occur is it productive of much suffering.

3rd Its duration. In infantile remittent fever Dr. Copland states the duration to be from two to four weeks, in the more favourable cases, & in the adynamic variety from one to two months. In fever of growth the duration is from a week, or ten days, to six months. The shorter cases having generally well-marked symptoms, the more chronic cases having much less marked symptoms.

The febrile condition only lasts for some days, at once, in the more chronic cases it is almost a succession of fevers, at varying intervals. 4th. The mildness of its symptoms.

In fever of growth the symptoms are much milder than in infantile remittent fever: there being no gastric disturbance; absence of general irritability; the countenance more languid than anxious; the urine normal: & in no case any convulsions. So that were even the other especial distinguishing characters absent, fever of growth, on careful observation could scarcely be mistaken for infantile remittent fever.

5th. The less frequent pulse. In fever of growth is much nearer the ordinary standard than in remittent fever: it is regulated, chiefly, by the febrile disturbance, in the more severe cases being considerably elevated, in the mild cases almost normal: it varies from 90 to 112; being seldom above 112, indeed only after any excitement.

In infantile remittent fever the pulse is described as varying from 120 to 160. In the variety described by Dr Copland as the chronic form of remittent the pulse varies from 100 in the morning to 140 in the evening. In strength, or perhaps more properly in

weakness. the pulse of fever of growth is no way to be distinguished, markedly at least, from that of infantile remittent fever.

Fever of growth in its general characters most resembles that variety of infantile remittent fever, called, by Dr Copland, chronic.

The general severity, however, distinctly separates them: there being, in fever of growth, no emaciation, abdominal enlargement, discoloration of the skin, apthous sores, or diarrhoea.

Terminations & Prognosis. The most common termination is a return to perfect health, nor has it ever resulted in any organic change, or functional derangement, which frequently follow infantile remittent fever. Its occurrence, chiefly among, otherwise, healthy children, is no doubt the cause of this. In two cases, however, which came under my observation, the result was different: in both cases the patients were boys, cousins. They both suffered from fever of growth almost chronically: no sooner had the system in the least accelerated the usual growth, than the symptoms became well marked: until growth was, at last, entirely suspended. Though aged 19 & 17 respectively, they present all

the appearance of boys of 13. & not even healthy boys of that age. There is any sufficient reason apparent, all the other members of the family being stout & hale, except in one case his mother suffered, previous to his birth, from chronic gastritis, which not long afterwards proved fatal. With these two exceptions all the cases terminated in perfect recovery. The Prognosis is, thus, of the most favourable character: this state is, however, liable to attacks of bronchitis, which is sometimes such as to give occasion for apprehension: in no case, at least in those cases which have come under my notice, has this complication proved fatal.

Treatment. The treatment of fever of growth is exceedingly simple: when there is much feverishness a little mineral acid is indicated: the acid which seems most suited is the nitro-muriatic. Fever of growth thus differs materially from infantile remittent fever in its treatment: writers on the latter in no instance advocate acids: from which it is reasonable to suppose, that if tried they have not been found beneficial, & practitioners who have tried them inform me, that

they did not see any advantage arise from their use, perhaps the reverse: in fever of growth, on the other hand, few cases require any further curative treatment than a little acid. In cases where the tongue is foul & there is a little disorder of the alimentary track, a small dose of Calomel & Jalap is indicated: Hyd. c. Creta, apparently, does not seem to be so beneficial: the dose is about Cal: gr. II. & Pulv. Jalap: gr. II or III. for a child of six, increasing the dose, of course, according to the age of the patient. In no case has it seemed requisite to administer barks, or any other tonic. Washing the body thoroughly with salt & water every night, or alternate night, is apparently of great benefit: having the salt & water rather above the temperature of the body; it should be done immediately previous to being put to bed, as it decidedly acts as a sedative, the little patient generally falling into a sound refreshing sleep.

When the febrile symptoms are alleviated & the child seems to have recovered its normal state of health sufficiently to be able to travel, a visit to the seaside will be found highly advantageous & this more especially in patients

living far inland. The change of air gives a great stimulus to the appetite, so as to increase the demand for food, while the more constant play in the open air assists in its assimilation, thus providing for the increasing wants of the system & the changes necessarily involved in growth, by an extra supply from primary digestion. Children, too, when taken to the seaside are allowed a free amount of exercise than is usually permitted at home; while the attention of the parents or nurse being more particularly directed to their health, their damp clothes &c. are more regularly attended to & removed than is often the case at home. In summer months, then, when a visit to the seaside is practicable, no better means of a thorough reestablishment of all the functions can be adopted. In the later months of spring winter & earlier months of spring, when a visit to the seaside is inadmissible, the strictest attention should be paid to the clothing: it is too much the fashion, now, to keep children lightly clothed; in short linen trousers &c. sometimes from vanity on the part of the mother, & sometimes from the very erroneous & even more pernicious idea of "hardening children".

by all sorts of exposure & hardships, at a period when care & the avoidance of all exposure is particularly desirable: by which "hardening" all the weaker children are inevitably killed & in the stronger children, in many cases, have been sown the seeds of much after disease, as phthisis &c. Instead, therefore, of the linen drawers & cotton socks, stout flannel drawers & woollen stockings should be suppositied, & the trunk invariably covered with flannel next the skin, while all exposure to cold & wet should be studiously avoided. The diet, too, should be regulated, instead of weak tea & aerated racks, a much more substantial diet should be given; consisting of a full allowance of farinaceous substances, of which nothing is better than the old-fashioned, now much despised, oatmeal porridge, when too purgative, varied by hasty-pudding, with half a pint, or in older children a pint, of new milk, to breakfast, & to dinner a quantity of animal food, without the fat cut carefully away, as is too much the case, the hydrocarbons being most requisite not only as respiratory food, but also assisting the assimilation of the nitrogenized substances. New milk & bread consisting of wheat all ground down together, as is the

technical phrase, the brain being highly plastic, & as well, assisting the vermicular action of the bowels, should be more frequently adopted than is now the case in nurseries & junior schools. The education during these attacks should be entirely suspended, in the more acute cases. It is not requisite to remark this, the child being evidently too ill: in the more chronic cases, however, it is most necessary to convince the parents of this: the prevalent idea of producing infant prodigies in learning, has induced cerebral disease in many children, who, otherwise, would not have been so afflicted. All education should therefore be positively interdicted during this period of growth. The occasional pain in the head, & the general depression are proof that the nervous centres are congested, & thus to increase the congestion, by forcing, or even allowing the child to study, can only be productive of the worst results. Many cases of cerebral disturbance, organic as well as functional have, most undoubtedly, been originally produced by the mistaken zeal of parents, in urging their children to mental efforts far beyond their powers, during this period of growth. While the redoubled vigour which, on complete recovery,

the children generally exhibit, soon enables them to recover any ground lost by their indisposition.

Case 1. T. R. aged 6 years. a stout plump boy, belonging to a very healthy family. pulse 100., tongue rather foul, but not much, bowels slightly costive. appetite almost nil, complained of pains in different parts of the body, occasionally in the abdomen & in the head. but transient & never severe. rest not very sound, was languid & restless. skin hot. with considerable fever. without any remissions. continued so for some days. when he completely recovered. this was about the New Year. he continued well until March. when he again complained. the symptoms precisely similar. pulse 96. continued so for three days. on the fourth he was almost entirely well. & appetite fair, on the next day, however. there was a return of all the symptoms. which continued for four more days. after which he gradually recovered in a few days. During the spring he has grown much.

Case 2. J. E. aged 4. pulse 106. with symptoms precisely similar to Case 1. caught a little cold in addition, remained ill for about ten days. after which he recovered without any return. Has also grown considerably.

Case 3. W. L. aged 3½. belonging to a healthy family of nervous diathesis. was exceedingly irritable, & much

afraid, pulse in consequence was high 120, was troubled with transient pains in different parts, with some headache, continued much the same for a fortnight when he recovered, without any return: is a tall child for his years, & has, also, grown much during the spring. Had no remissions.

In these cases, a little calomel & jalap was prescribed, with some acid mixture, under which treatment they made manifest improvement —

The symptoms of all were very much alike —

Case 4. J. B. aged 12. a tall, fair, slender girl, when seen, her pulse was 92, & rather weak; she had been ailing more or less for two months, but never much; had been unable to go to school; had had these "growing fits" (outgo) every spring but not quite to the same extent; complained of general aching & weariness, the aching most constantly in her lower limbs, & frequently across the breast: her tongue was clean; appetite defective, but improving. Was ordered a better diet of new milk, porridge, &c. with thicker & warmer clothing, & special care to the feet: has since improved much, & grown considerably; is now quite well.

In this case the affection was, markedly, of the chronic type, the intervals of normal health not being very decided. the symptoms being always so much the same, without aggravation or alleviation.

Fever of decay is a pathological phenomenon which is, necessarily, only met with among the extreme aged. The strong hale constitution, which has successfully resisted any disease of a special organ, is at last obliged to capitulate to the chemical power of oxygen: no one part succumbs sooner than another: the general vital force, sapped & undermined by a prolonged existence, gradually is reduced till it can no longer keep up a successful resistance to the action of oxygen. Gangraena senilis & mortification of the lower extremities are much more common: in those the vital force in some part is more reduced than in others: & these histolytic changes are all produced by a union with oxygen. An old patient above 90, gradually declining, not from fever of decay, but with a temperature below normal, was generally protected from the extreme cold & necessarily condensed oxygen, by the bed clothes, the now, not thus protected, was attacked, significant of the general change so soon to take place.

