OBSERVATIONS ON A SEVERE EPIDEMIC OF INFLUENZA

AT SENEKAL O.F.S. SOUTH AFRICA

DURING 1918-1919.

WITH SPECIAL REFERENCE TO PROPHYLAXIS AND TREATMENT.

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BY,

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Many therapeutic measures have been recommended, and many ranked as of great value, if not actually specific, in ~~thi~~ this disease. No one remedy has however, attained anything approaching universal recognition.

In this Thesis I will endeavour to show:-

Firstly, the beneficial effects derived from the use of a Polyvalent vaccine, both Prophylactically and as treatment during an attack.

Secondly, to demonstrate the great Therapeutic value of Venesection in certain conditions. ~~The vaccine used~~

The vaccine used contained the following organisms:- B, Influenzae, Pneumococcus, Streptococcus, Micrococcus Catarrhalis, Streptococcus mucous Capsulatus, Staphlococcus, B. Friedlander, and B. Septus. To this I will refer more fully later.

Before, however, describing the Epidemic which I saw and treated, it may be of interest briefly to summarise some of the many forms of treatment which have been employed. For example:-

Boudreau recommends Iodine, "The value of which ~~is exaggerated~~

is supposed to be due firstly to its action on Glandular Tissue in general, and specially its functional stimulation of the Endocrine Glands. Secondly to a similar action on Lymphoid tissue, and thirdly to its remarkable tonic action on the myocardium.

It also possesses a bactericidal, anti-toxic, lymphagogue, and diuretic action." In severe cases he gives 100 min. in the first 24 hours in 10 doses.

Iodine has also been used intravenously with good results in influenza broncho-pneumonia by Baillic who gives 20-30 min. of the tincture diluted with 9cc. of a 0°85 per cent solution of salt in freshly distilled water on two or three successive days.

Blum has treated more than 250 cases with methylene blue either by mouth in doses of 20 cgm. for adults and 10cgm. for children 4 to 5 times daily; or intramuscularly, adding ½gm. of Quinine Hydro-chloride dissolved in a little water by means of ½ gm. Urethane for its anasthetic effect, or intravenously (1-2 cc. in 24 hours of a 5 per cent solution). If given within 24 hours of the disease, the injection often causes the disease to abort, and in some cases of pulmonary complications the infection was arrested and rapid defervescence took place.

Loeper and Grosdidier also used the same remedy in a fairly large number of cases in which treatment with Urotropin had failed, in doses of 20-30 cgm. by mouth in cachets, and obtained cures in 13 out of 20 cases of Broncho-

pneumonia. In four cases intra-venous injections were given, but this method did not appear to offer any advantages. Frank and Bruhl treated 38 severe cases of Influenza with Novarsenobenzol with 8 deaths or a mortality of 21 per cent. The drug being administered either by mouth or intravenously. Hector McKenzie recommended musk in cases of prostration in elderly subjects.

Köhler advocates the use of Hot Baths as employed in numerous diseases in Japan.

Fixation Abscess

Wanner attributes the efficacy of a fixation abscess to its causing an intense accumulation of Leucocytes, which are broken up and so liberate a large quantity of ferments, by which resolution of the pneumonic exudation is effected. Merklen urges that treatment by fixation abscess should be reserved for serious cases. That it is inadvisable if the patient cannot be kept under observation, owing to the danger of secondary infection. He, however, thinks that fixation abscess is one of the best means of protection of the system against simple influenzal infection and still more so against influenza complicated by broncho-pneumonia.

Mauriac has tried intra-pulmonary injections of antipneumococcal serum in cases of influenza with pulmonary complications ---and was much impressed by the rapid improvement in desperate cases. Of 16 so treated 13 recovered and 3 died.

Rise and Hosenberg treated 32 cases, all of which were very severe, by injections of anti-streptococcal Serum with only 5 deaths.

Mc Guire and Redden used intravenous injections of human convalescent serum with a mortality of 4 per cent.

Stoll employed the same treatment using blood or serum.

Holst treated 20 Cases of influenzal pneumonia with intramuscular injections of serum from convalescents from post influenzal empyema.

Ross and Hund treated 28 cases of influenzal pneumonia and Broncho-pneumonia by transfusion of citrated blood obtained from persons who had recovered from the disease and gave negative Wassermann reactions.

Lesné, Brodin, and Saint Girons treated 14 cases of influenza by intravenous injections of human plasma. The same results were obtained whether normal or convalescents' serum, or the serum of the patient himself was used. Plasma was used, as it is less toxic than serum and does not give rise to anaphylaxis.

