

In absentia

S

Thesis for M.D. degree.

by
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Diphtheria: its evolution from benign sore-throat.

Notwithstanding the revolutions that have taken place in scientific medicine during the past three or four decades, whereby much of the previously existing empiricism has been swept away, & concise & rational expositions of disease processes have been substituted for the crude notions of a former generation; it is curious to note how effectually some of the most important & destructive diseases have baffled solution, & continue to remain in the dark mazes of ignorance. Among these we must place diphtheria. Its cause, until quite recently had remained a mystery; & although we now appreciate the part played by the Klebs-Loeffler bacillus in producing the train of symptoms



Symptoms characteristic of the disease, we know almost nothing of the conditions which influence its growth & spread.

conseq We know the disease to be eminently contagious, but where the contagium vivum has its natural habitation, & what are the conditions leading to its development into an epidemic disease; how it is grown & propagated, we are in entire ignorance. Diphtheria has always been looked on as one of those diseases nourished & disseminated through the medium of unhealthy hygienic conditions, & is intimately associated with the sewage question; but when we come to look into the evidence on which this theory is founded, we find little or no scientific data to substantiate it. Possibly on account of its resemblance to typhoid, typhus & cholera, in the excessive mortality accompanying it in its epidemic form, it has come to be so classified. But when we examine the evidence in favour of its dependence on bad sanitation, we find the comparison by no means striking. For, while the various infectious diseases, recognised as arising from imperfect sanitation have been shown to have diminished in progressive degree with
corresponding

Corresponding improvements in our sanitary surroundings, diphtheria presents the reverse condition, & has been shown to be on the increase year by year; particularly since the year 1840 when the present school system came into force.

Not do towns or localities which are exceptionally circumstanced as regards sanitation, present an exemption, more so than less fortunately circumstanced towns. We see Cholera which is nurtured in India & throughout the east by filth, & which causes such decimation among the Mohammedan pilgrims on account of inattention to cleanliness & sanitation, & other diseases for a similar reason, successfully combated by improved hygiene. Typhus has now become comparatively rare; as also Puerperal fever among lying-in women; while Typhoid, if not presenting an equally successful submission to the observance of sanitary laws, has at least so far succumbed as to exist in a milder type than it did in former years. Manifestly therefore diphtheria cannot be placed in this category.

In its origin & spread it resembles rather such infections as small-pox, measles, scarlet fever & influenza.

Diphtheria

Diphtheria belongs essentially to the class of Specific diseases. That is to say, it arises from a definite cause which is distinct from the causes of all other diseases (& acts within the body). But although it is well known that the poison of a particular disease only produces that disease, yet we find that the phenomena of specific diseases at times vary so greatly, that we are unable to base our belief in their specificity on their clinical evidence; so much so that were we to judge them on this basis alone, we might infer that there are transitional forms connecting the one with the other. But when they are studied from the etiological side, we see that each specific cause only produces the one disease, however varied in type.

Diphtheria is generally described as a true specific affection, which as a rule begins with one or more isolated cases sufficiently well marked to admit of diagnosis, & then passes into an epidemic more or less widespread.

But a careful study of various outbreaks brings to light the fact that the disease is generally preceded by a considerable amount of illness of the nature of simple sore-throat. More particularly

do we find this among children attending the public schools, where for some time there may exist a form of sore-throat- which is eminently contagious & attacks the greater number of the children. I have several times observed, that in the case of a child kept at home for a few days on account of sore throat, other children in the same house, but not attending school, fell victims to a similar affection, thus proving its contagiousness.

As a rule this mild throat affection is so slight that it fails to attract attention, until it is succeeded by an outbreak of pronounced diphtheria, when its true nature is indicated; & the observer cannot shut his eyes to the fact that these mild sore throats preceding & leading up to an outbreak of diphtheria, stand in intimate relationship to the true disease, if indeed they are not identical.

That these minor throat affections are unquestionably infectious, there can be no doubt. And that fatal diphtheria may be acquired in the same house from such a case, I shall endeavour to show later on.

The point that I wish to insist on is: that epidemics of diphtheria invariably begin

begin with a series of mild cases, so mild that their true nature is not recognised. They differ from the fully developed disease in that the marked constitutional depression is absent. Nor do we at first find the typical false membrane growing on the tonsils; although as the epidemic progresses, the differentiating signs make their appearance in progressive sequence.

First we see a few spots of isolated membrane on the tonsils, accompanied by little or no constitutional symptoms. Or even the tonsils may be simply inflamed & enlarged without the presence of any trace of membrane. At a later stage of the epidemic these appear larger in successive cases, until patients are observed with a confluent false membrane covering the tonsils & uvula; & yet there may be no symptoms to cause anxiety, such as the grave depression & anaemia. Indeed I have seen cases where both tonsils & the soft palate were completely covered with typical false membrane, with only a moderate rise in temperature, & where there was entire absence throughout of severe constitutional symptoms; the case running a mild course.

When the epidemic has advanced so far as

to

to present such a case as the above, my experience has taught me to anticipate meeting a typical case of diphtheria in all its virulence within a very short period.

The view which is here expressed that epidemics of diphtheria begin with mild cases in no way differing from simple sore throat is upheld by Dr. Thorne Thorne in his Milroy Lectures, where he states that "preceding any marked diphtheria cases it was often learnt that for some considerable period there had been prevailing a large amount of illness to which were applied such terms as sore throat, tonsillitis, etc., these attacks commonly receiving but little notice until the seasonal activity of diphtheria showed their true meaning, & indicated also how these mild throat attacks were often the connecting links between successive prevalences of well-marked diphtheria". [British Medical Journal, Vol. 1, 91-92, 1854]

Further he expresses the view "that in the case of diphtheria we had to do with an unstable poison which gave evidence of a progressive development of the property of infectiveness, which property might be as easily lost as it was acquired, in much the same way as special

characteristics

"characteristics may be artificially developed in
"higher plant life, & be as easily lost again" [Loc. cit.]

If we contrast - diphtheria with other infectious epidemic diseases, we find a striking similarity in the manner in which they run their course, where there is manifested a progressive development in the virulence of the specific poison. Thus in the exanthemata, influenza, the continued fevers, cholera, etc., the epidemic invariably begins in a more or less insidious manner.

In influenza we at first see cases differing little from the ordinary "colds" so generally prevalent. Then the affection becomes more pronounced, so that we are able to diagnose its nature with certainty. And as the epidemic spreads, its specific action becomes progressively accentuated. The temperature chart shows a higher course in succeeding cases. The sufferers are more prostrated, & take longer to recover. It is only when the epidemic is well advanced that complications, such as pleurisy & pneumonia make their appearance, & that the disease is followed by the more severe sequelae, as the various nervous affections, psychological changes, phlebitis, thrombosis, etc., Then the epidemic begins

begins to decline, as if the virus, growing in intensity until a certain degree of virulence is attained, undergoes a process of attenuation & dies out.

Likewise in scarlet fever, it is only when the epidemic has reached a certain stage that the more serious manifestations of the fever make their appearance; such as those cases where hyperpyrexia, delirium, coma or convulsions have killed the patient before the symptoms get time to develop. It is at this stage that "typhoid" symptoms are seen, & severe ulceration of the throat with gangrene, when death may result from haemorrhage; & the tympanum may become inflamed & discharge pus. & the increasing virulence of the contagium may be manifested in the form of complications, as pneumonia, nephritis, pericarditis or endocarditis, & inflammation of the joints.

We also see an epidemic of measles run a similar course with a progressive intensity in succeeding cases, until we have cases complicated with broncho-pneumonia, ear disease, haemorrhages from mucous surfaces, diphtheritic throat and gangrenous stomatitis. The poison having then attained its acme of virulence undergoes a more or less rapid attenuation, until it ceases to produce

any action on the system.

I think it may be asserted that as a general rule, the practitioner with a certain amount of experience, should not fail to recognise the true nature of these initial cases of diphtheria. They should not be confounded with tonsillitis, which presents a quite different clinical picture. Thus the latter affection begins generally in a well marked manner with a chill or rigor. The temperature rises to 102° or 103° F.; the pulse is rapid & bounding, & the child looks ill & distressed. He complains of stiffness & aching all over the body, & particularly of a sense of weariness in his bones. The tongue is thickly coated with fur; the tonsils are swollen & red, as are also the soft palate, uvula & pillars of the fauces. As the disease progresses the temperature often reaches as high as 104° Fahr. The tonsils become further enlarged, giving rise to increased distress & pain on deglutition, & the voice assumes the characteristic nasal quality. Suppuration generally takes place in the tonsil, & the bursting of the abscess is followed by a speedy recovery. There is seldom any enlargement of the lymphatic glands. Moreover there is always an oedematous appearance in the
inflamed

inflamed parts which is characteristic of tonsillitis. And the more pronounced the oedematous appearance, the more certain the practitioner is that a few doses of salicylate of soda will cut short the disease.

I shall now endeavour to describe the course of an epidemic of diphtheria which occurred in a small town of 600 inhabitants. It was confined chiefly to children, & more particularly to young children, although a few cases were observed in adults. The epidemic from first to last continued for about three months.

The disease first manifested itself by a hoarse barking cough. The children did not seem ill, but on the contrary continued to run about & play. There was no rigour or shivering to usher in the disease. The temperature usually ran from 100° to 103° Fahr. The affection lasted for about a week, & at no time was there any sign of depression. The tonsils were enlarged & inflamed & poured out a more or less profuse secretion, in addition to which there were a few minute patches of exudation generally present. The uvula was likewise implicated in nearly all cases, though at first it was free from false membrane. There was invariably a hoarse croupy laryngeal

laryngeal cough coming on occasionally, but not prolonged for any time or causing much distress. The breathing as a rule was normal, & seldom was there any obstruction of the inspiration during the paroxysms of cough. There was no enlargement of cervical glands observed in those early cases.

After lasting from four days to a week, the cough gradually disappeared & the tonsils returned to their natural condition. Nor did I see a single instance where suppuration had taken place.

The appetite generally remained good.

The following may be taken as a type of those earlier cases.

Case. I.

Boyd. — Seen 20th Dec. 98. He is 2 years of age. Has always been a healthy child. Two days ago it was observed that he coughed frequently, making a loud, harsh metallic noise, but without any obstruction to respiration. Temperature 101° F., pulse 100. The child looks bright & cheerful, taking his food fairly well; tongue slightly furred; bowels constive. The tonsils are enlarged, red & covered with minute scattered patches of exudation of a dirty white colour; the uvula is likewise inflamed but clear. There are no enlarged cervical glands.

Lungs

Lungs healthy, Perspires freely.

The treatment consisted in keeping the child in doors & the administration of a diaphoretic mixture.

Dec. 22nd. - Temperature 100° F., Throat Condition the same. Does not cough so loud or so frequently. Appears quite lively & plays about.

Dec. 24th. - Tonsils much diminished in size, & cough much less frequent. Temp. 99.6° F.