In the extreme aged the general weakening of the muscular system, the low temperature, the want of contractility in the arteries, the dilatation of the veins, all shew the languid circulation

of the blood, from which all the tissues are formed: too slowly circulating for proper nutrition, the waste is not supplied: while the imperfect digestion & assimilation do not provide the surplus from which the blood, in the first place, is maintained in its integrity. The action of oxy-gen on the declining frame is evidenced by the reduction in bulk of the substance of the muscles, as well as all the fat, seen in the wrinkled appearance of the integument: while its action on the nervous centres is shown in the loss of memory & the weakening grasp of thought, dotage in fact, & by the uncertain, feeble, tottering gait, due, partially, to the decay of the nervous, as well as the muscular, system. Even in this histolytic process usually accompanied by any increase of temperature, for in the aged the temperature of the body is below that of middle age. This general weakening of the system is shown in the symptoms of disease in the aged. Dr MacLachlan (on the Diseases & Impairments of Advanced Life) states that extensive disease even of an inflammatory character, as phrenitis, which is generally accompanied by considerable acute pain, is often without the usual symptoms: the decaying

nervous centres neither recording the pain, nor the enfeebled vital power setting up its usual reaction. That the aged are carried off generally, by some attack of an acute character, as Dr Macleod states, there can be no doubt, but that they occasionally sink without any special disease, must be allowed. The mode of death, in these cases, is precisely similar to Virbigs account of the cause of death in chronic diseases: following the same order, in the destruction of the tissues, commencing with the hydro-carbons, then the muscular & lastly the nervous system.

Few of decay occurs, as far as my opportunities have enabled me to observe, in those, who enjoy a vigorous green old age. Their physical & mental powers far beyond their contemporaries, generally.

The first complaint is, usually, of a feeling of diminished energy, listlessness, & a slight want of appetite, probably sympathetic, without, at first, much increase of temperature. If the weather be cold the old patients express their satisfaction at never feeling cold, congratulating themselves on the fact, without being in the least aware of its fatal significance. The appetite is rather improved, even, in cold weather, as is

usual. to admit of the increased chemical changes, but it is unable to supply the waste produced. or in other words. to keep the respiration oxygen at bay. As the disease proceeds, the symptoms become more marked, the increase of temperature, especially, the appetite being gradually lost, while from decreasing strength the patient is confined ^{to bed} or at most to the room. The excretions & secretions are not much affected, the bowels, if anything, inclined to be torpid, probably from deficiency in the contents of the intestinal tube: the urine is quite normal, or, occasionally, pale, straw-coloured. The external atmosphere, in its varying temperatures, has a marked effect upon the patients: a fall of the thermometer is accompanied by increased feverishness, thirst, restlessness, & irritability, a rise of the thermometer by a reduction in all the symptoms, the skin previously dry, hot, & burning, is relaxed, cool, & perceptibly moist to the touch; the thirst is abated, the patient lively, inclining to chat, & very agreeable, offering a marked contrast to the previous conduct & appearance. The changes varying with the temperature, & closely too, show the inseparable connection of this fever & waste of the tissues, with

the amount of oxygen respired: in cold weather the air being condensed a greater amount of oxygen is respired than when the temperature is higher. the same bulk of air containing a greater amount of the compressible & expansive gases.

As the disease proceeds the pertness is much more marked. the patient merely existing, until the flame of life dies quietly out. Of the three cases, which have come under my own notice, one only lived through all these changes. the second, at a very late period however, & third were carried off by bronchitis, to which these patients seem more than ordinarily liable: other complications may doubtless exist, but in these cases the bronchitis was rapidly fatal, the expulsive power being unequal to the effort of expectorating the increased mucus. In the second case the patient was in the last stage, having been confined to bed for some time, when the attack of bronchitis supervened. The idiodiagnosis. There is no disease with which fever of decay may be compounded: it could not be mistaken for a mild case of typhoid, from its duration, & its persistence, the symptoms becoming gradually more & more marked, without any alleviation, until the body is worn out.

Neither, again, can it be confounded with death from old age, without any increase of temperature, a much more common mode of death: it differs from death from old age, chiefly in its high temperature, & hot burning skin, while in the other the temperature is low, considerably below the normal heat of the adult, & in the patient being more rapidly worn out, as might be expected. It most resembles & yet essentially differs from the Climacteric Decay of Sir H. Haller, described by Dr Copland: He says of it, "It usually comes on insensibly. The patient first complains of fatigue upon slight exertion: his appetite becomes impaired, his nights are disturbed or sleepless, & his mornings unrefreshed. The tongue is somewhat white, the pulse a little accelerated, the face emaciated, occasionally slightly bloated, the body emaciated, & the ankles & legs disposed to swell. The urine is not deficient, but the bowels are sluggish, & pains with vertigo are occasionally felt through the head, & various parts of his body, but are not possessed of a rheumatic character. As the vital exhaustion proceeds the stomach

loses all its powers. the emaciation is greater, the lower limbs are more oedematous, restlessness during the day & sleeplessness during the night increase. & all the vital manifestations mental & physical are gradually extinguished".

In fever of decay the nights are not sleepless, neither are the days restless, most particularly in the early stage: the appetite at first is not much affected: there is no tendency for the legs to swell, nor is the tongue much altered. The patients do not complain of any pains.

In climacteric decay Dr. Copland speaks of the patient improving, in fever of decay they grow gradually worse, without any improvement.

In climacteric decay the anxiety of life is one of the exciting causes, in fever of decay there was no reason to suppose this in any of the cases, the mind being very calm & strikingly vigorous.

Climacteric decay is described as being more common among males than females, in fever of decay out of three cases, two were females, one a widow the other a spinster. The most marked symptom of fever of decay & which almost first attracts notice, is the increase of temperature, which is considerable & which distinguishes it

essentially from all other diseases of the aged.

Dr Copland makes no mention of any increase of temperature, in his account of climacteric decay & yet it is so marked, in fever of decay, that so keen an observer would never have overlooked it.

There is still less possibility of confounding fever of decay with climacteric decay as described by Dr MacLachlan.

The Prognosis. The prognosis is necessarily as unfavourable as is possible: the vital power which originally preserved the tissues in their integrity is losing its grasp; that force which alone could preserve the chemical combinations of the body from the action of the respired oxygen is irredeemably weakened, previous to being entirely destroyed. The excessive union of the tissues with oxygen is a histolytic change which can never be checked: no medium can supply the place of the vital power: the change has already commenced which is merely increased by death, when the dissolving vital force no longer offers even its enfeebled resistance — a change which will only cease when the tissues are entirely resolved into the inorganic compound from

which they were originally compelled. Vegetable vital force first compelled them to form themselves into organic tissues, from which man is nourished, either directly, or through the herbivora; the weakened animal vital force can ^{no} longer ever hold them in their combinations: they are resolved, by a union with oxygen, into their original forms, to serve again a similar purpose, & undergo identically similar changes.

The increase of the temperature may even increase the tendency of the tissues to unite with oxygen to a greater extent than they would at the ordinary temperature of the body: the changes thus aggravating the changes about to take place, bad becoming intrinsically worse, until dissolution, sooner or later, supervenes.

In fever of decay, almost more than in other fevers, is it shown, that all fever is the triumph of histolytic over histogenetic changes.

Treatment. The treatment is necessarily only palliative. To keep the bowels open by a little aloes & myrrh pill, castor oil, or any purgative, which is neither too griping nor too exhausting, is requisite: a very little is required as the bowels are only slightly costive, probably from torpor or weakening of the

alimentary tract. To assist the languid appetite a little calumba, as the best bitter, not being liable to produce any irritability of the stomach. &c. with a little nitric or nitro-muriatic acid, is desirable. Cinchona, from its physiological action of augmenting the cohesion of the organic mass, would appear most calculated to be beneficial, if it was not so liable to produce irritability of the stomach, & thus more harm than benefit.

Acids are found to be very beneficial from practice, while their physiological action would especially indicate their exhibition, from decreasing the chemical changes, by their action on the carrying power of the red corpuscles.

The diet is of material importance; it must be nutritious & easily assimilable: if not possessing both these requisites it is unsuitable. It must be nutritious to supply as far as possible the excretive waste, & should contain a large proportion of hydro-carbons, as more readily uniting with oxygen & thus protecting the system, as well as being more readily assimilable. & should consist of farinaceous matters chiefly, as light puddings &c. but without sugar, & with a little wine added. Animal food is too indigestible, & should never

be allowed in the later stages, & in the first only in the form of broth, or finely minced. If the food is not easily assimilable indigestion is the consequence, & still greater depression of the powers following, or diarrhoea even, which would sink, at once, the powers beyond all redemption.

Alcoholic drinks, if not carried to excess, are especially suitable. Liebig calls wine the milk of the aged: but some of the malt liquors are even more desirable, as porter, or strong ale, containing a large amount of saccharine matter in addition to the alcohol: spirits are too stimulant, & consequently too exhausting, if freely administered. One form of administration, which is in great favour among the aged, is a little rum added to a tumblerful of new-milk, a most nutritive mixture, which among old persons, whether in disposure or not, is in Westmorland, extensively used, with the best results: being neither too stimulant nor producing any irritation in the stomach.

The temperature of the room should not be allowed to fall below 60°F : the increase of oxygen respired at a lower temperature increasing the pernick symptoms, & producing greater waste: while if the temperature is much above 60° it is un-

pleasantly warm. & also exhaustive by inducing increased action of the skin.

Sponging the skin extensively with spirit was found in Case 1. to afford great relief. & more particularly the salient points, exposed to pressure as preventing the tendency to form bed-sores, which would greatly aggravate the sufferings of the patient.

Too much company should not be allowed around them, as being liable to produce exhaustion, if agreeable. & if the reverse. Calculated to aggravate the mental irritability, which is considerable & increasing: the mind should be kept in all possible calm, as completely as the body is protected from any thing exhaustive.

Case 1. R. A. aged 86. a retired East Indian, having spent no less than 20 years in the climate of Java, without any indisposition, except an occasional attack of fever: of remarkably temperate habits, having been originally brought up the profession. he enjoyed a green old age, with the intellectual powers remarkably vigorous, having no approach whatever to dotage: his physical powers were uncommonly good for his years. The first complained of indisposition on the 4 of January 1862.

Was languid, listless, & complained of slight want of appetite: skin hot: tongue clean, bowels regular: urine clear: pulse slightly above normal: feeling a want of energy: his sleep not so sound as natural, but undisturbed. On the 13th of that month he commenced taking a little calumba & nitric acid: having previously hoped his indisposition would be only temporary: did not receive much benefit from it, but continued taking it.