Faivre states that the only treatment of any avail in the cases of broncho-pneumonia in puerperal women was autotherapy, i.e. injection of the pleural effusion or blood of the patient herself according to the method of Artant de Vevey.

Wynn maintains that prompt treatment with vaccine within a few hours of the onset of the disease will definitely abort an attack of influenza. The same good effect was also produced in cases with Broncho-pneumonia from the first.

His vaccine contained several strains of pneumococci, Streptococci and B. Influenza, Micrococci Catarrhalis was not included. I consider that it should have been. Micrococcus Catarrhalis is an important factor in Epidemic influenza.

Tremolières and Raffinesque treated cases of influenzal Broncho-pneumonia with the vaccine G, prepared at the Pasteur Institute consisting of Strains of the Pneumococcus, Streptococcus, B. Influenza, Micrococcus Aurens.

Lyon, Tenney and Szerlip gave large doses of Tinct. Digitalis as a routine practice at the beginning of influenzal pneumonia.

Hildebrandt states that when an extension of the pneumonic process or heart failure is the cause of dyspnoea and cyanosis, free bleeding is indicated to prevent paralysis of the right heart. With this I fully agree.

Cowie and Beaven treated nine cases of influenzal pneumonia by intravenous injection of dead typhoid bacilli, but it is a safe procedure only within limits, being contra-indicated in (a) cases beyond the third day, (b) where there is undoubted evidence of advanced myocardial insufficiency or acute endocarditis.

Wells also employed the same treatment.

Patschkowski has treated 40 cases of influenzal pneumonia with injections of milk; 10 cc. of boiled milk being injected into the muscles of the thigh.

Roberts and Carey used a vaccine which contained Influenza bacilli, pneumococci types i. ii. and iii. Streptococci and

Staphlococci.

Edgeworth used anti-streptococcal Serum, but the results were not good when pneumonia was already present.

O'Kelly Day found a vaccine composed of Pneumococcus, Micrococcus Catarrhalis of value.

Giuseppi recommended Camphor given by the mouth --- with this Prof:: Stachelni agrees. vidi Lancet p.258 1918.

Proctor Sims reported good results from the use of Quinine.

Carnegie Dickson used a mixed vaccine containing Streptococcus, Staphlococcus, Pneumococcus, gram negative Influenza-like bacillus B. Friedlander, Micrococcus Catarrhalis. "In most cases apparently the disease was shortened and occurrence of complications prevented."

B. Turner recommended Salicin which cuts short an attack and prevents complications, destroying the infectivity of the patient.

Dr. Luigi Meilley "Autotherapy in Influenza" introducing into the organism of a patient suffering from a severe form of influenza, a nonheterogeneous serum which presumably contains the antibodies or anti-toxins of the antigen or toxin which produces the disease and which, beyond its own antitoxic properties, would also act as a producer of fresh anti-toxines". Autoserotherapy has no specific action upon complications, except by improving the general condition of the patient, and favourably influencing the course of the disease".

Oliver and Murphy used intravenous injections of H_2O_2 in 25 cases with 13 recoveries and 12 deaths without gas embolism

being produced.

Friedmann treated 39 cases with Anti-influenzal pneumo-Streptococcal serum. In 14 the serum appeared to have a favourable effect. He, however, is doubtful whether this beneficial effect is due to the specific actiont of the serum on the pneumococci, or to the nonspecific action of the loose serum.

Lochelangue describes the vaccine G of the Institut Pasteur, the composition of which was at first:-

Pneumococci	4000 million
Streptococci	2000 "
B. Influenzae	2000 "

Subsequently the formula was changed to:-

B. Influenzae	5000 million
Streptococci	5000 "

The vaccine produced no local reaction or only slightly. The use of the vaccine was followed by rapid and striking reduction of the number of organisms in the sputum. In most cases the fall of temperature occurred suddenly after the 4th, exceptionally after the 3rd infection. The Pneumonic form of the disease appears to benefit most from the treatment.

Laveutelli and Turin used Bruschettini's polyvalent vaccine which contains various strains of Strepto-and Pneumococci in 238 cases of influenza of all degrees of severity with a total mortality of 1'2 per cent.

Coglievina warmly recommended calcium chloride, the favourable results being due to its anti-phlogistic action.

Hughes treated 16 cases in early stages with subcutaneous injections of polyvalent anti-streptococcus serum with good

results.