Dec. 24th. - Temp. normal, Throat presents a slight redness, the small patches of membrane having disappeared, & the cough is quite gone.

A few days later two other children in the same house became similarly affected.

The next case is more severe, & may be taken as a type of many presenting fever symptoms.

Case II.

George M. - Aet: 6 years. Seen 7th Jan. 94. He began to complain to-day of sore throat. Temp. 102° F. Tonsils enlarged but clean, would red & inflamed. He has a frequent loud croupy cough unaccompanied by any laryngeal impediment. Lungs healthy. Tongue furred.

Jan. 9th. - Temp. 102.8°. Tonsils increased in size & almost meeting in the middle line. A profuse secretion is poured out which tends to choke the

patient

patient, but is relieved by frequent emetics of sulphate of copper. Distinct patches of membrane are seen over the tonsils, but the uvula & soft palate remain clear. Considerable difficulty is experienced in swallowing. Coughs frequently. No enlarged cervical glands. Pulse 118 strong & regular. The urine contains no albumen.

Jan. 12th. Temp. 99.8°. Child appears quite lively. Tonsils considerably diminished in size, but still pouring out a copious mucous secretion. The patches of membrane have all separated. Taking food fairly well. Cough much better.

Jan. 13th. Temp. 98.6°. Tonsils present a slight enlargement still, with great diminution of the mucous secretion. Cough entirely gone.

Jan. 14th. Child quite well. Throughout, the pulse continued good & there was no evidence of any depression whatever.

As the epidemic spread the duration of the illness became more prolonged & the symptoms more severe. The enlargement of the tonsils was greater & the false membrane appeared over their whole surface, implicating at the same time the uvula. The cervical glands were enlarged. These were in fact, typical

cases of diphtheria with this exception: that there was no failure of the pulse, anaemia or depression.

The children made a rapid recovery, there being nothing to cause any grave apprehension in the prognosis. Following closely on the above were several severe cases of diphtheria, one of which died of exhaustion [Case V.], while another after a fortnight's illness, was on a fair way to recovery, the membrane having separated entirely leaving a severely ulcerated throat with destruction of the walls: died suddenly from cardiac failure on attempting to sit up.

The following three cases are of peculiar interest in as much as, occurring in the same house & family, they present a beautiful clinical picture of the increasing virulence of the diphtheria poison in the successive cases. They likewise serve to show that the mild sore throat is undoubtedly infectious.

When the first patient became ill, I took precautions to isolate the family & prevent them associating with their neighbours, so that I think it may be safely asserted that the first child taken ill passed on the infection to the others. And this is rendered all the more probable by the fact that at the time the first of

these

These children was taken ill there were no cases in the town which could be called diphtheria, were we to judge them by the description of the disease given in our text-books. We must therefore infer that the diphtheria in this particular case could not have arisen by means of infection from another case; it must therefore have originated de novo in that house. Or we must regard the mild cases as springing from the same contagium as the severe, & capable of developing into the severe disease by accentuation of its violence. This last assumption is further borne out by the fact that the mother, disregarding my injunctions, allowed the children to sleep together & made no attempt to keep them separate until after the second case had occurred.

Case. III.

Mary E - Oct. 3 years. First seen on Jan. 4th 94. Has been ill for two days complaining of sore throat. The mother states that she snores loudly during sleep & at times chokes, when she wakes up & ejects a considerable quantity of mucus. Has a loud barking cough, but no obstructed breathing. Tonsils are greatly enlarged & covered with patches of thick dirty-white membrane. No enlargement of cervical glands. Temp. 102° F., pulse 110. Child looks cherry & bright.

10th Jan. - Tonsils are about the same size, but the membrane has separated leaving a clean surface with minute ulcers where the spots of membrane had been. There is a profuse secretion of mucous from the throat which at times chokes the patient & to remove which frequent emetics are administered.

Takes food fairly well. There is no appearance of anaemia or constitutional depression. Temp. 99.6°F , pulse 98, regular & strong.

13th Jan. - Temp. normal. There is still some slight enlargement & redness of the tonsils, but the child appears quite well, taking her food & playing heartily.

Case IV.

John E - Aet. 2 years. The child was not observed to be ailing until this morning (10th Jan.) when he refused food & vomited several times. He appears apathetic & lies in bed breathing loudly with saliva trickling from the corner of his mouth. Coughs occasionally. At 2 P.M. the temp. was 102° ; pulse 121, of good tension & regular.

The left tonsil & the uvula are red & inflamed, but clean; while the right is greatly enlarged & covered entirely with false membrane. Several glands on right side of neck are enlarged & tender.

11th Jan. - Temp. 100.8°. Pulse 104, regular with good tension. Slept fairly well. Bowels moved during night. Condition of throat remains unchanged. Cervical glands have increased in size. γ

13th Jan - Temp. 100°, pulse 105 regular & strong. The right tonsil has diminished in size & the membrane has commenced to separate.

15th Jan - Child much better. Temp. 99.4°, pulse 98, regular & fairly strong. The right tonsil has greatly diminished in size & is quite free from membrane.

20th Jan - Child is quite well. Throughout this case gave cause for no anxiety, there being no anaemia or failure of the pulse. The urine at no time contained albumen. The treatment consisted in the administration of perchloride of iron both locally & internally.

CASE. V.

Ida E - , Aet 4 years. 25th Jan. 94.

This patient has been ill for two days. She lies in bed snoring loudly with a profuse discharge from mouth. Has a loud croupy cough. Both tonsils are enlarged with patches of exudation on their surfaces.

Temp. 101°. Pulse 104.

27th Jan - Both tonsils are covered with a

continuous

continuous false membrane. Cervical glands are inflamed forming hard tender lumps projecting from the side of the neck. Temp. 100° . pulse 120, regular but weak. Urine contains a trace of albumen. The child wears an anxious & depressed appearance.

Food is being administered regularly.

28th Jan —. The false membrane has extended to the whole soft palate. The cervical glands have increased in size & run together, forming a large hard mass on either side. Temp 100° pulse 131 intermittent & very weak. There is profound anaemia. The nasal passages are obstructed, & there is a profuse sanious discharge from the nostrils. Breathes loudly but without obstruction.

Towards evening the child became perceptibly weaker, & at 5 P.M. the pulse ceased to be felt at the wrist. Two hours after she died.

The epidemic ran a similar course among the native population, beginning with mild cases which were recovered from & drew no attention; then passing on to more severe cases. As it was impossible to persuade the natives of the necessity of isolation the disease spread rapidly among them causing a very high mortality.

A similar epidemic to that described above as having occurred at Wairoa, was witnessed in a small township situated five miles distant, at the commencement of the present summer. A number of the children complained of sore throats, but as they did not appear ill the parents took no notice. Later on the affection became more severe, when I saw several children with distinct patches of exudation on the tonsils; but beyond a slight rise of temperature there were no constitutional symptoms. At this stage I advised that the school should be closed & means taken to isolate children suffering from sore-throat. A few days later two cases of severe diphtheria occurred, one of which died from exhaustion three days after I had opened the trachea. There were no other cases observed.

Hitherto I have confined myself entirely to clinical evidence in support of the hypothesis of the progressive increase in severity of epidemic diphtheria. The evidence of pathology must remain wanting until more knowledge is acquired

acquired concerning the lower forms of vegetable life. We know something of the behaviour of micro-organisms within the system, but what the conditions are which govern them outside the animal body, we are ignorant of. Do they pass a phase of their existence outside the body, & then complete their life history after gaining access to their host? In the case of Anthrax & certain other organisms, we know that the spores can lie dormant for a long time in the ground & suddenly spring into full vigour. But it has not been shown that all forms of bacterial life are capable of producing spores; & it is well known that the organism cannot endure the same vicissitudes as the spore. The inference therefore is that these pathogenic organisms must live & propagate in some suitable medium probably connected with dwelling-houses, from which they at times pass to man, giving rise to outbreaks of disease.

We are familiar with some of the properties of the fission fungi, which may help us to explain this peculiarity in the evolution of diphtheria.

Thus they may permanently lose their properties of producing disease under the action of abnormal external conditions, & this loss may then be trans-

mitted

mitted to the offspring through a number of generations, even when the conditions of existence have again become normal. This process of attenuation can be carried out in various ways. The employment of high degrees of temperature has proved to be a very suitable means; the temperature may vary between 42°C. & 55°C. , & the organisms must be exposed to it for a longer time, the lower the temp. employed. The experiments of Pasteur & Koch with Anthrax bacillus show that when exposed for a considerable time to the influence of mild degrees of heat, the organism takes much longer to regain its virulence, than when attenuated by short exposure to high temp. as by Youssaint's method. Similar results are obtained ^{with} the bacillus of fowl cholera, symptomatic anthrax & swine erysipelas. [Hügge, "micro-organisms" p. 654].

Attenuation may likewise be carried out by passing the organisms through the bodies of various animals; also by subjecting them to the influence of chemical substances.

It is reasonable to infer that bacteria may be subjected to conditions which may lead to a natural attenuation of their powers. This may follow as a result of the various influences

working

working through the medium they find suitable to live in while outside the body. So little however, is known of this phase of bacterial life, that we have no data to guide us in forming conclusions. But there are no special reasons why bacteria should not undergo attenuation outside the body & then, entering the system, after a series of generations regain their former virulence. Were this attenuation of the lower fungi a pathological process, a degeneration in the true sense, arising under the influence of abnormal conditions of life, & which only remained so long as these conditions remained in force; we could not look for its repeated recurrence in nature. But attenuation is not analogous to the numerous degenerative processes which have been observed in higher organisms. Attenuation is a physiological process which most pathogenic bacteria have to undergo, otherwise we should not hope to see the various epidemic infectious diseases decline & disappear after a certain time.

It is a remarkable fact that the attenuated condition, when carried to a certain point, cannot be removed, as in the case of degenerated plants, by subsequent cultivation under normal conditions.

On the contrary, it has been shown that this attenuated condition can last for a long time, being transmitted through a series of generations; especially is this the case when it was brought about by subjection to mild degrees of temp. employed for a long time.

Should these views be shown to hold good with regard to the life of the pathogenic fungi, we should have a satisfactory means of explaining those cases of diphtheria which I have described. The organism, passing from the patient grows in some suitable medium, in or near human dwellings, where they undergo this attenuating process, in varying degrees according to the nature of their surroundings. Some attain a state of attenuation more suitable to existence than others, & these survive in the conflict for life.

Then they gain entrance to the human system & are subjected to a series of influences entirely different from their previous external conditions; as a result of their modified surroundings, they begin to develop their virulent powers, as shown by the increasing severity of the disease from successive generations of the bacillus.

The Bacillus Diphtheriae first
discovered

discovered by Klebs & isolated by Loeffler, is now recognised as the primary infective agent in diphtheria. It is limited in its growth to the superficial layers of membrane formed in the pharynx by its local action; & it shows no tendency to enter the blood & infect internal organs, as in the case of the anthrax bacillus. Indeed when it is inoculated subcutaneously, its growth is always limited to the site of inoculation.