Continued much in the same state until the 30th of February, when his bowels became rather costive: was ordered a teaspoonful of Castor oil, when necessary, which kept his bowels regular. At first he kept much his usual habits, but gradually rose later & later, & went again to bed gradually sooner: his physical powers failing: his mental powers unaffected. Soon he was almost entirely confined to bed: he continued much the same for a month.

The temperature was constantly higher than natural, skin hot & dry, generally: the temperature of the external atmosphere visibly affected him: when cold he was restless, irritable, & highly feverish, all his symptoms being aggravated: when warmer the skin lost its dryness & felt much

cooler, & more natural: the restlessness & irritability much reduced. & altogether his symptoms were mitigated: the old gentleman being quite lively. His appetite gradually decreased, returning almost entirely to a farinaceous diet. At this time he desired to be sponged daily with whisky. & apparently was relieved by it. During all this period he never complained of anything which could be referred to disease of, or disturbance in, any special organ: his symptoms being all general, & gradually increasing.

He thus continued until the 5th of April, when he was much reduced. & from long-continued lying in bed, became much afraid of bed-sores. & had all points liable to pressure sponged with brandy: he was not, however, troubled with them: he became so weak, that he could not bear both sides to be sponged on the same day. On April 6th he sank, his mind & memory vigorous & unimpaired to the last, without any pain. His system was greatly wasted, the fat was entirely consumed, except a little across the bowels: his muscular system was also considerably wasted: the nervous system apparently unaffected, continuing to conduct his business affairs to the last.

Case 2. E. K. aged 82, a spinster, belonging to a long-living family, had been rather shrinking during the autumn of 62: on the advent of winter her symptoms were more marked. When seated beside the fire, along with her sisters, when they complained of cold, she required a screen between her & the fire, being uncomfortably warm. As the disease advanced she became confined to bed: her mental powers still good, without any approach to obtuse: her appetite even still remaining very fair. Frequently during the winter nights she became so unpleasantly hot that she used to require her sisters to pull her up in bed, when she sat, in her night-dress only, to cool: her sisters being very uncomfortably cold during all this. This continued for some weeks when she caught an attack of bronchitis. As she had become far spent previously, so much so that her friends looked daily for her death, she soon sank; greatly emaciated -

Case 3. S. J. aged 90, a widow, having borne a large family, of remarkable powers of mind & body, belonging to a surprising long-living family, generally attaining the age of 90. & many beyond. During all the winter of 62-63 - had never once

complained of any feeling of cold; her children were astonished at her great warmth when touched, & the colder the weather the more was this apparent. her appetite was excellent. During the ensuing summer & warmer weather this was abated. Was observed to be failing a little during the autumn of 63: the appetite being still vigorous the system was protected from the respiration oxygen. Her memory, for present things, was only slightly affected, for occurrences long past quite perfect. On the winter setting in the increase of temperature in her again became very apparent, & though her appetite was still vigorous, she was evidently thinning. In the 2nd week of January she was seized with an attack of bronchitis, which carried her off in 73 hours. In no case was there any pain or uneasiness, or anything to indicate any disease, or disorder, of any part or organ —

John Fothergill.

Morland, October. 1864.

Typhus. Case VIII. - James Ferris, act 41 Steamboat Stoker, resident at Leith. Admitted Dec 15, 1884, to Ward 1x, Royal Inf^y under care of Dr Saunders. Has been ill for 9 days, during which time has had no treatment or attendance. Fever already in house.

Day from fever	Circulatory System		Integumentary System		Respiratory System		Genito-urinary System - Urine			Digestive System		Nervous System		Ordered Bandy
	Pulse	Temp.		Respir.		S.G.	Deposit	albumen	Chloides	Tongue	Evac ^{ns} of bowels			Dr.
10	110 weak	103.8	Face pale; prostrated aspect; typhus eruption	30	No bronchial rales and wheezing. Slight cough.					brown and dry	Bowels constipated.	No appetite	Mind confused	6
11	102	102°	Skin dry	28		1.020		none		brown and dry	No stool			6
12	90	101.3		26		1.019		none	yes	brown and dry	3 relaxed stools		Intelligence improving	6
13	82	100.8		20.						brown and dry			Feels better.	6
14	77 of fair strength	98.3		18		1.017		none		dry	Bowels very relaxed	no appetite	More intelligent - but slightly deaf. Pupils small. Feet cold & tingling.	6
15	68 soft and rather weak	97.3		16		1.018		none	Still dim?	Clearing white thin dryish	2 stools	appetite improving a little	Does not feel much better	6
16	70 fair strength	97.3		18						moist and clean	Still relaxed		Feels decidedly better.	6
17	80	98°				1.006		none	diminished almost normal after this day but sticky	almost clean	2 stools: regular after this	Appetite much improved	Still cannot say what day of the week it is. Pupils small.	4

Typhus. Case IX. - John Wilson, act 60, Painter, resident at 90 High St. Admitted Dec 25, 1884 to Ward 1x Royal Inf^y under care of Dr Saunders. Had rigors on 21st Dec. Fever already in his house. Known to have lead an intemperate life for years. This patient died 12 hours after the report on 10th day. Blister was applied to scalp and brandy administered - died quietly. No post mortem examination made.

Day from fever	Circulatory System		Integumentary System		Respiratory System		Genito-urinary System - Urine			Digestive System		Nervous System		Ordered Bandy
	Pulse	Temp.	Eruption observed on admission 5 th day of fever	Respir.		S.G.	Deposit	albumen	Chloides	Tongue	Evac ^{ns} of bowels			Dr.
6	120 of fair strength. Cardiac sounds normal.	104.5	Copious eruption of red spots, fading on pressure. Skin dry.	26	Cough present. Slight rhonchi audible on auscult.					hemulous. moist white fur.	Bowels constipated	no appetite	Restless and moaning. Intelligence fair. Wandering last night - Pupils large - hemulous.	
7	122	104.5	Large indelible spots	26		1.030		none	Slightly diminished	dry	1 stool		Still very hemulous. Wandering last night	6
8	137	103.5		36		1.031	none	none	much diminished	dry	1 stool		Muttering incoherently.	6
9	136	102.3		38		1.028	none	none	Slightly dim. (?)	dry	no stool		Muttering: subcaltas tendinum: Pupils small.	6
10	146 almost insupportable at wrist. Cardiac sounds inaudible with murmuring	101.3	Hands exposed and cold; feet warm.	40	sighing respiration	1.028	none	none	diminished	very dry	no stool		Pupils very small - And the patient unconscious of all around him.	6

Typhus Case X. Donald McIntyre, æt 51, Railway porter; resident at 9 Dumbarton St.; Admitted to Ward IX Royal Inf^y under care of Dr Saunders Dec. 28, 1864. Had rigors with headache 22nd inst. Always healthy man. From already in his house.

Day of fever	Circulatory System		Integumentary System		Respiratory System		Urine			Digestive System			Nervous System	Order of Wine		
	Pulse		Temp.		Resp ^{ns}		S.G.	Deposit	Albumen	Chloids dimin?	Tongue	Evacuations of bowels				
7	100	of fair strength, soft, regular.	104°	Robust man. Face flushed, eyes injected. Several red spots, disappearing on pressure, on trunk & arms.	20	Slight Cough.					Moist, white fur.	None for 3 days.	Taken no food for 3 days.	Intelligent. Headache. Feels cold.	13.	
8	103	rather weak, regular.	104°		24		1.028	none	none		Moist, white fur.	none	very thirsty.	Patient calm and intelligent.	6	
9	104		104°3	Eruption less distinct.	25		1.025		none	yes	Moist	none		Intelligence not markedly impaired.	6	
10	108		104°5		17		1.023	none	none		Moist white fur.	1 relaxed stool.		Intelligence little blunted.	8	
11	60	Very irregular & weak	102°8		24	No severe cough.	1.016		none	considerable	moist			Tendency to wander in conversation.	8	
12															8	
13	102	Weak, regular	104°		24						Covered with little brown scales.	Several relaxed stools.		Papils small. A little wandering last night.	8	
14	112	of fair strength	102°5		21		1.017	none	trace(?)		dry	Several relaxed stools.	Involuntary evacuations of bowels & bladder.	Papils very small. Patient slumbering into morose sleep.	8	
15	96	of fair strength, regular	101°8		22		1.015		none(?)		dry	4 relaxed stools.	Involuntary evacuation of bowels & bladder.	Muttering delirium.	8	
16	96		103°		19		1.024	Slight	none		dry	none		Still delirious. Still delirious.	8	
17	79		99°	Looks brighter.	14 14		1.019 1.019		none none		dry	none		Much more intelligent.	8	
18	72	of fair strength.	99°8		18						Moist, but looks on edge.	1 stool	Appetite improving		8	
19	74	of good strength	99°3		20		1.027	little	none	yes	Moist and clearing			Slight wandering.	8	
20	78		99°8 99°8		18		1.017	none	none	almost normal.	Moist	none		Still liable to wander in conversation.	8	
21	82	of fair strength reg.	99°8		14		1.015			no	Clean	1 solid evac ^{ts}	Good appetite		6	
22	78		99°3		14		1.015		none		Moist	1 stool			6	
23	74		99°5		17		1.020	copious							3	
														26 th day.	For last 2 days complained of pain & deafness in right ear. There is purulent discharge today.	3

Typhus. Case XI. George McIntyre - aet 14. Schoolboy. resident at 9 Dumbarton St. Admitted Dec. 28, 1864 to Ward 18 Royal Inf. under care of Dr. Saunders. Taken ill 24th inst. Fever already in the family.