Gregor proved that men exposed to NO_2 and SO_2 fumes present a certain amount of immunity.

Beaumont tried the following methods of treatment:-

(1) Potassium Iodi and Creosoti, 30 cases 4 died.

(2) Vaccine -- Using Millbanks prophylactic vaccine in small doses after onset of disease.

B. Influenzae 60 million)
Streptococcus 80 ") in each c.c.
Pneumococcus 200 ")

For Treatment

1st dose $\frac{1}{50}$ of P.D, 2nd injection 2 days later, $\frac{1}{30}$ P.D. 3rd injection after one day's interval, if temperature still raised, $\frac{1}{20}$ P.D.

Beaumont's Conclusions:- "The figures tend to show that vaccinated cases do better than unvaccinated, but the series is too small to warrant any definite statement; certainly the vaccine did not produce any striking beneficial results.

(3) Salicin The Mortality of cases treated with Salicin was four times as great as those which received no specific treatment.

The average duration of pyrexia was 2·3 days longer in cases treated with Salicin. Broncho-pneumonia occurred 1·6 times more often in cases treated with Salicin.

Salicin is of no avail once Broncho-pneumonia has begun.

(4) Perchloride of Mercury injected intravenously. The mortality was 20per cent.

Blood transfusion One case which died.

Continuous Oxygen. One case only, who died.

Venesection "has been done in a fair number of cases, but I have never seen any benefit result from its use and the blood is often extremely difficult to obtain in quantities exceeding a few ounces".

He concludes by stating:--

(1) "None of the specific methods tried has proved satisfactory in every case.

(2) "The temperature chart does not afford a reliable criterion of the efficacy of any special form of treatment. Patients who have had no drugs beyond aperients will sometimes exhibit charts as striking as those seen after the administration of Vaccine, Salicin, or Perchloride of Mercury.

(3) "In the present state of our knowledge Symptomic treatment alone is available."

I disagree entirely with his experience of Venesection. I never experienced any difficulty in getting a free flow of blood, and as much blood as I wanted to withdraw, by opening the median basilic vein after first putting a light rubber bandage on the upper arm to make the veins stand out prominently. The effect of Venesection in my cases was very good as is shown by the charts. Nor did my experience agree with Beaumont's estimate of the value of vaccine, although I must admit we employed vastly different vaccines.

Cooper Cole, found that in some cases venesection relieved the congestion, especially if combined with Salicine, or glucose and Salicine, given subcutaneously or intravenously or by rectum.

Oxygen alone or through alcohol helpful.

Eusol, intravenously gave uncertain results, and serum was not found of much use.

INCIDENCE OF THE DISEASE IN SOUTH AFRICA.

Epidemic influenza was first reported as such in South Africa on the 14th September 1918 in the vicinity of the Harbour area, Durban.

It was next traced to the Rand, where numerous cases were observed amongst mine natives on or about the 18th September 1918. Within a few days several thousand natives were affected. The mortality amongst these natives was comparatively low.

It was next officially reported on the 23d September amongst the Nigerian troops at Port Craig, Cape Town.

At Kimberley, the Epidemic commenced on the 23d September. In a short time the disease appeared in several other places, and within 2 or 3 weeks it became pandemic.

The first cases were mostly of a mild type, but towards the end of September 1918, the disease took on a more severe form, the number of deaths showed an alarming increase, and only then the true significence of the Epidemic dawned on the public at large.

Copied from Official Report of Government Commission on Epidemic Influenza in South Africa

EPIDEMIC INFLUENZA AND ITS COMPLICATIONS.

TABLE OF CASES AND DEATHS. 1st AUGUST TO 30th NOVEMBER, 1918.