The researches of Dr. Sidney Martin on the chemical pathology of diphtheria show that the blood, spleen & other tissues of the body contain a proteid substance consisting almost solely of deuter-albumose, & an organic acid; & that these produce fever, diarrhoea, exhaustion & paralysis when injected subcutaneously — the albumose being the more powerful poison of the two. [Goulstonian Lectures, Brit. Med. Journal, Vol I. 92 — p. 642].

He concludes: "It is evident that the primary infective agent in diphtheria is the bacillus diphtheriae; that this liberates in the membrane a ferment which, when absorbed, digests the proteids of the body, forming albumoses & an organic acid. These digested products are the agents in producing

death

death, in causing fever, the depression & the paralysis which follows diphtheria." [p 400].

In conclusion, we may infer that outside the body the bacillus undergoes attenuation whereby it loses the power of producing this ferment, but that after gaining entrance to the throat it begins to acquire this power, & that after successive generations it is capable of secreting this ferment in sufficient quantity to digest the animal proteins & set-free albumose in large quantities to produce the train of symptoms characteristic of severe diphtheria.

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11th March. 1895.

DISEASE.

Diphtheria

Notes of Case.

Name *John Brown.*

Age *13.*

Diet

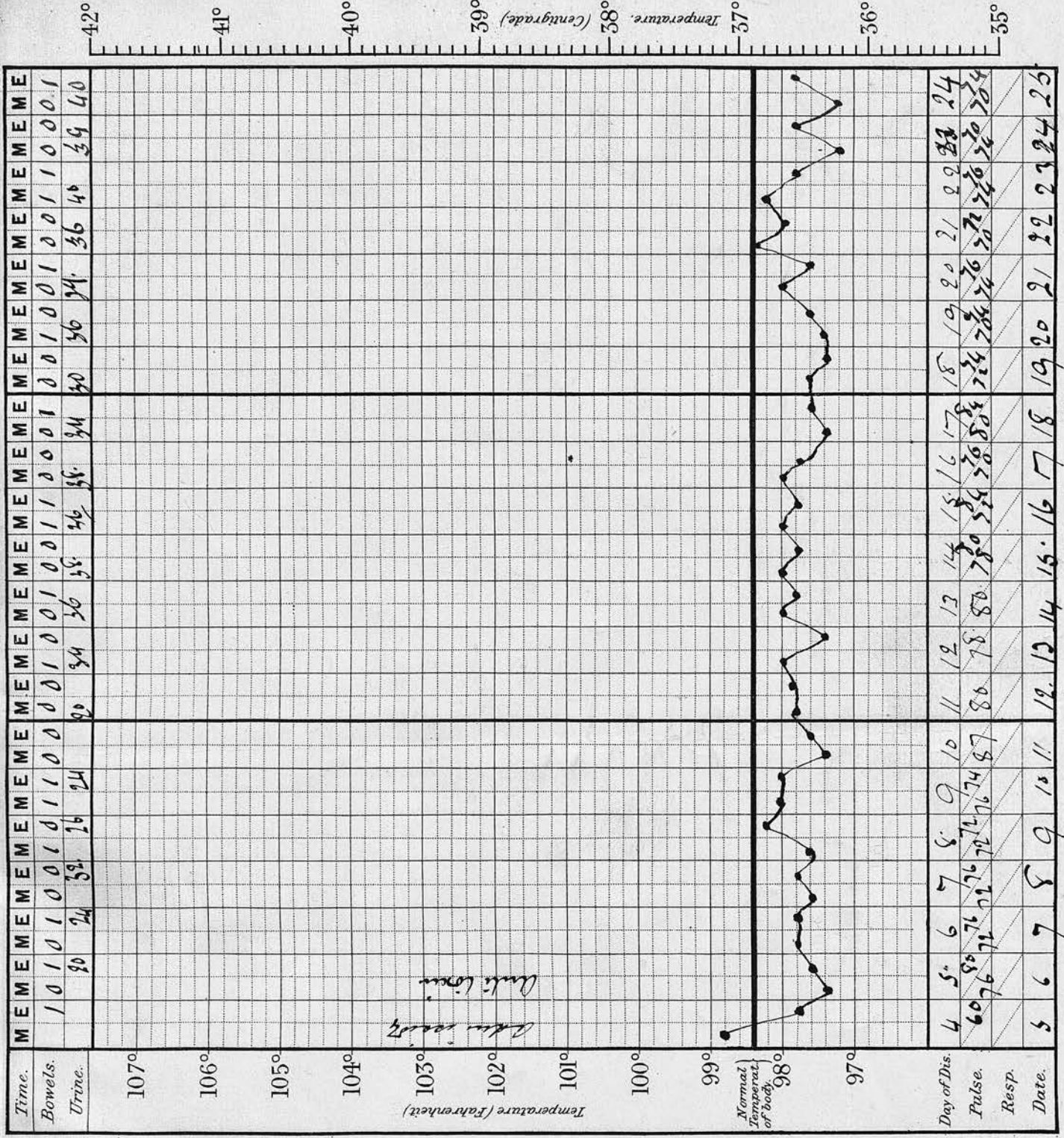
Case Book No.



Date of admission.

March 5th

Result *Recovery*



DISEASE.

Dysphtheria

Notes of Case.

Name Thomas Graham

Age 19.

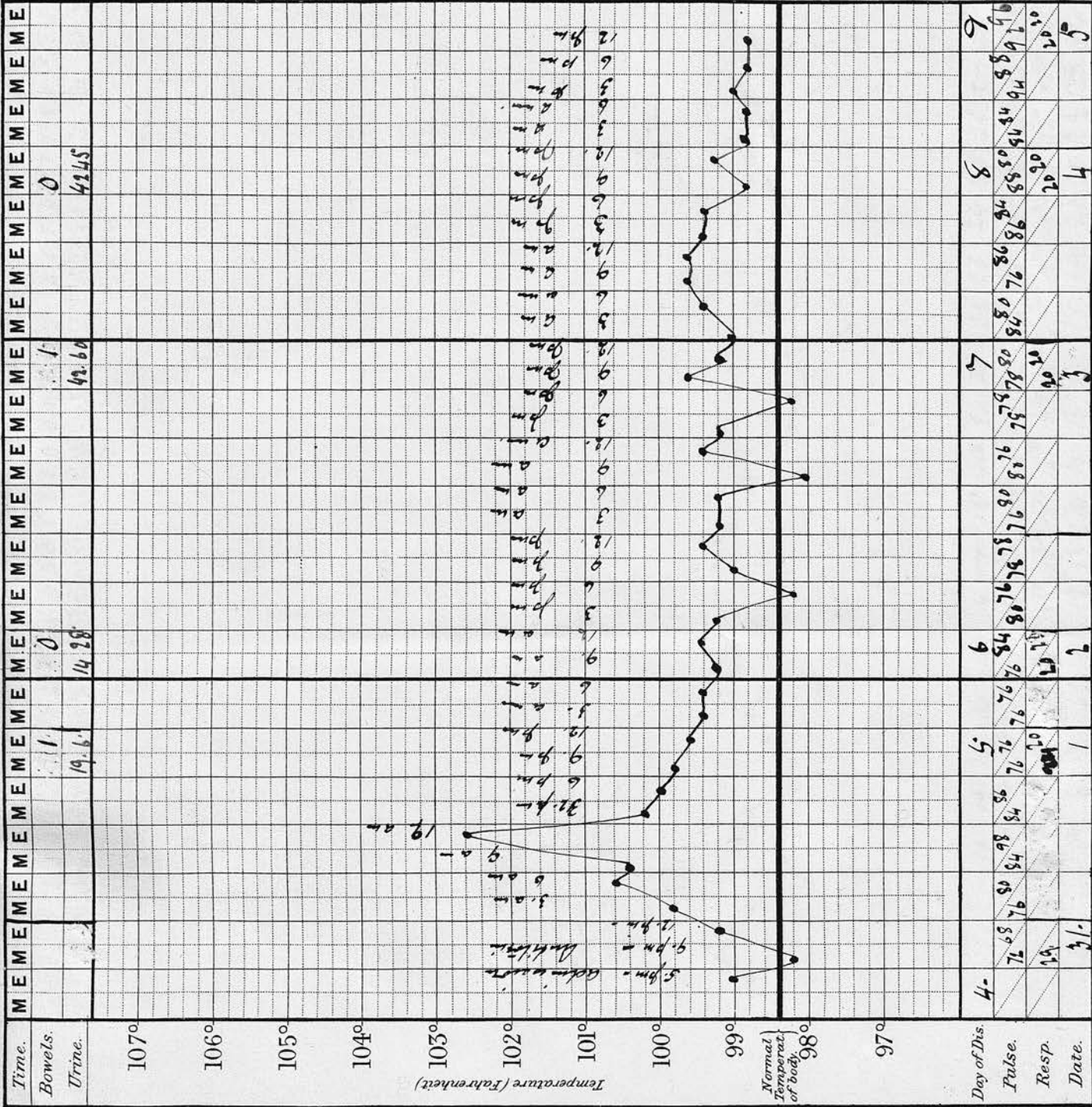
Diet

Case Book No.

Date of admission.