Day	Circulatory System	Integumentary System	Respiratory System	Genitourinary System-Urine.	Digestive System.	Nervous System					
Febr	Pulse	Temp.	Resp ⁿ	S.G.	Deposit	Albumen	Chloides dimin ^{da}	Tongue	Wac th of hands		
5	100 of good strength	103°3	In good condition: Expectorant heavy: few to spots on skin, disappearing on pressure.	26	A little cough today.			white fur with few capillae	none for 3 days	No appetite.	Headache: abdominal pain and tenderness.
6	110	104°		30		1030	none	Slightly moist thin fur	one stool		Abdominal pain.
7	116 of fair strength.	102°5		31		1025	none	scarcely moist	none		Still complains of pain in abdomen especially in the hypochondriac region.
8	110	103°		28		1024	none	moist	none		Abdominal pain.
9	124	103°8		32		1026	none	considerably moist	none		Patient is irritable.
10											
11	120	103°		34				Moist: thick creamy fur	one stool		The intelligence good throughout.
12	106	103°5	Patient looks brighter	23		1018	none	moist - cleaner	none		
13	95 fair strength	102°		23		1022	none	moist	one stool		
14	86 of fair strength, regular	99°3		21		1012	none	moist and clean	one stool	Appetite better.	Pupils of moderate size throughout and no delirium.
15	72	98°		19		1025	none	moist	none		
16	74	98°3		22				Clean	1 solid stool	Good appetite	Does not sleep well
17	58	98°3		17		1020	none	normal quantity	Clean	none	
18	60	98		20					none		Progressing favourably
19	64	98°3		24					none		

No stinkulant noted.

Typhus. Case XII. Hugh Rogers. Oct. 25, laborer. Admitted Resident at Kirknewton. Admitted Jan 8th 1865, to Ward 14, Royal Inf. under Care of Dr. Sanden. Always in good health, except that he had attack of pleurisy 6 years ago. Rigors Jan 2nd. Fever spreading in the land in which he lives.

Circulatory System		Integumentary System		Respiratory System		Genitourinary System - Urine		Digestive System		Nervous System		Order W	
Pulse	Temp.	Swelling - Tad strong man, well red hair & blue eyes.	Respi ^{on}	Has had a cough from 1 st day	S.G.	Deposit	Albumen	Chloride	dimin?	Tongue	Evac. of bowels		
7 107 of good strength, soft, reg. Systolic sound rather indistinct.	104.8	Face flushed, Expression heavy. Numerous hot disappearing on pressure; indistinct & large on back	26	Breath sounds rough. Slight expectoration. Normal pers ^{on}	1025		none	considerably		Moist, dirty white fur	1 Solid stool thin morn?	Intelligence good. Occasional slight pain in abdomen - Sleepless at night - Pupils rather small.	03.
8 101 of fair strength	104.3		16	Considerable cough - with watery expectoration.	1032		none	considerably		Moist white fur.	1 stool	Quite intelligent. Pupils rather small.	6
9 102 rather soft	104.3	Skin dry.	30	Frequent cough.	1027		none	to a trace		Moist, thick white fur.	3 stools	Patient was a little delirious last night	6
10 106 weak and soft	103.5	Eruption well marked on trunk upper and lower extremities. Skin dry	42	Cough less severe	1025		none	no chloride detected			1 stool	Fair intelligence: feels weak. Pupils of moderate size.	6
11 106 weak, irreg.	103.5		32	Cough less troublesome. Expect. not less but thicker & more tenacious	1020	none	none	no chloride		Moist, thick white fur.	several stools.	Memory marked & impaired. Pupils of mod. size -	6
12 108 - weak, irregular	103.3	Indistinct spots well marked on chest	36							moist.	none.		6
13 108 more regular	104	Eruption still copious	34	Cough has considerably subsided.	1017	none	none	none		dry	none	Patient drowsy. Pupils mod. size.	6
14 110 very weak	103.3		41							moist thick, coated		Fair intelligence	6
15 100	103.3	Cough still troublesome - thick tenacious mucus with large bubbles with difficulty of expect.	32	Cough still troublesome. Thick mucus with large air bubbles expect. with difficulty	1020		none	trace		moist.	none	Intelligence good.	8
16 92 weak	102.5	Eruption considerably faded; but few spots still well marked.	31		1023		none	trace		dry but not darkened	1 relaxed stool.	Pupils mod. size.	8
17 74. Regular. fair strength	98	Swelling last night. Does not look markedly improved today	28		1023		none	less diminished		moist and clearing a little	1 stool	Does not feel much better today.	8
18 77 weak	98	Several spots of eruption still appar- ent.	24	Cough still persists and little expectoration of thick mucus.	1020		none	still much diminished		moist but furred.	none.	Patient drowsy, and says he feels 'silly', but no pain.	8
19 66	97.5		24		1016		none	still less?		Clean	none.	Feels much better.	4
20 56 very weak and almost comatose.	97.3		17		1015		none	chloride, nor- mal in amount?		Clean	none	Appetite improv- ing a little.	4
21 52 weak. regular. Ty- phic sound in middle	97.3	new sweat	16		1018	none	none	normal		Clean	none	Feels very well, and regains his strength.	
22 48 of better strength, and the typhic sound is distinct today	96.8		16		1016	none	none	little dimin?					
24 56-60 irregular. of better strength					1016								
27 68 still rather weak and irregular										Bowels regular	appetite good.	Left bed today for the first time	

Weight of
Patient in lbs.

[illegible]

Typhus. Case XV. Francis Blank. aet. 19, male, resident at Westport. Admitted Jan 24, 1865, to Ward 19, Royal Inf. under care of Dr. Sanders. Taken ill with shivering 20th Jan^y 1865. There was fever already in the land in which he lived (the flat below). He had not communicated with any of the fever patients.

Day	Circulatory System	Integumentary System	Respiratory System	Genito-urinary System-Urine	Digestive System	Nervous System	Height of Patient in inches	Weight of Patient in pounds						
fever	Pulse	Temp.	Patient above 6 ft. in height and slightly built. Expression of countenance heavy. No eruption or mottling visible. Skin dry	Resp.	Oz. of Urine in 2 1/2 hours	S.G.	Chlorine	Albumen	Tongue	Stomach & bowels				
5	86 of fair strength, rather small	104°	No marked eruption. Skin dry.	20	Slight tickling cough: no expectoration.				Almost clean of dark-red color.	Bowels moved by medicine just.	No appetite: not thirsty.	Intelligence unimpaired. Says he sleeps badly.	135	
6	93	104°5	No marked eruption. Skin dry.	20	Respirations sighing	40	1028	2.605	normal	none	Glaucous anteriorly, no stool		Complains of severe frontal headache.	
7	92	104°5	A typhus eruption observed today	24		60	1026	3.600	little dimin?	none	Urine drawn away for 20 hours previously passed post 2			
8	88	104°8		24		55	1024	3.075	little dimin?	none	Urine drawn away for 20 hours: passed moderately, afternoon.			
9	98 weak.	103°5	Eruption is now well marked, and not disappearing on pressure	24		100	1026	6.000	considerably diminished	none	Covered with moist white fur.	No stool	Complains of abdominal pain.	
10	108	103°5		24		44	1019	1.948	trace	none	Thickly coated - moist.	No stool	Feels very ill. Intelligence fair.	
11	116 weak	104°5		23		80-90					Coated post 2: and dry ant 4	No stool		
12	115	104°3		28		56	1016	2.169	much diminished	none	Dry: Clean anteriorly	1 copious stool	Still complains of pain. Slight muzzling.	
13	102	103°8		24		85-95	1017	3.565	trace	none	Dry, and with difficulty protruded	No stool	Pupils rather small: no delirium.	
14	104 weak and small, regular	103°		24		90	1018	3.774	trace	none	Covered with dry brown scales	2 stools	No delirium, but exceedingly stupid. Pupils of moderate size.	
15	85 of better volume and strength.	103°	Skin dry	14							Dry		Sleeping: pupils small.	
16	92 rather weak	101°8	Skin dry	19		63	1016	2.348	much diminished	none	Several relaxed stools: dark	No stool	Sleeping with mouth open.	
17	75 weak, regular	99°8	No sweating	19		64	1015	2.236	none	copious	Dry, but clearing	No stool	Feels better. Pupils small.	
18	57	97°5		13		40	1018	1.677			Moist, but slightly coated	No stool	Feels quite well. Pupils of normal size.	117
19	72 of fair strength	99°3		16		45	1017	1.782	almost normal quantity	none	Clean and moist	No stool	Progressing favorably. Pupils of normal size.	
20	65	98°3		15		61	1016	2.273	little diminished		Clean, dryish.	No stool	Feels well. Pupils of moderate size.	119
21	58 of good strength	98°5		15		58	1016	2.762	normal		No stool		Sleeps badly.	
22	64	98°8				70	1015	2.446			Covered with slight white fur.		Pupils of moderate size.	
23	60 of good strength					56								117

Typhus Case XVI. Lolly Camichad, aet 12. resident at Grog's Market. Admitted Jan 25th 1885, to ward XI Roy al Inf^y under care of Prof. Bennett. Felt cold and dizzy on 22nd. There was fever already in the house.

Day of fever	Circulatory System	Integumentary System	Respiratory System	Genito-Urinary System - Urine	Digestive System	Nervous System	No.							
	Pulse	Temp.	A delicate scrofulous-looking child Eyes watery. No marked eruption visible on chest	Resp ⁿ	03.4 Urine S.G. in 24 hours	Chlorine	Albumen	Tongue	Evac ⁿ of bowels					
4	116	104°		28				Coated with moist white fur	1 stool after an aperient.	No appetite: Thirsty	Intelligence unimpaired.			
5		104°8		30	52-56	1.017	2.139	little diminished	none	No stool				
6	108	104°3		40	58	1.020	2.703		none	No stool	Complains of headache.			
7	114 rather weak	104°3		44	62	1.027	3.900	little diminished	none	Moist: Slight coating on centre.	No stool	Intelligence unimpaired.		
8	108	104°3		42	68		2.745	Considerably diminished	none	Moist: Slight fur on centre	No stool			
9	104	104°		52	60			Much diminished	none	Moist	No stool	Feels better.		
10	104	104°3		52	66					Moist	No stool	Intelligence unimpaired.		
11	100	103°		44	62	1.019	2.745	Much diminished	none	dry	1 stool	Sleepy: rather deaf.		
12	88	100°5		42	66	1.021	3.229	more copious	none	Moist	1 stool	Pupils rather small.		
13	88	101°		35	52					Moist and clean.	No stool.	Pupils of moderate size. Feels much better.		
14	76	97°3		34	68	1.017	2.693	more copious	none	Moist	No stool	Hungry	Pupils of mod. size. Feels quite well.	
15					56									
16	72 of fair strength	97°8		28	64	1.015	2.237	almost normal				Hungry.		
17	66				60	1.017	2.376							
18														
19														
20	68													

Dr. Bennett.