PROVINCE	POPULATION.			CASES			INCIDENCE PER CENT			DEATHS			DEATH RATE PER CENT OF PERSONS ATTACKED			DEATH RATE PER 1000 OF POPULATION.		
	EUROPEAN (1918)	OTHER THAN EUROPEAN (1911)	TOTAL	EURO-PEAN	OTHER THAN EUROPEAN	TOTAL	EURO-PEAN	OTHER THAN EURO-PEAN	TOTAL	EUROPEAN	OTHER THAN EUROPEAN	TOTAL	EURO-PEAN	OTHER THAN EURO-PEAN	TO-TAL.	EURO-PEAN	OTHER THAN EURO-PEAN	TOTAL
CAPE	617,131	1.982,588	2,599,719	192,007	1,009,223	1,201,230	31.11	50.90	46.20	5,855	81,253	87,108	3.04	8.05	7.25	9.48	40.98	33.50
TRANSVAAL ..	498,413	1,265,650	1,764,063	140,639	491.448	632,087	28.31	38.82	35.83	3,267	25,397	28,664	2.32	5.16	4.53	6.55	20.06	16.24
ORANGE FREE STATE ..	181,613	352,985	534,598	79,532	150,492	230,024	43.79	42.63	43.02	2,242	7,495	9,737	2.81	4.98	4.23	12.34	21.23	18.21
NATAL	120,903	1,095,929	1,216,832	42,475	510,989	553,464	35.13	46.62	45.48	362	13,600	13.962	.85	2.66	2.52	2.99	12.40	11.47
UNION	1,418,060	4,697,152	6,115.212	454,653	2,162,152	2,616,805	32.06	46.03	42.79	11,726	127,745	139,471	12.57	6.90	5.32	8.26	27.19	22.80

The "First Epidemic" in Senekal started on the 6th October 1918 and lasted till end of December 1918. The "Second Epidemic" started in June 1919 and lasted till August 1919, and although not affecting so many of the inhabitants as the first, the mortality was equally high.

Races Affected --- Epidemiology etc.

Both the European, and native, or coloured races, were affected.

The coloured races suffered more severely than the European, which was probably due to the following causes:-

1. Their being generally more susceptible to Respiratory diseases.
2. Their living in crowded, insanitary and ill-ventilated huts.
3. The fact that they easily lose their morale as a race, especially with internal complaints.
4. That they had very little medical or other attention.

This was seen very well in the Cape Province where the death rate of persons attacked amongst the coloured was 8·05 and Europeans 3·04. See official report.

In the Transvaal the percentage for the Native race was 5·16, in the Orange Free State 4·98.

This I put down to the fact that the coloured races, in the last two provinces live amongst cleaner surroundings and pay much more attention to personal cleanliness etc.

Amongst the Europeans again my experience was that those

who had been born in Europe and who had lived there for part of their lives, before going to South Africa, did not on the whole, get the disease so badly as those who were born and grew up in South Africa.

This, I think, was due to the fact that people in Europe got attacks of colds, influenza, and respiratory catarrh, much more often than those in South Africa, and therefore were partially at any rate, immunised against the complicating organisms.

Compare the Natal European death rate of .85%. The percentage of European born against Colonial born being much higher in that province than in the other three provinces.

I found that most of the deaths occurred amongst the strong, healthy men and women between the ages of 15 and 30 years. My youngest death was 10 years and my oldest 56 years.

Those above 60 years and below 10 years of age as a rule had mild attacks.

I did not see the disease develop in a single one of my cases of Chronic Bronchitis, Asthmatics, Chronic suppurating lesions, or those who had recently suffered from an infective condition.

Nor did I find any of my patients, who had had repeated mild attacks of influenza, or ordinary respiratory catarrh, coryza, or hay-fever, develop a bad attack of Epidemic Influenza.

I did not have a single authentic case, where a

patient, who had had one good attack of Epidemic Influenza i.e. during the first Epidemic Oct.--Dec. 1918, developed another during the second Epidemic June--Aug. 1919.

The disease was much more fatal amongst pregnant women, especially in those towards the later months of pregnancy. In those cases where labdur commenced during an attack, the mother almost invariably died. The disease in those patients ran a rapid course, A patient who d in the morning had no physical signs in the lungs might have a confluent Broncho-pneumonia in both lungs at night and die before the next day. In this my experience agreed with that of J.W.Harris (Vide Med: Science abstract and reviews. Vol. 1 p.48 and 49).

The infection might be given to a second person by one who is not himself actually ill. This fact I observed in October 1918. A patient of mine (Mr. R.T.), living on a farm 3 miles from the town of Senekal, was in town and in the street spoke to Messrs. L. and B. also patients of mine. Mr. R.T. was taken ill within a few hours after he left town, which he did soon after speaking to Messrs. L. and B. Messrs. L. and B. were both taken ill with a typical attack two days after.

In this case I could prove conclusively that the only way in which Messrs. L. and B. could have been infected was through Mr. R.T. The latter was amongst the first to contract the disease. He got infected through native servants, who in turn were infected by another native who

who brought the disease from Johannesburg.

Incubation Period.