Dec 31st 94

Result Recovery



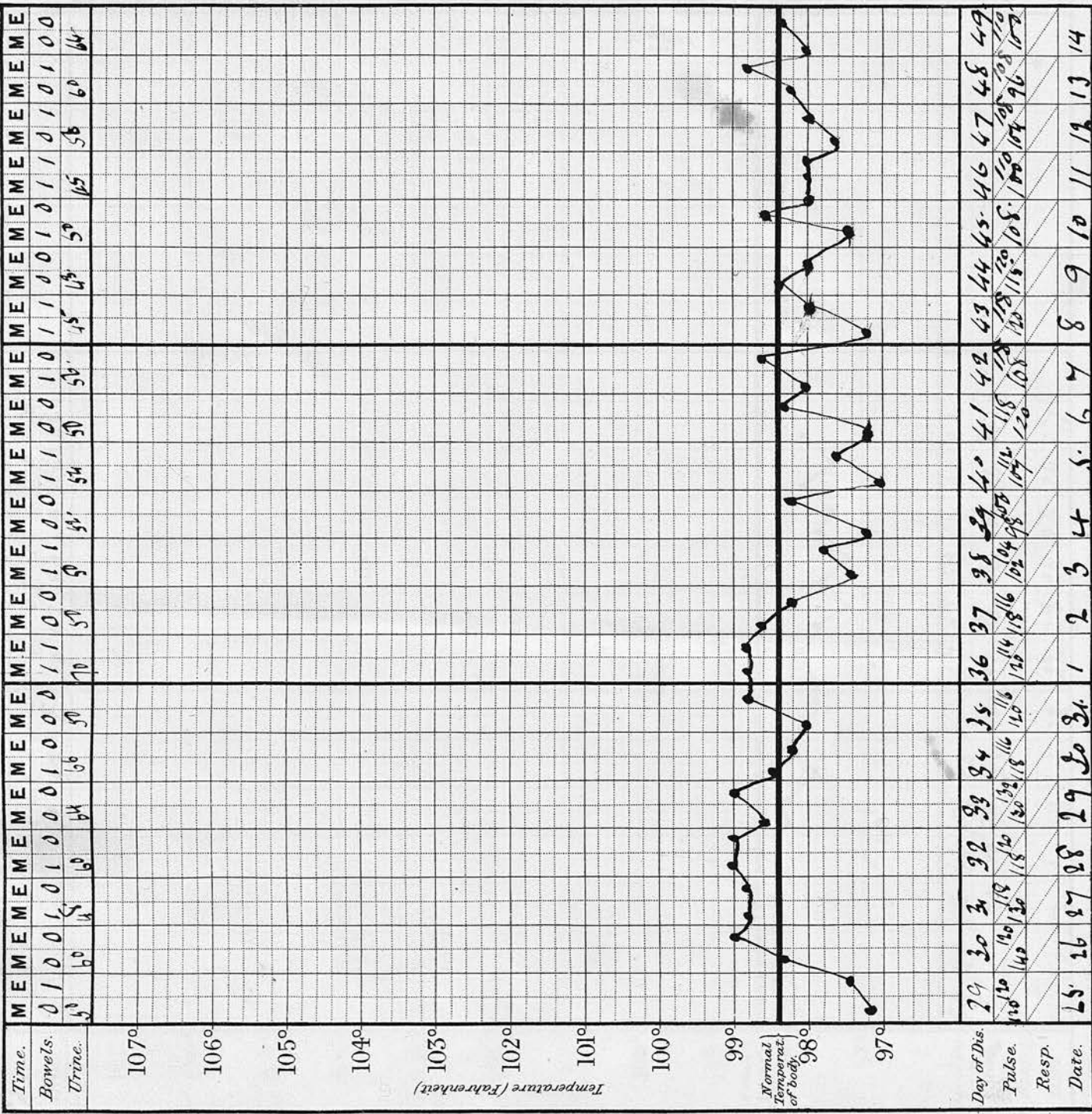
DISEASE.

Dysphtheria

Notes of Case.

Name { *Y. Graham*
Age { *19*

Diet
Case Book No.



Date of admission. *Jan.*
Result

DISEASE.

Dysphtheria.

Notes of Case.

Name *Walter Laing*

Age *2.*

Diet

Case Book No.

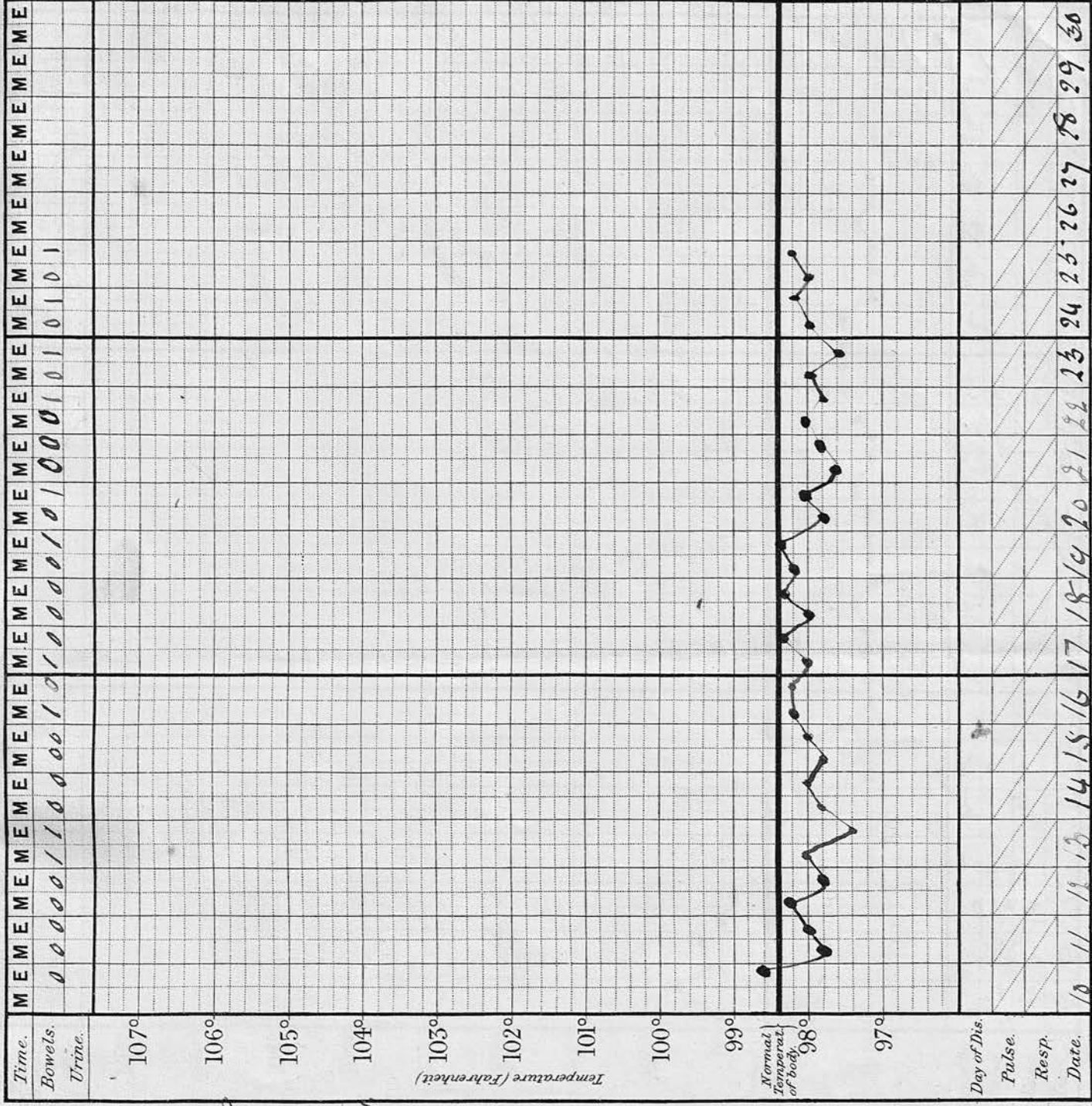
Discharged Aug 31st

Date of admission

August 16th

Result

Recovery



10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

42
41
40
39
38
37
36
35

Temperature (Fahrenheit)

Normal Temperature of body

Day of Dis.
Pulse
Resp.
Date.

DISEASE.

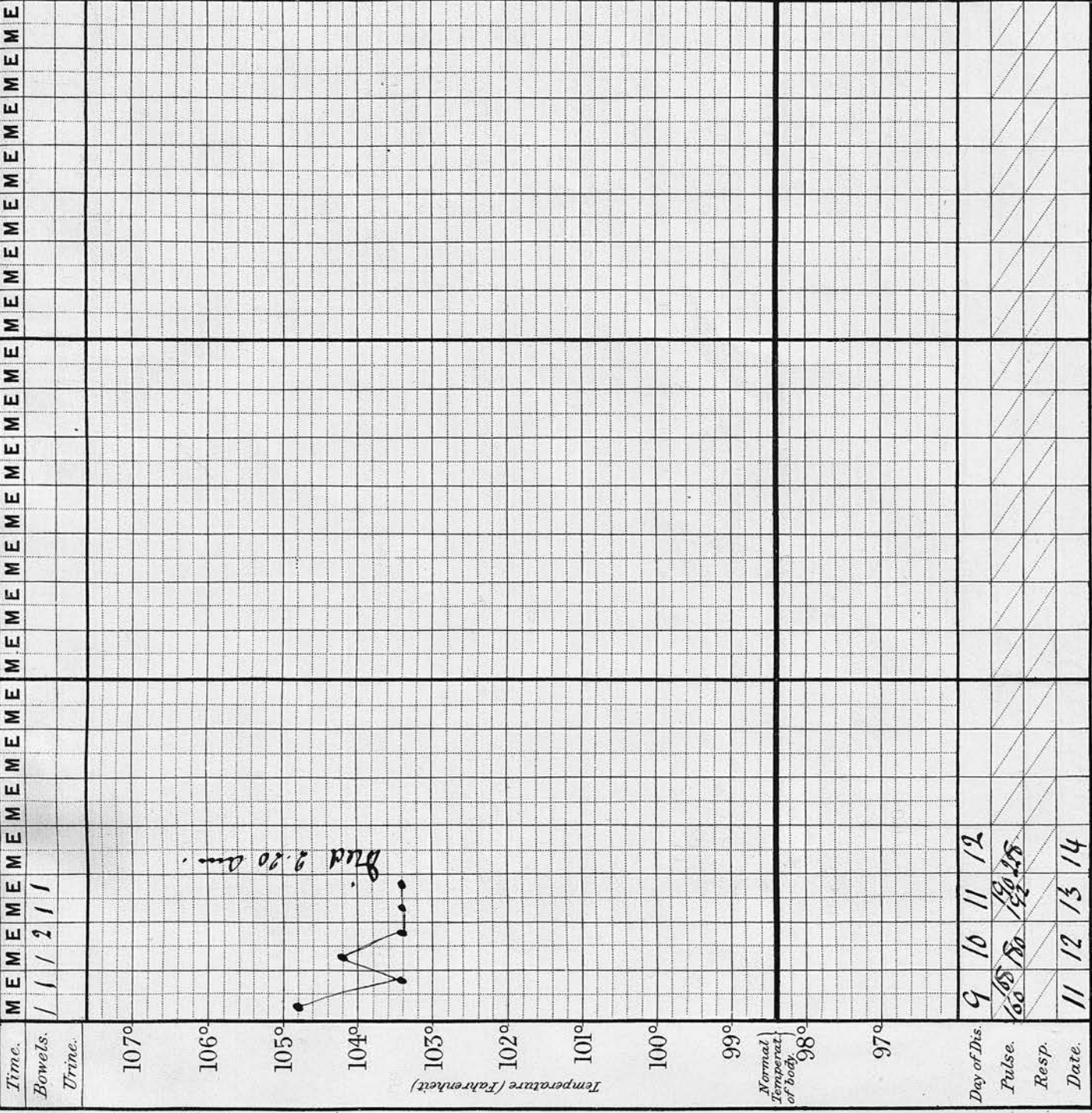
Diphtheria

Notes of Case.

Name *Ernest
Robinson*
Age *2 1/2 years.*
Diet

Case Book No.