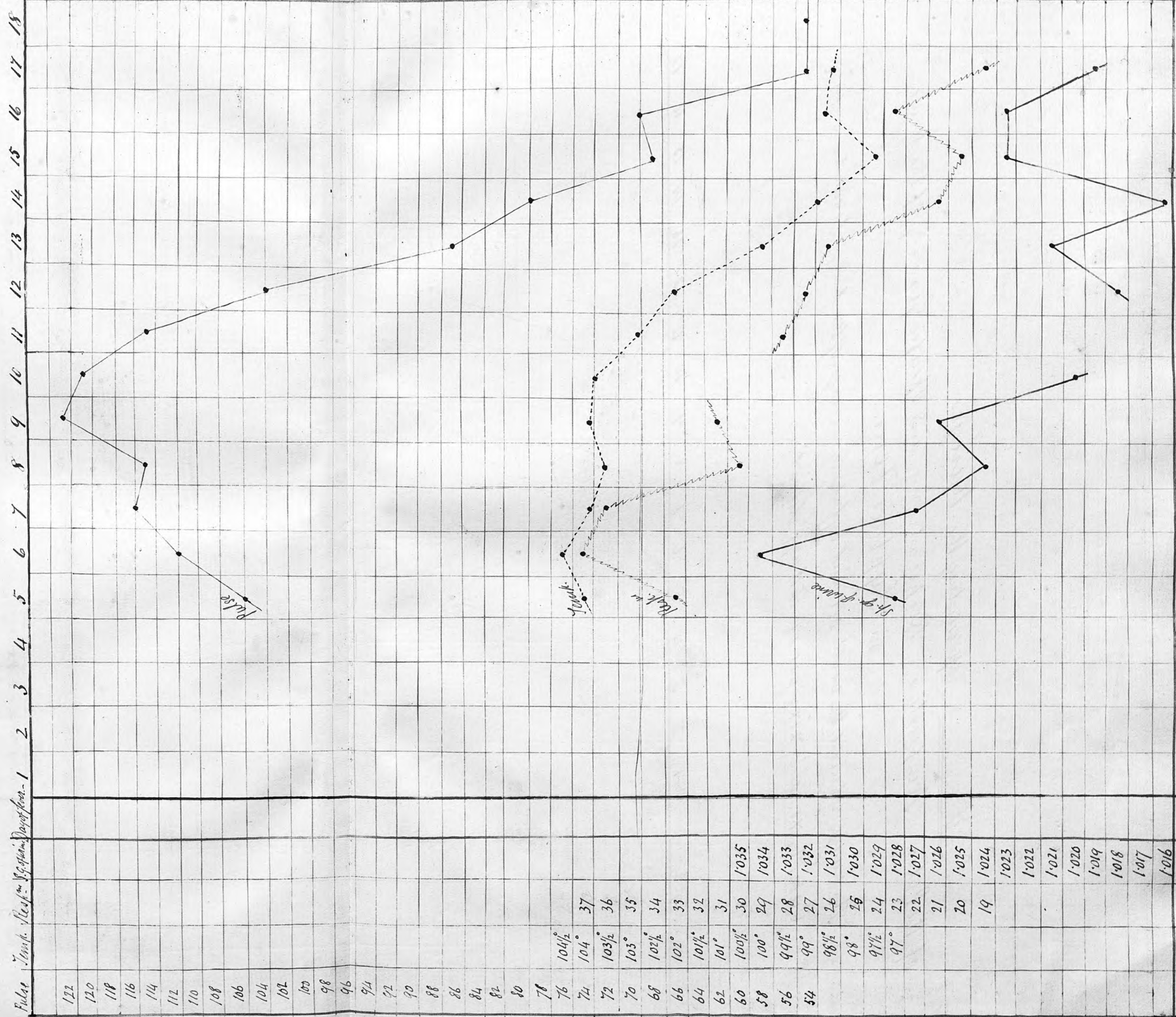
Typhus Case XIX. Jacob Faller, abt 15, member of a German band; resident at Mannheim. Admitted on 25th Feb. 1885 to Ward 18 Royal Inf^y under care of Dr. Sander.
Taken ill on 23^d with shivering &c. Fever already in the house.

Circulatory System		Integumentary System		Respiratory System		Genito-urinary System.		Urine.		Digestive System		Nervous System.			
Pulse	Temp.	Of face complexion in good condition. Face	Resp.	Of urine	S.G.	Amount	Grams	Chlorine	Colors	Albumen	Tongue	Excretory glands	No appetite, thirst;	Frontal headache and pains in loins and limbs.	lbs.
3 93 of fair strength & vol. reg. Cardiac sounds of good strength	104.2	Slightly flushed and expression heavy. No marked eruption. Skin dry.	22	27.		0.5.	grams				Thin white fur with few layers of pap.	1 stool daily.	no abnormal pain or tenderness.	Intelligence unimpaired. Pupils of good size.	
4 108	105.2	No distinct eruption yet. Skin dry. Expression more depressed.	36		1.028			abundant	yellow	none	Moist	2 semisolid stools of light color.	Slight abdominal pain.	Pupils of normal size.	81
5 110 systolic sounds feeble	104.9	No eruption visible, but skin of a dusky hue; dry	40	Breath sounds roughened.	26 1/2	1.028	1.726	340	abundant	reddish-yellow	none	Covered with white fur post. moist	no stool	Pupils normal size. no marked impairment of mental faculties: except stupor.	
6 112 feeble, soft, regular.	104.5	Skin dry.	44. irreg.		30	1.026	1.800	315	little diminished.	reddish-yellow	none	Furred, dryish. Dry scales on lips & teeth.	no stool	Pupils normal size. Complaints of pain in right hypochondrium: headache less severe. Still complains of pain in abdomen.	
7 116 still weaker.	104.5	Skin very dusky, but no distinct eruption	40	Slight cough. no expect.	25	1.026	1.500	320	considerably diminished	turbid	none	dryish	no stool		
8 119	104.2		32		25 1/2	1.025	1.485	315	considerably diminished.	yellow	none	Covered with thick moist fur.	no stool	Pupils of normal size. abdominal tenderness. no delirium.	
9 111	103.6	no eruption visible	30			1.025			much diminished.	yellow	none	Dryish, brownish yellow fur.		Pupils normal size: no delirium.	
10 117	104.5		38	Still has cough.	24 3/4	1.023	1.327	295	much diminished	yellow	none	Brownish yellow coating.	1 semi-solid stool.	Still thirsty and no appetite.	Pupils of normal size. no delirium. Complaints of headache, and abdominal pain.
11 102	103	The skin looks little clearer.	22			1.020			little more abundant.	yellow.	none	Thick dark dryish coating of light yellow.	3 relaxed stools	Patient feels little better. Pupils normal.	
12 86 of better strength	101.0		31		38	1.013	1.178	175	more abundant.	yellow.	none	Dryish dark coating.	2 relaxed stools.		
13 74	100		23		28	1.017	1.109	175	Still considerably diminished.	yellow	none	Clearing and whitish.	1 relaxed stool, dark.	Pupils normal. Patient feels decidedly better.	
14 68 of fair strength and vol. regular.	99.8	Skin clear and dry.	21		26 1/2	1.020	1.235	205		yellow	none	moist, and almost clear.	3 relaxed stools.	Patient sleeping. Pupils rather small.	
15 57 labored, and slightly irregular. of good volume	99.6	Skin dry	22			1.021			abundant	yellow	none	moist and clear	2 stools.	Appetite good	Slupy and peevish.
16 52	99	Skin very clear.	24		16 1/2	1.021	.807	190	normal	yellow	none	clear	1 stool.	Patient more attentive.	76
17 51 fair strength & volume	98.6	Face pale and clear.	22		35	1.017	1.386		normal	pale yellow	none	Pale & flaky.	1 stool.	Appetite good.	
18 49					32	1.015	1.118								
19															76
21															
22 54 rather weak, reg. of fair volume.	98.2		20								Pale, clear	Bowels moved daily	appetite good.	Pupils of moderate size. Progressing favorably. dismissed 2 days after this.	

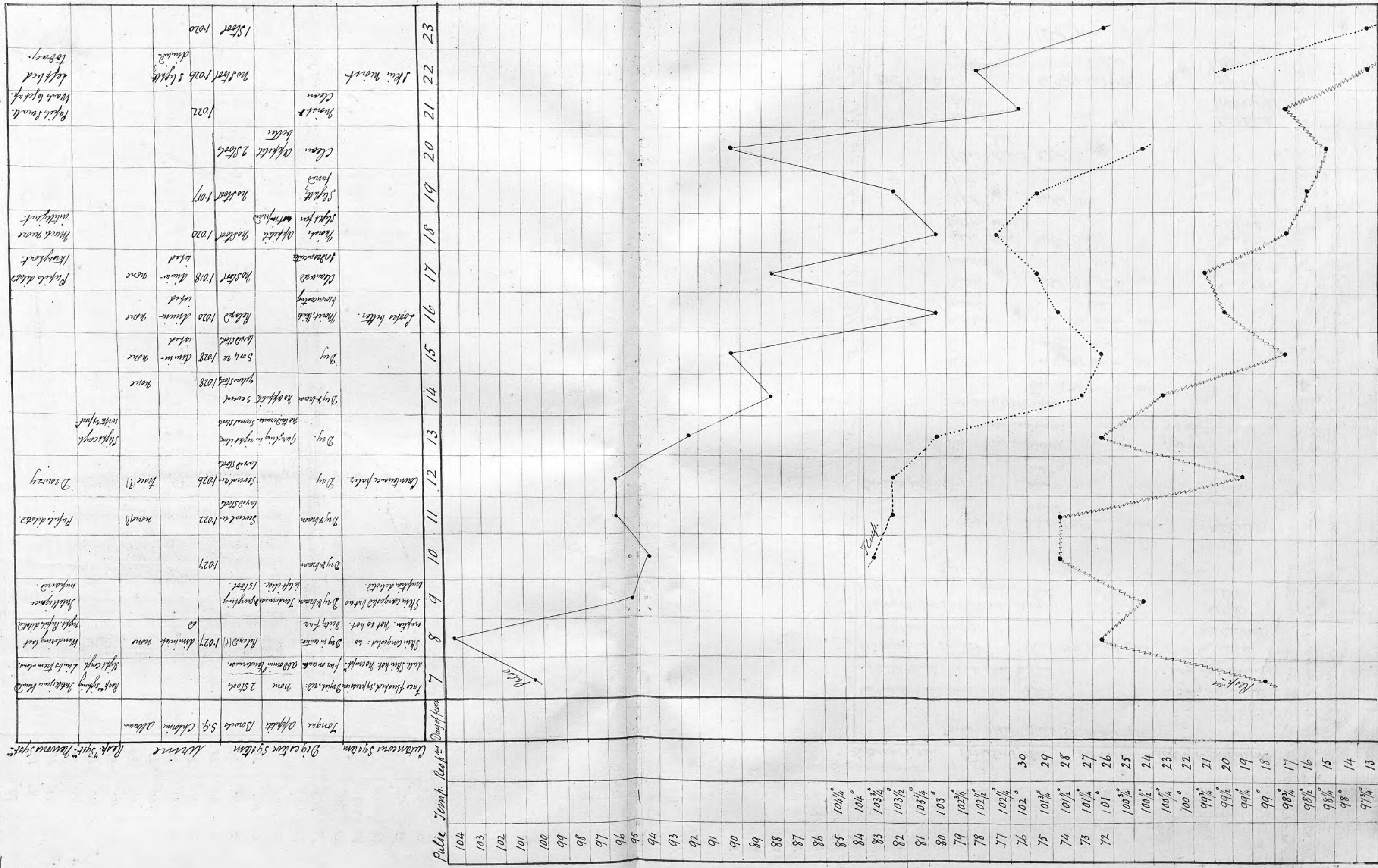
A Diagram representing the Ranges

of the Pulse, Temperature, Respirations, and Specific Gravity of the Urine in Typhus Fever.

The Ranges represent the results obtained by taking average of the daily observations in Cases I, XI, and XIX; all of 15 days' duration.

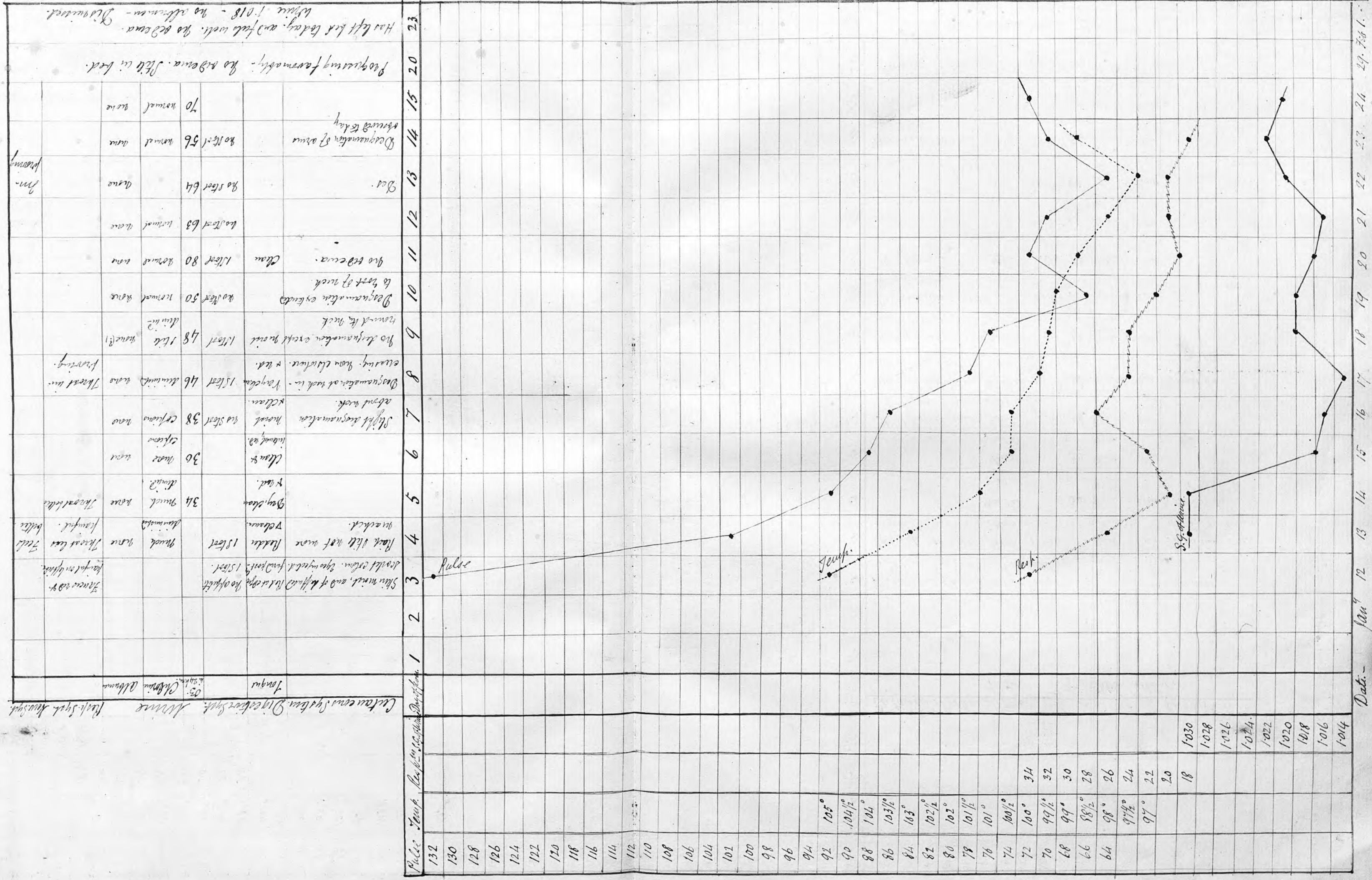


Typhoid Case XX. John O'Connor, at 19, Labuan, resident at Penang. Admitted Dec. 10, 1904 to Ward 18 Royal Infirmary, Penang. Always healthy prior to Dec. 6. Then seized with shivering & headache. Continued at his work till 3rd day of illness. Then was children ill in the same house.
N.B. The upper and lower ranges in the subsequent diagrams represent the pulse beats per minute; the second range the degree of temperature; the last range the respiratory.