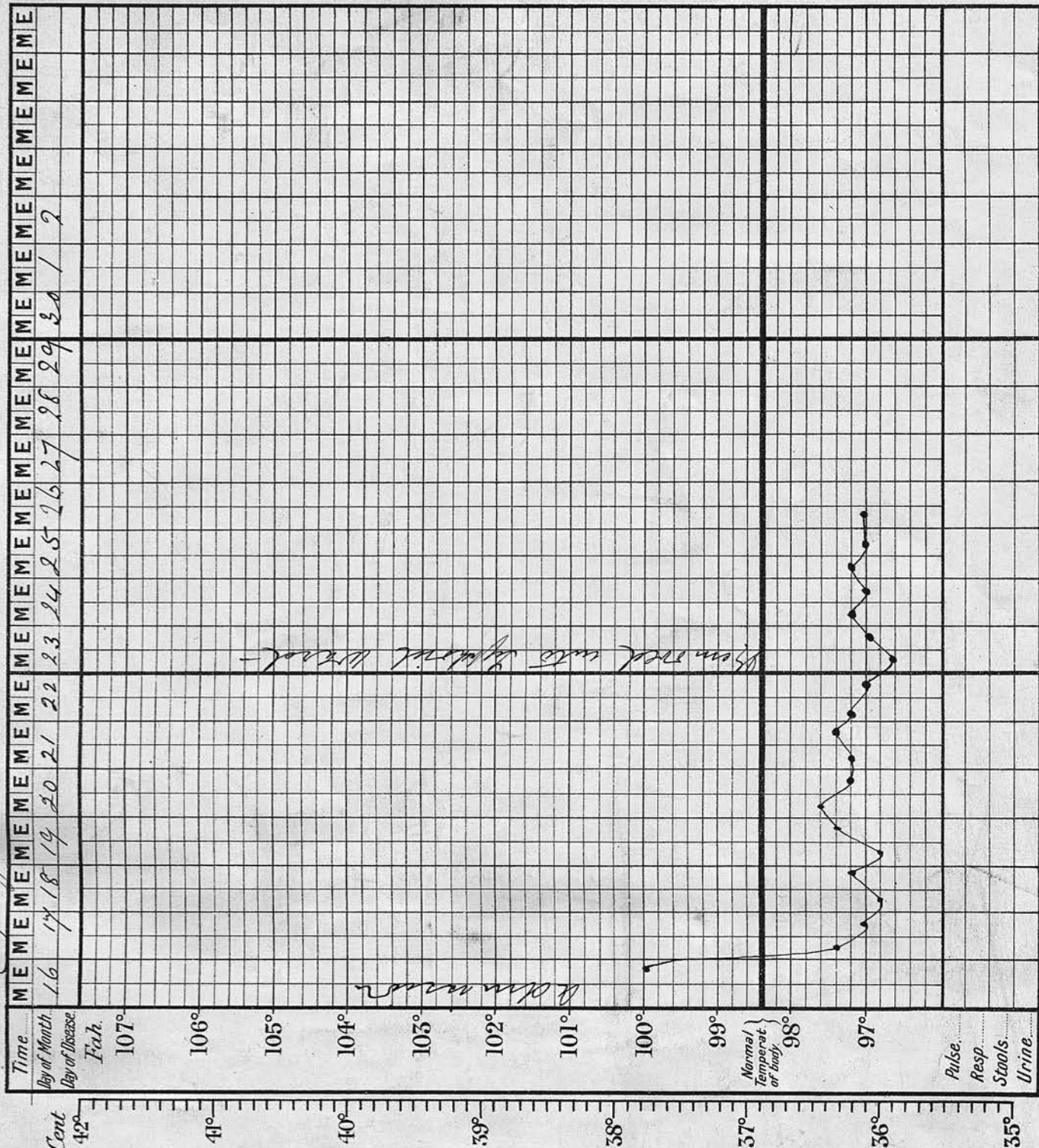
Date of admission.
Nov 11th 1894
Result *died*

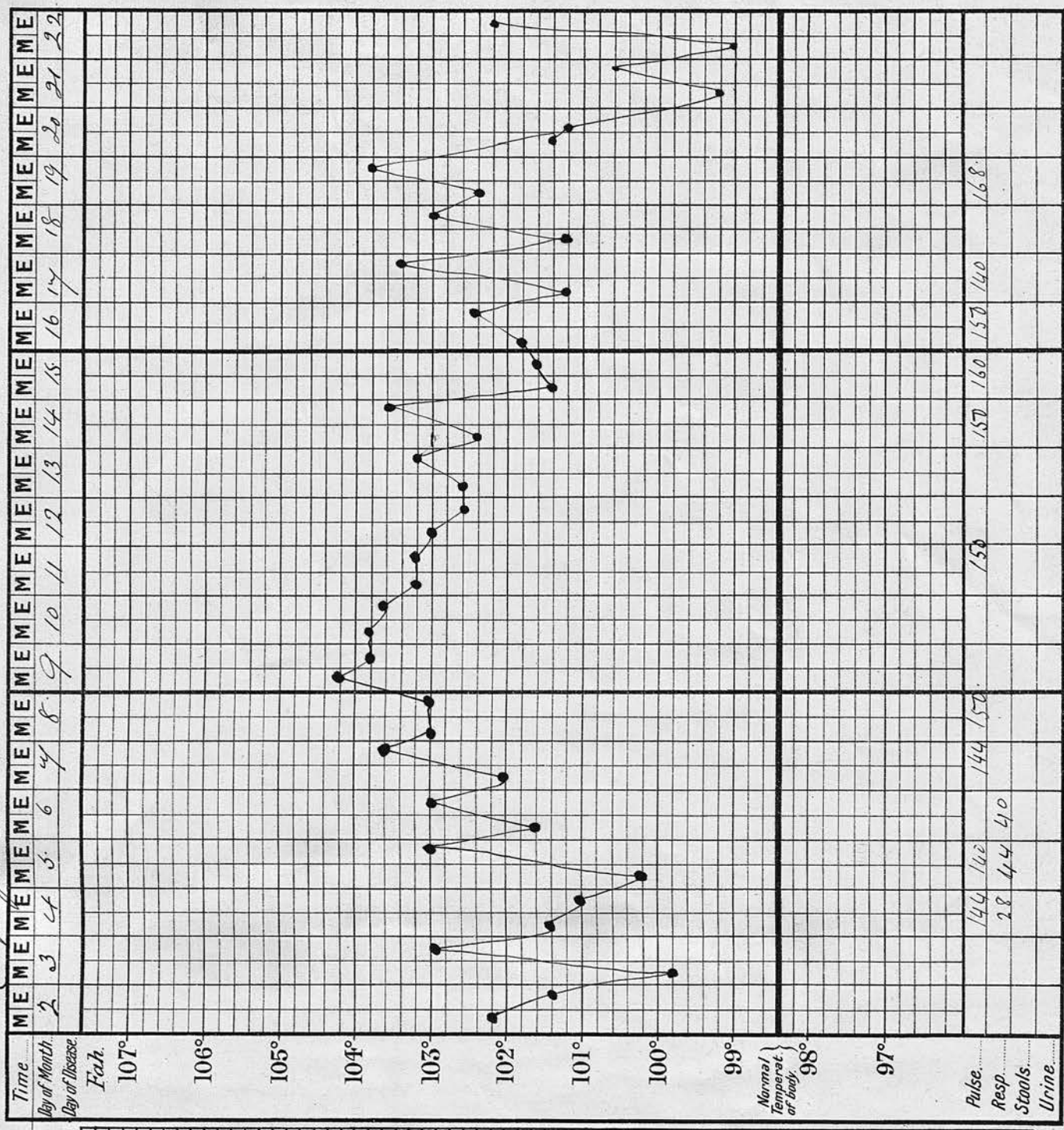


Records of Temperature, Pulse, Respiration, Stools and Urine from 16th Day of May 1893 —
 Result

In the case of *H. pylori* parvulus

Aged 5 Occupation

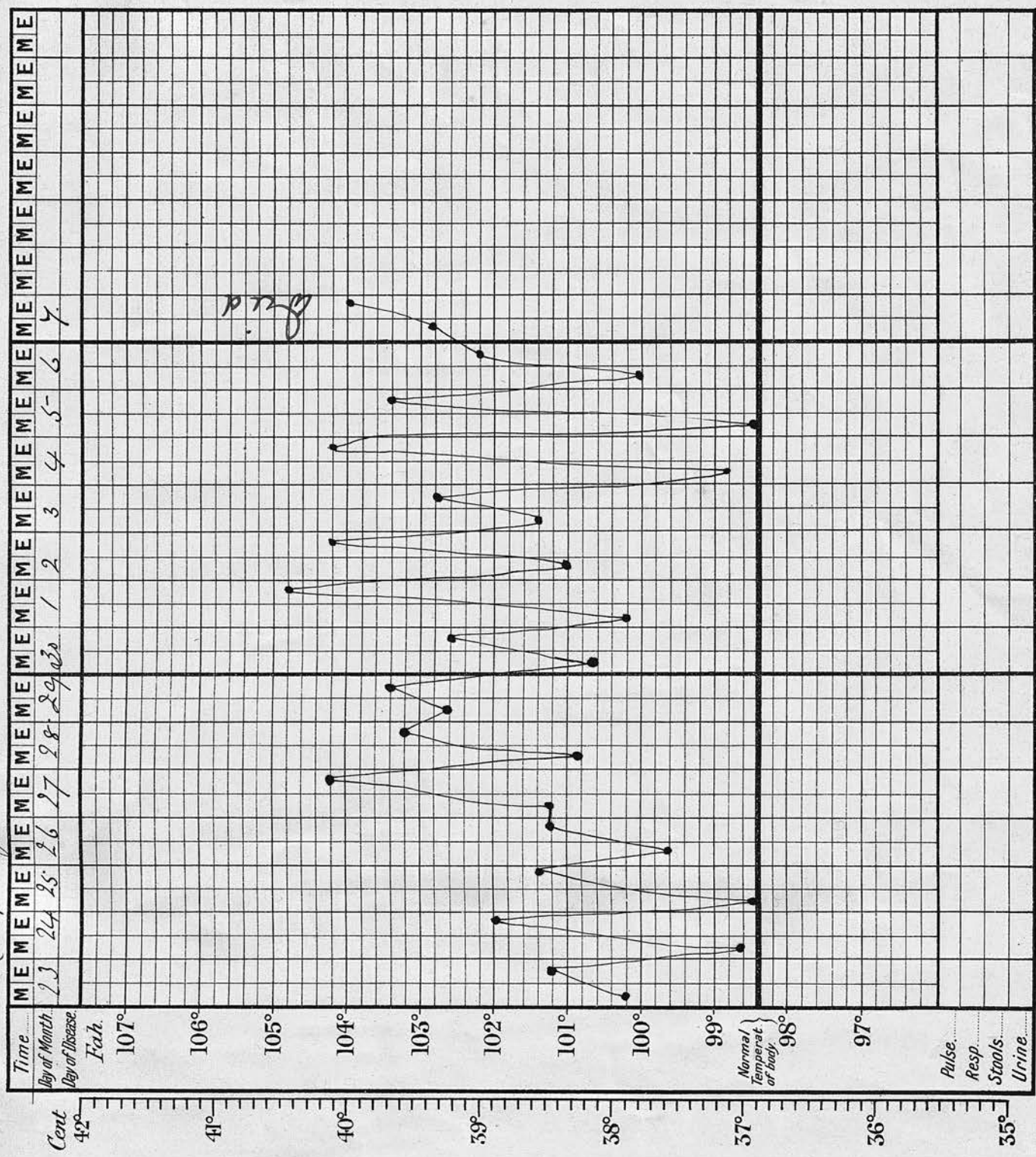




spoke
yrs 9 h.