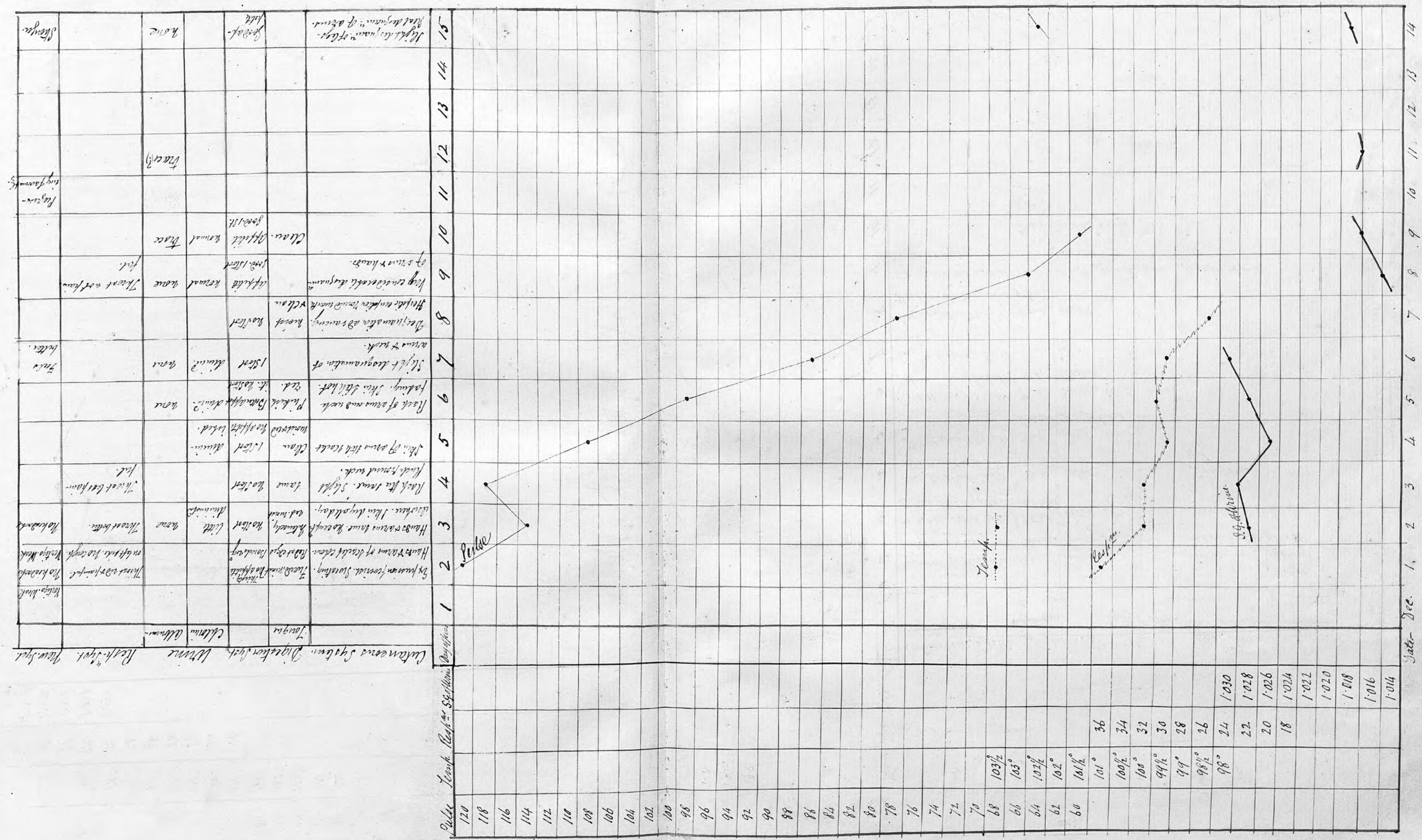


Date: Dec. 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

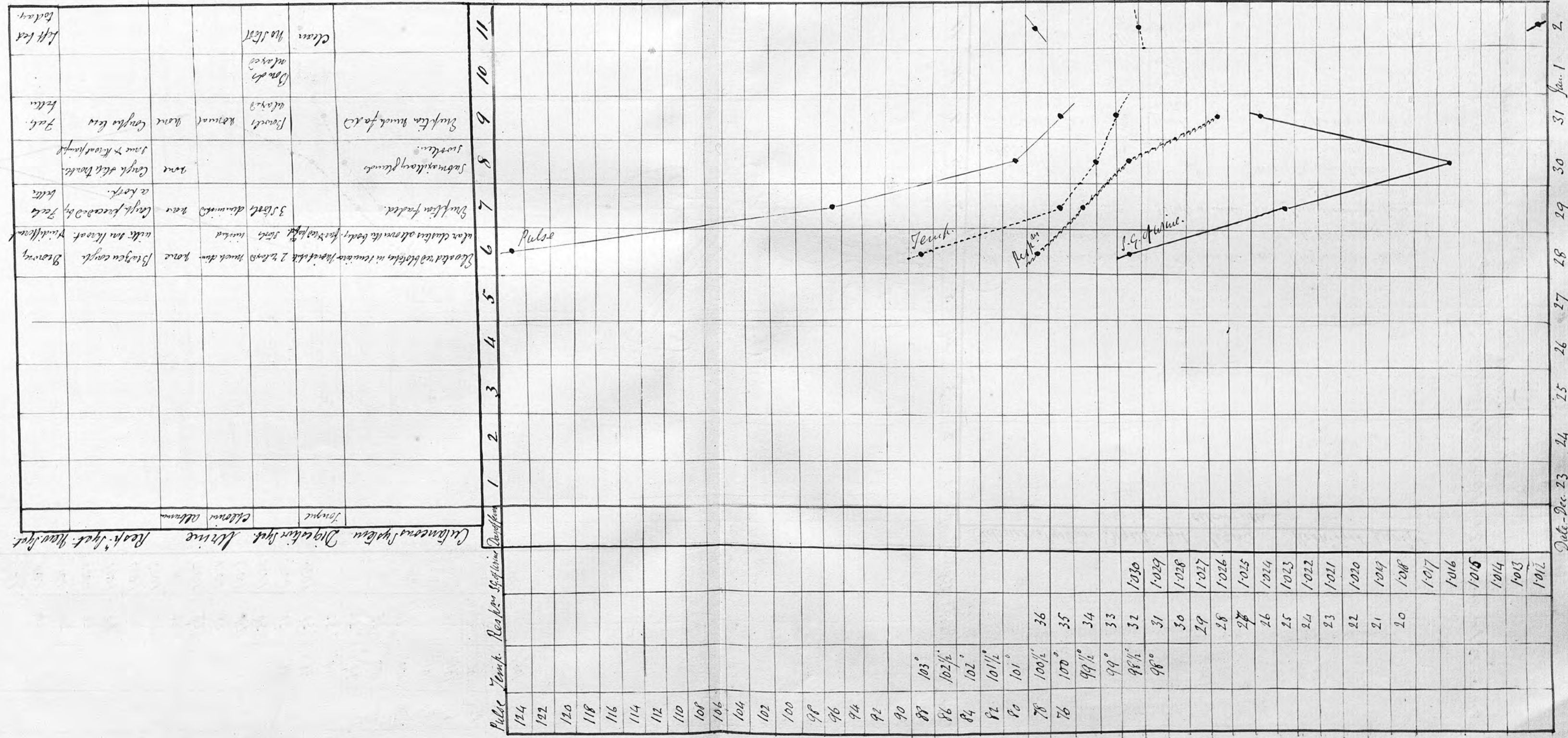
Scarlatina. Case XXII. Alex. Stuart, - at 20. Master at Douglas - on River St. Admitted Jan^y 12, 1865. to Ward 18. Royal Expt. "under Dr. Van Hook.
Always in excellent health up to Jan^y 9th. When the throat became sore, and he had several attacks of fevering with high cough. Reconvalescence with easy and etc.
for months.



Scarlatina, Case XXIV. Isabella Kirkwood, a 17th year old, Admitted Dec 1, 1864, under care of Dr. Anderson to Ward 11th Royal Inf. Has always enjoyed good health. Catamenia regular - menses began at 14 years. On 31st November had signs of scarlatina, backache, and some bad pain, with general catarrh.



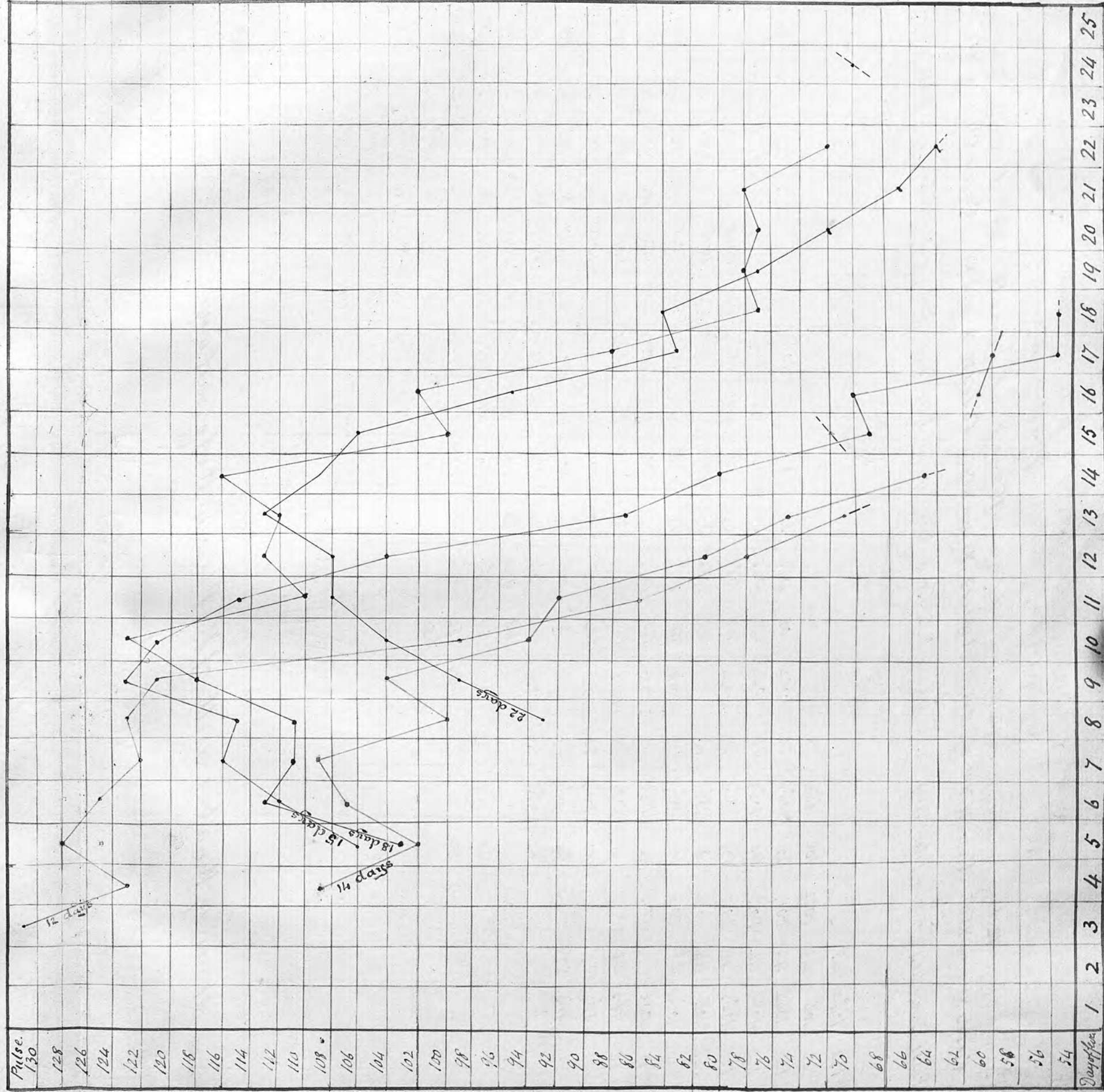
Measles. Case XXV. James Menzies, a 10. Resident at Leith. Admitted to Ward 1 Royal Infy. under Dr Bennett. Dec 28. 1864.
Fell ill on 23 Dec. when he "felt something crawl" and pain in his head.



A Table showing the average results of the daily observations of the pulse, temperature, respiration and specific gravity of the urine in 2 cases of 12 days, 3 cases of 14 days, 3 cases of 15 days, 3 cases of 18 days and 2 cases of 22 days duration of typhus fever.

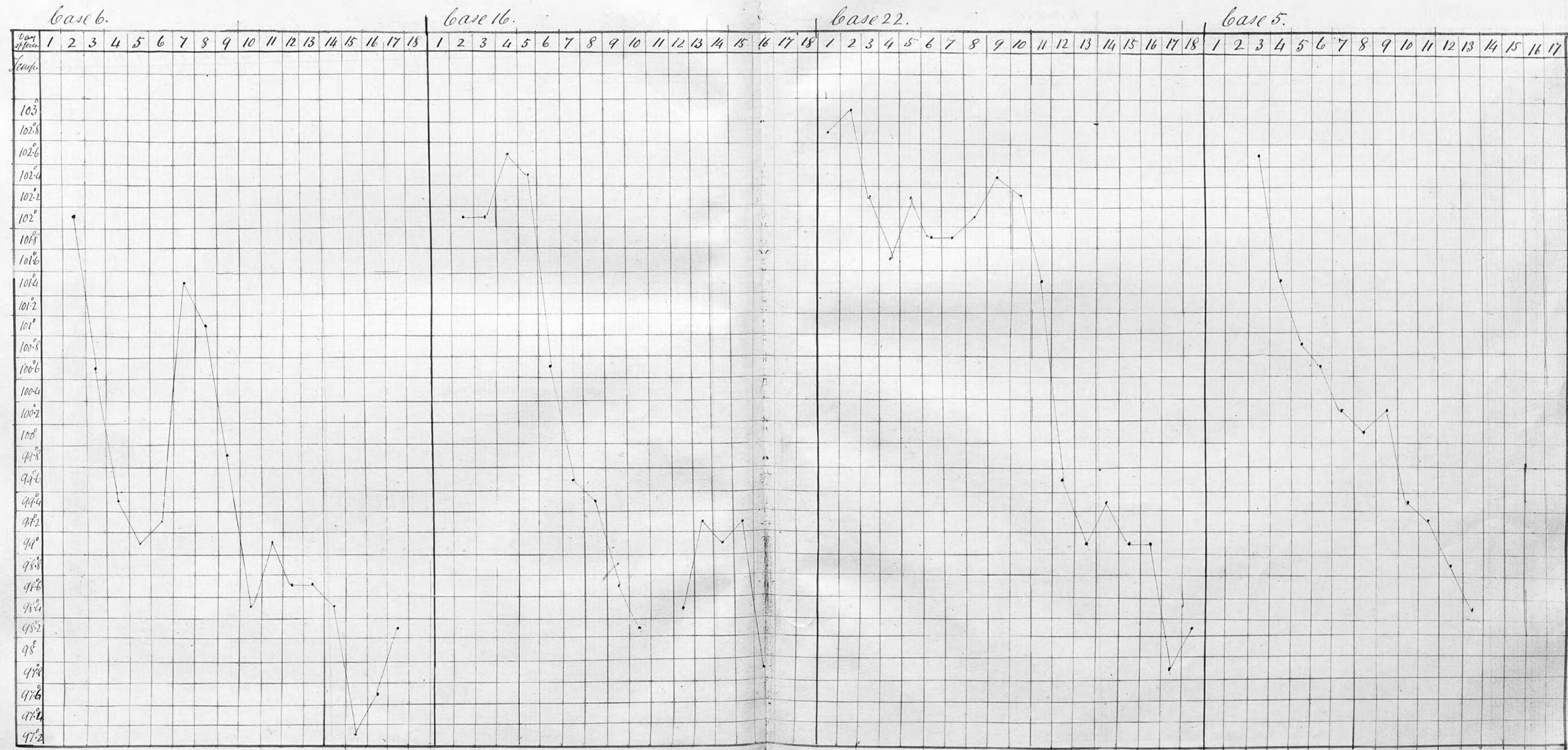
Day of fever.	Cases XVII and XVIII. Duration of fever = 12 days.				Cases IV, XIV, and XVI. Duration of fever = 14 days.				Cases I, XI, and XIX. Duration of fever = 15 days.				Cases VII, X, and XV. Duration of fever = 18 days.				Cases VI, and XII. Duration of fever = 22 days.			
	Pulse	Temp.	Resp. ^m	S.G.	Pulse	Temp.	Resp. ^m	S.G.	Pulse	Temp.	Resp. ^m	S.G.	Pulse	Temp.	Resp. ^m	S.G.	Pulse	Temp.	Resp. ^m	S.G.
1																				
2																				
3	130	104.9	45																	
4	122	104.1	45	1.022	108	104.4	28													
5	127	104.2	44	1.017	101	104.6	30	1.024	105	104.1	33	1.028	102	105.2						
6	124	104.4	46	1.016	106	104.3	34	1.023	111	104.5	37	1.034	112	104.1						
7	121	104.3	42	1.017	108	104.2	32	1.024	115	103.8	35	1.027	110	103.9	22	1.029			26	
8	122	104.1	44	1.020	99	103.7	36		114	103.6	30	1.024	110	103.8	24	1.026	92	103.4	16	
9	120	104.4	40	1.018	103	103.7	43	1.019	122	103.8	31	1.026	117	103.3	24	1.025	98	103.5	30	1.027
10	98	103.6		1.013	93	103.2	40	1.020	120	103.7			122	103.2	20	1.021	103	103.3	42	1.026
11	85	99.3	29		91	102.4	36	1.018	114	102.8	28		109	102.9	23	1.016	107	102.9	52	1.023
12	77	97.7	23		80	100.5	32	1.021	103	102.1	27	1.018	112	102.6		1.018	107	102.6	36	
13	70	98.3	22	1.019	74	97.7	29		88	100.1	26	1.021	111	103.2	24	1.018	112	103.1	34	1.017
14					64	97.5	26	1.021	79	98.7	21	1.016	115	102.5	22	1.018	108	102.7	41	1.016
15	71			1.016					68	97.4	20	1.023	99	101.5	18	1.018	105	102.6	32	1.016
16					60	98.0	23	1.012	69	98.6	23	1.023	101	101.4	19	1.021	94	102.2	31	1.022
17					59				54	98.4	19	1.018	87	97.2	16	1.019	82	97.5	28	1.023
18													76	97.9	15	1.020	83	97.5	24	1.020
19													77	97.5	18	1.022	76	97.8	24	1.021
20													76	99.0	16	1.018	71	98.7	17	
21													77				66	98.2	16	
22													71	99.1			63	97.6	16	1.020
23																				
24																	69			

A Diagram representing the above results of the pulse in the form of rays.



A Diagram representing the Ranges of Temperature in Four Cases of Scarlet Fever. Recorded by Dr S. Kniger. (See Trans. Med. Chir. Soc. Lond. Vol XLV)

The ranges represent the results obtained by taking an average of the first morning and last evening observations for each day.



The Effects of the "Net Sheet" on the Pulse and Temperature in Two Cases of Scarlet Fever.

The Effects of the Ice-sheet on the Temperature of the Atmosphere.
These operations were made, under the superintendence of Prof. Bennett, on patients in Ward XI. Beg at Infy.^y during seasons of months of June and July, 1844. The patients were enveloped in a sheet wrung out of cold water, and then wrapped in blankets. The bulb of the thermometer was introduced into the axilla.

Name of patient and general remarks.	Adamson, female, act 19. Copies scrubbed on trunk and excretion on admission 6 th day of illness. Convalescent 10 th day. (See p. 63 Case-book S.M. Div. Ward X.)	Morrison, female, act 16. Copious scarlet rash on trunk and excretion on admission 5 th day of illness. Convalescent 10 th day. (See p. 120 Case-book N.W. Div. Ward XI.)	Baxter, female, act 19. A steady scarlet rash on the legs only, one day of admission 3 ^d day of illness. Convalescent on 9 th day. (See p. 94 Case-book S.H. Div. Ward XI.)				
Day of fever	6 th day.	7 th day.	8 th day.	9 th day.	5 th day.	3 rd day.	6 th day.
Length of time the shoe was applied.	An hour	45 min.	45 min.	45 min.	30 min.	30 min.	30 min.
Pulse Temp. Pulse Temp. Pulse Temp. Pulse Temp. Pulse Temp. Pulse Temp. Pulse Temp.	138 101°	130 102½°	116 102½°	100 101½°	100 102°	114 101½°	83 100¼°
Before application of shoes.							
5 min. afterwards.			102¼°		92 101¾°		72 99¼°
10 min. "			102½°		92 101¾°		73 99¼°
15 min. "		100°	102½°	101½°	92 101¾°	104 101¼°	76 99½°
30 min. "	122 100¼°		102¾°	101¾°	96 102°	104 101¼°	80 99½°
45 min. "		100¼°	102¾°				
The Shoe removed.							
5 min. after removing shoe.							
10 min. "	138 101°					102 100½°	74 98¾°
15 min. "		100¼°		101½°	92 101¼°	101°	80 99¼°
30 min. "	(20 min.) 138 101½°	100¼°	102°		96 102°	110 101½°	78 99¼°
An hour -		100½°	102½°		96 102½°	112 101¾°	78 99¼°
An hour & half -					94 102¾°		
2 hours -							
2 hours & half -							100½°

conclusions.

conclusions. On taking the mean across of the results in above table, it is found. —

[illegible]

15 min.	0	8
30 min.	"	6
5 min. after removing sheet	"	2
30 min.	"	the same as
5 min. after application of sheet	"	5 $\frac{1}{2}$ lower than before application of sheet

"	10 min.	"	"	3 ⁰	"
"	15 min.	"	"	2 ¹⁸	"
"	30 min.	"	"	2 ⁹	"
"	45 min.	"	"	1 ⁸	"
that	5 min. after removing the sheet	the temp. was	1 ⁰ lower than it was before removing the sheet.		
"	10 min.	"	"	5 ⁸	"
"	15 min.	"	"	3 ¹⁸	"
"	30 min.	"	"	1 ⁸	"
"	1 hour	"	"	2 ¹⁸ higher than	"
"	1 hour & half	"	"	4 ¹⁸	"
"	2 hours & half	"	"	the same as	"
				(or the same as it was before applic ⁿ of sheet within	

Dickersonis sometimes occurred about an hour after removing the sheet.

The patient felt most cool and comfortable immediately after the removal of the wet sheet, but soon afterwards felt warm again.

The three Lakes were convalescent on the 10th, 10th, and 9th days respectively; and progressed favorably, subsequently.