17 h.
thy Coy. Squint
Contraction of
flexor hands
& wrists

Records of Temperature, Pulse, Respiration, Stools and Urine from 23 Day of June 1893.
 In the case of Hugh Gardiner Aged 5. Occupation Result



Dysentery

In the case of

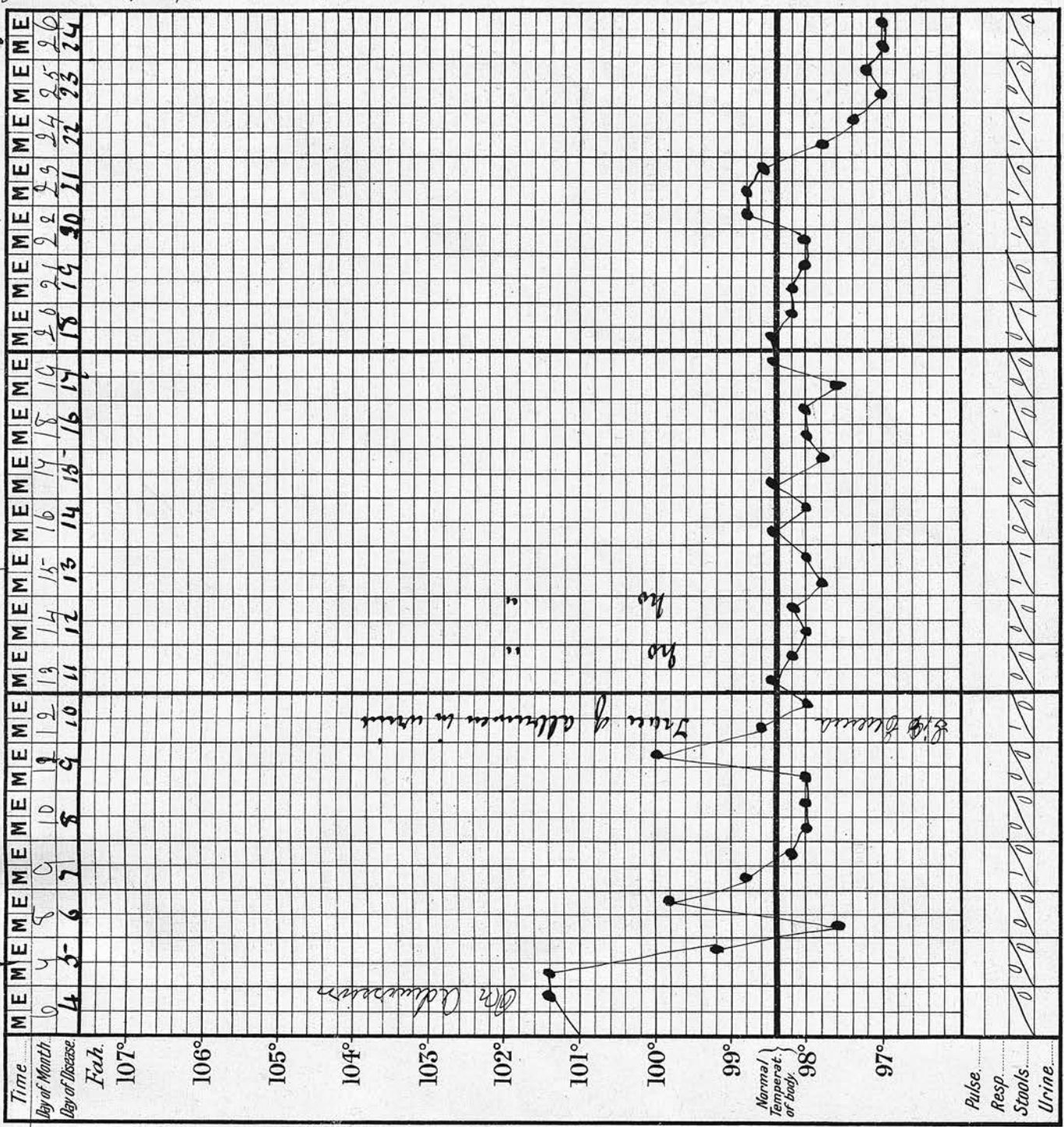
Genie Nichol

Aged 4 y Occupation

Day of January

Result Recovery

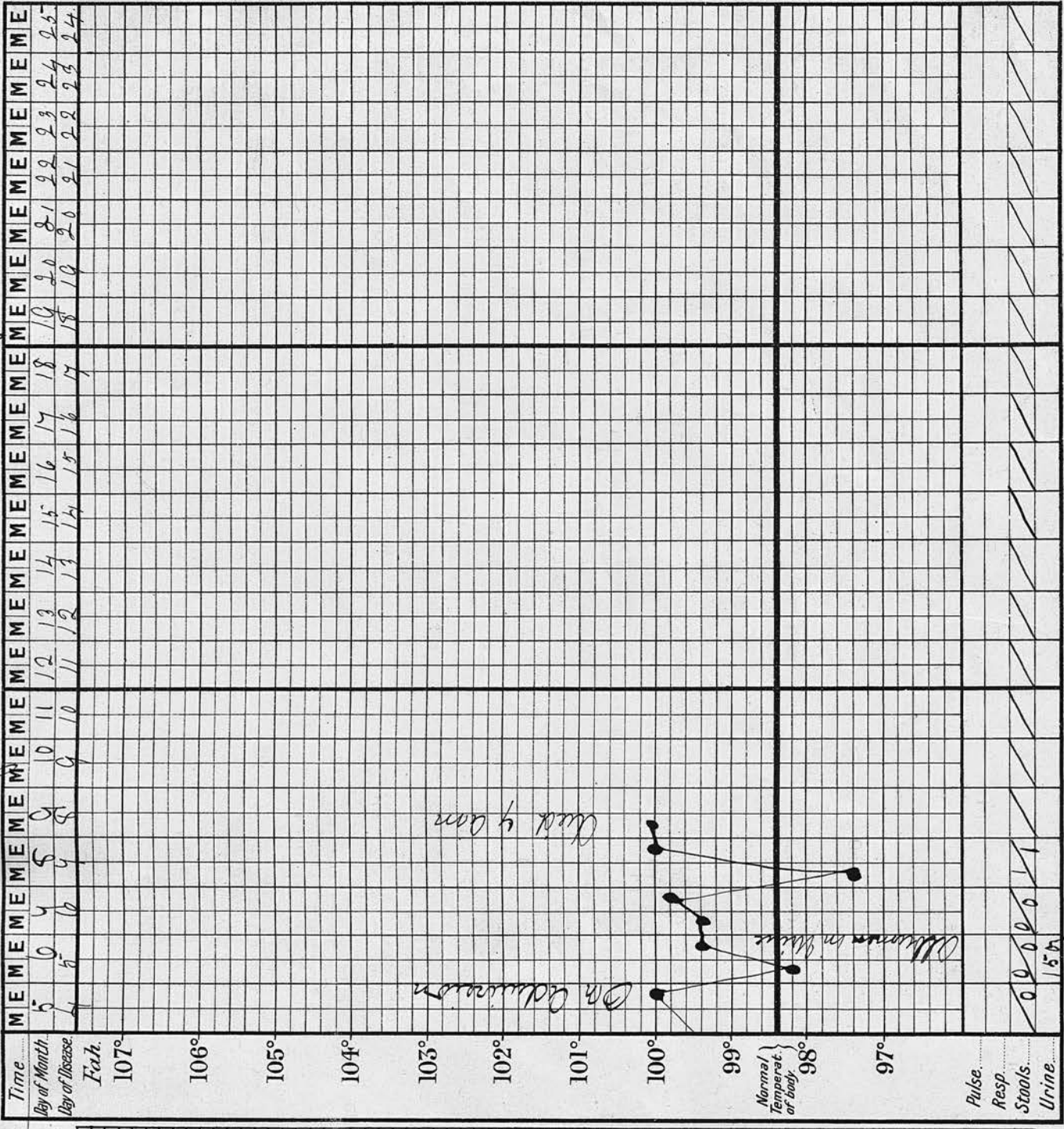
Continued normal until discharged Feb. 2



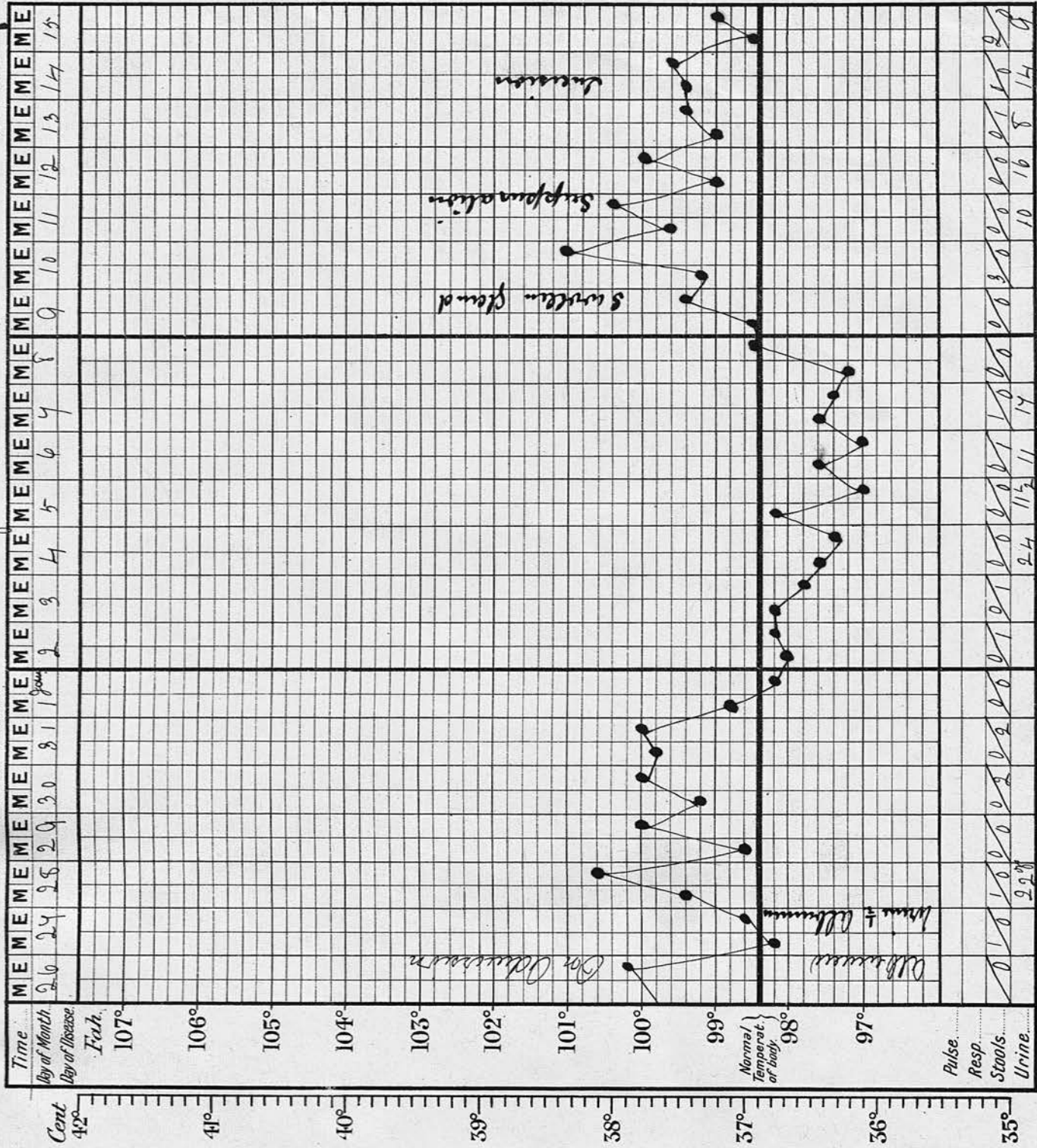
Diphtheria

In the case of *Mrs. Hardy* Aged *44* Occupation *Janney* Result *Reid* 18 *93*

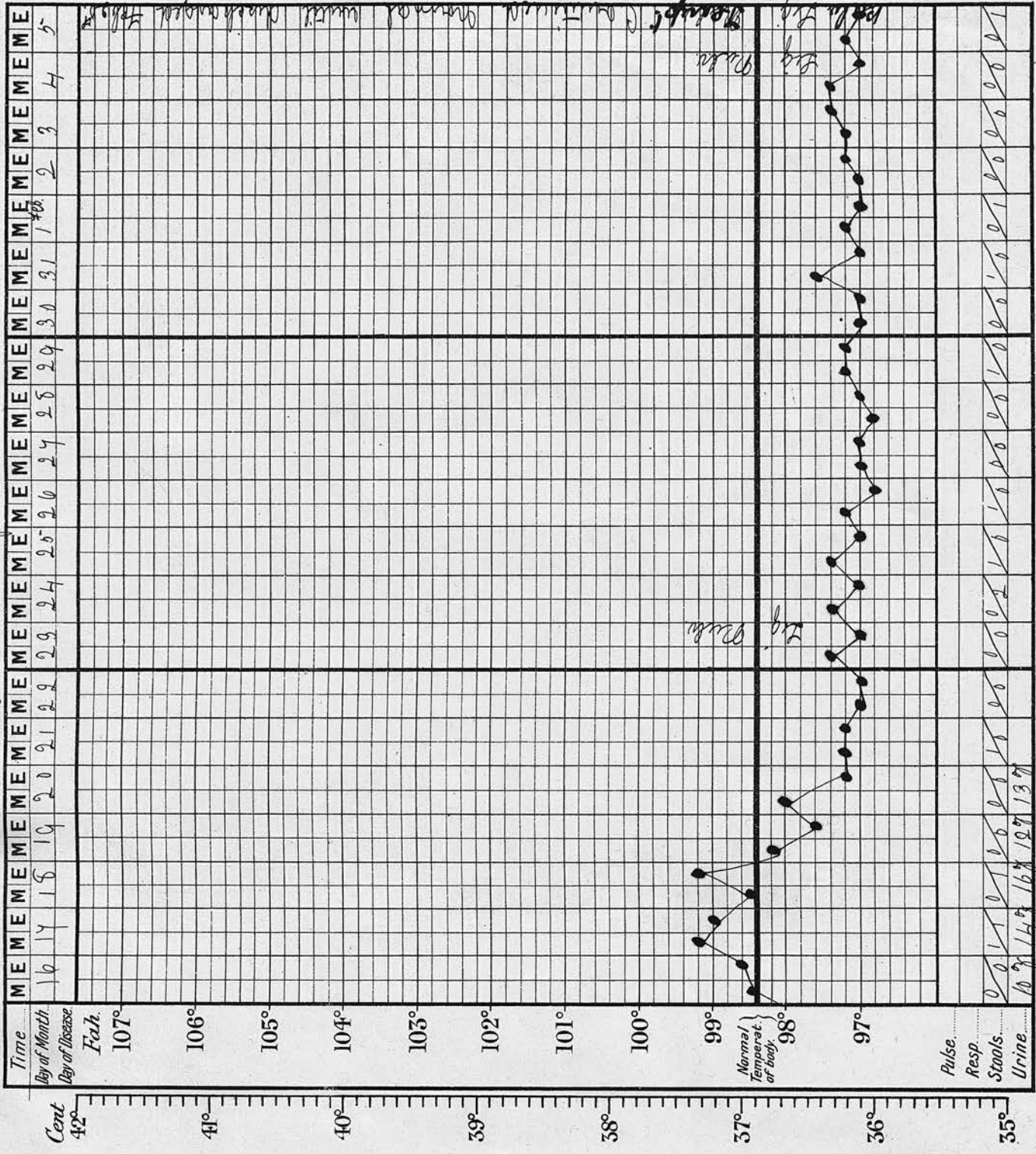
Records of Temperature, Pulse, Respiration, Stools and Urine from 5th Day of Disease



Records of Temperature, Pulse, Respiration, Stools and Urine from 26th Day of December. 1892.
 In the case of Miss Semson Aged 5⁴/₃ Occupation Result Recovered



In the case of Miss Demerson. Aged 5⁴ yrs. Occupation Result January 18 93

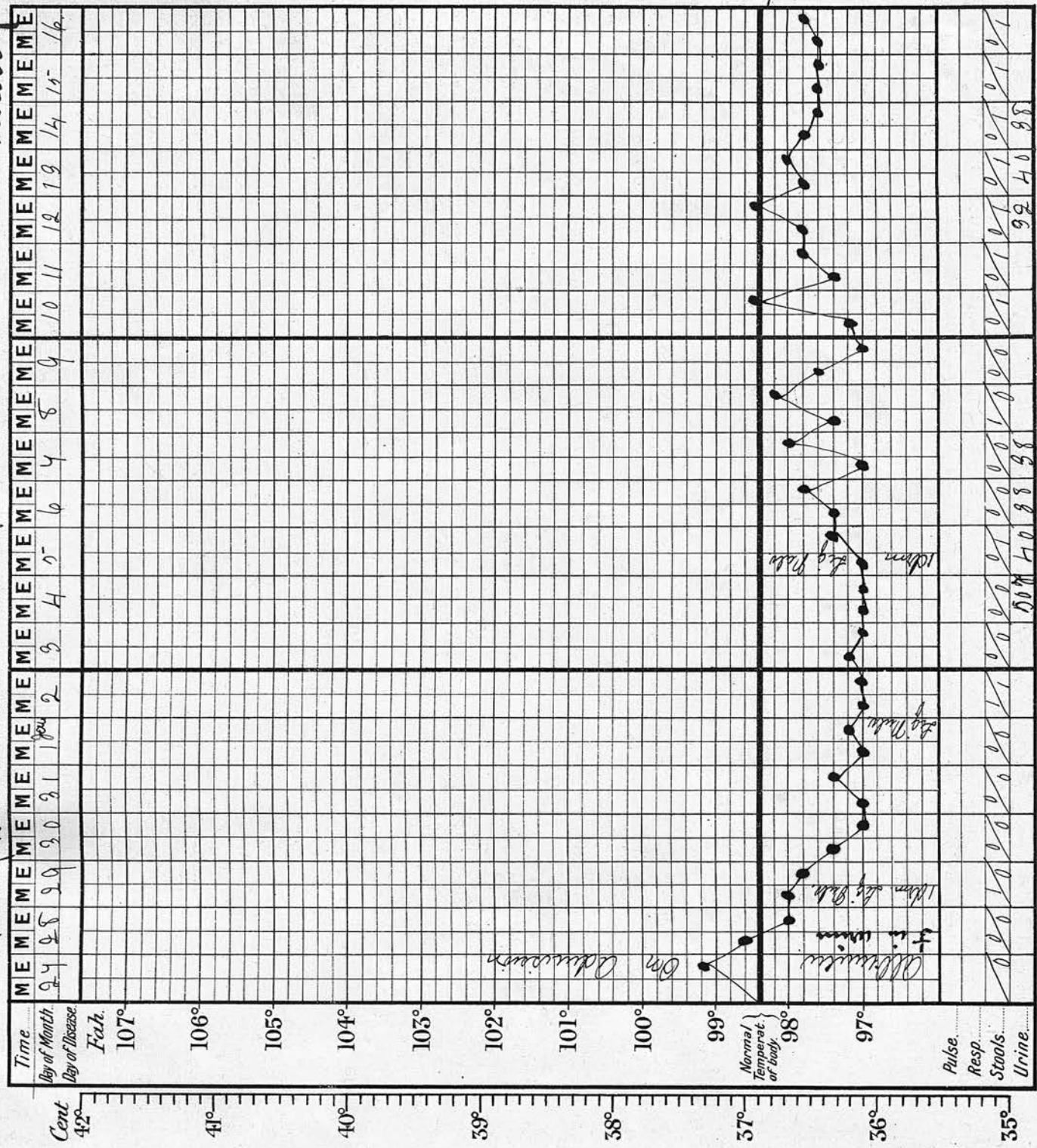


Records of Temperature, Pulse, Respiration, Stools and Urine from 2nd Day of December. 1892.

In the case of *Cholera* *Demissa* Aged 12^{ys} Occupation

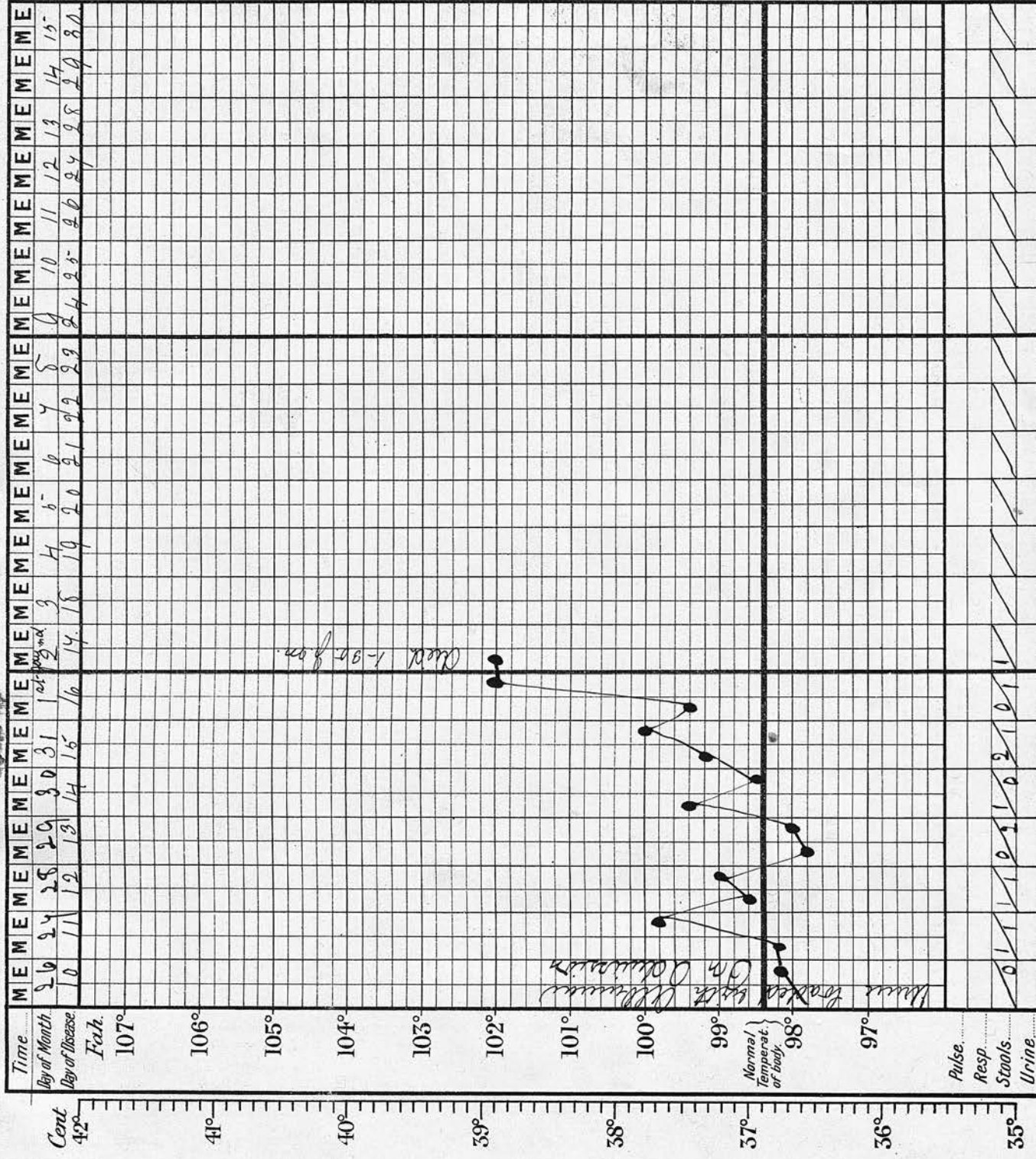
Result Recovered

See Continued Journal, will be discharged. J. L. 4 1892



In the case of Mrs. Demmer Aged 40 Occupation Housewife 18 9 1892 Result Died

Records of Temperature, Pulse, Respiration, Stools and Urine from 26th Day of December.



DISEASE.

Notes of Case.

Name *E. Ann Green*

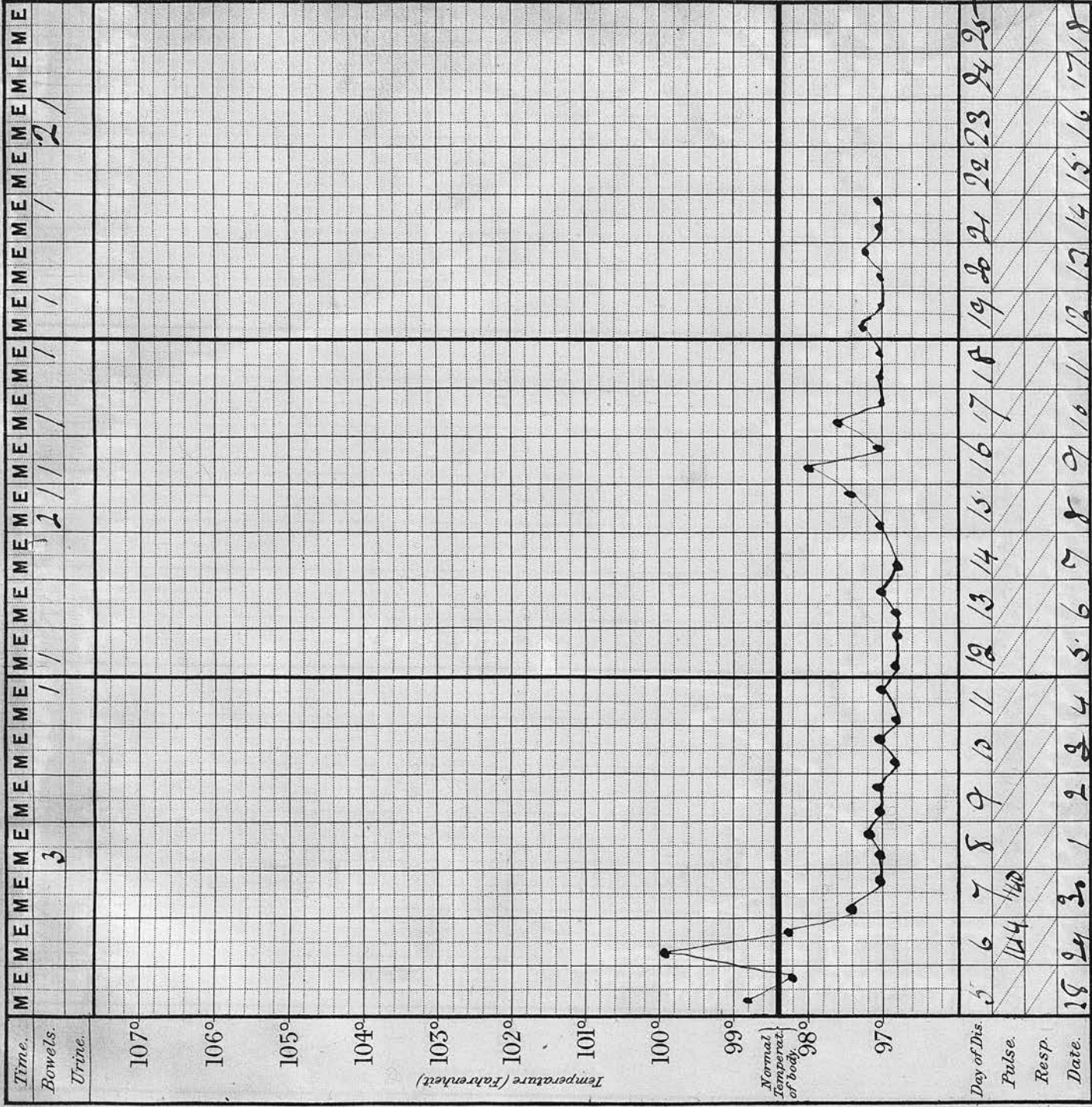
Age *5 yrs.*

Diet

Case Book No.

Date of admission.
Sept. 28th 94

Result



DISEASE.

Diphtheria

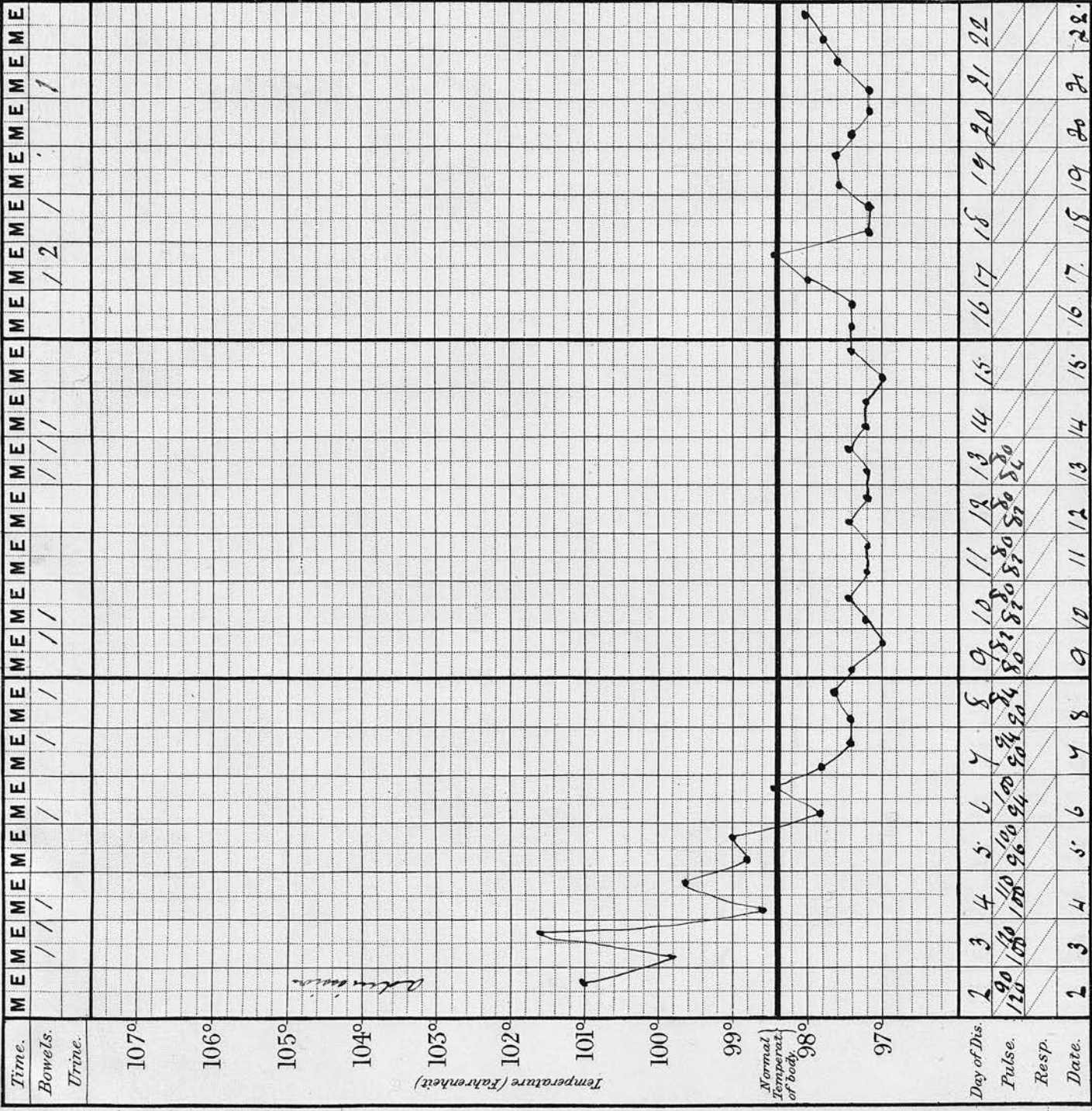
Notes of Case.

Name *W. J. Ward*
 Age *2.*
 Diet
 Case Book No.

Date of admission.

July 2 1894

Result *Recovered*



DISEASE.

Dysentery

Notes of Case.

Name *Eure Wilson*

Age *25*

Diet

Case Book No.

Date of admission.

Nov. 28th 1893.

Result