The incubation period was from two to five days. Uaually two days in my cases, as was well illustrated in cases of Messrs. L. and B. above mentioned, and also in the following case:- That of the local gaoler. In this case the source of infection was traced to a prison warder who had had the disease in Bloemfontein, and who after being out of bed for 4 or 5 days came to Senekal to escort some prisoners back to Bloemfontein. The gaoler met the warder in the street in front of the gaol, spoke to him and there handed over to him the prisoners. The gaoler was taken ill exactly two days after speaking to the warder. The warder in this case either brought the disease from the infected train or else was himself still infective. In this case I could prove that the only way the gaoler could have been infected was through the warder.

In this my conclusions about the incubation period agreed with those of Forster and Cookson (vide Lancet 1918 p. 588).

Beginning of Epidemic in Senekal O.F.S.

The first case I saw in Senekal was in consultation, on the 6th October 1918. The patient had contracted the disease in Bloemfontein 2 days previously; he died on the 16th October 1918, of heart failure following on a Confluent Broncho-pneumonia. The next case occurred 3 days later. T

The third case was taken ill on the 11th October and died on the 18th October of heart failure following on a confluent Broncho-pneumonia.

After this the number of cases rapidly increased, so much so, that by the 15th and 16th October, the call for medical attendance was so great that neither I nor my colleagues could attend to more than half the patients. The Epidemic spread so rapidly that within 10 days after the first cases occurred, all business was brought to a standstill.

This same state of affairs was occurring over the rest of South Africa. Some places had the disease in a more virulent form, while some small areas escaped it altogether.

Short description of Typical Cases.

The patient, usually a strong and previously healthy individual, suddenly experienced a pain in the head, mostly confined to the back. At the same time he felt a chilliness over the whole body, and a certainty that he was becoming ill.

Pain was usually also felt in the body generally, but was more confined to the back and posterior regions of the legs and arms. Soon a sensation of weakness overtook the patient, rapidly increased, and within a few hours, sometimes in less than 30 minuted, he mas forced to take to bed. ~~This~~ This weakness was so marked in many cases, that it was quite a common experience to find patients in bed with most of their clothes on. This was specially seen in cases where

all the members of a family were taken ill at the same time.

When in bed and covered with blankets the patient soon felt warm and perspired freely. This latter condition was ± in some cases not seen, nor could it be induced, and I always took it as an unfavourable sign. Sir J. Horder says:- "In these very bad cases sweating does not occur, and it is useless to attempt to produce it".

The patient lay in bed with his eyes closed, his head turned away from the light, and was disinclined to speak or to answer questions. Except for water, he could with difficulty be persuaded to take any nourishment. The temperature soon rose and within a few hours may reach 102°F. or 103°F. The pulse at the same time increased in frequency but did not always correspond to the temperature. With, or soon after, the onset an irritating cough began, which at times was very troublesome and difficult to relieve. The tongue was at first moist with a little whitish fur on dorsum behind. As the disease advanced the tongue gradually became more coated, and drier, and in bad cases became so dry that the patient could only with difficulty speak, or protrude his tongue. In these cases the tongue was usually covered with a thick, brownish black fur, which often cracked. The patient, after a day in bed, felt brighter the following day, but this only lasted for a few hours. He gradually got worse,. The temperature, which may have

fallen after the initial rise, soon rose higher, and with remissions, which were not regular, and which were sometimes smaller and sometimes bigger, reached 105°F. or even 106°F. within a few days. The patient was now very ill, and often passed into delirium, either the mild type which lasted for only a short time, or the wild type, when he could only with difficulty be kept in bed, or the "quiet, muttering, picking of bedclothes" type, which might gradually lead to the typhoid state.

The cough became less irritating now, and sputum which at first was absent now became abundant. At first clear and shiny, it now became frothy and blood stained. The blood at first pinkish in colour later became bright red, and in bad cases almost pure, frothy blood was expectorated in large quantities. I never saw the rusty, sticky sputum so characteristic of Lobar pneumonia

The bowels were usually constipated, and might remain so during the whole illness, except in fatal cases when for a day or two before death, diarrhoea and incontinence might develop.

The gastro-intestinal type of the disease I only saw in one or two cases.

Vomiting might be an early symptom, and in some cases might occur during the course of the disease, it was, however, not troublesome.

The heart which might at first be only slightly accelerated, soon increased in rate. Cyanosis was often seen,

sometimes early and sometimes only when delirium had developed. Heart failure was most often the ultimate cause of death.

The patient might now improve, as was indicated by the fall in temperature, which was usually by lysis, the decreased pulse rate, and the tongue beginning to clean. He slept better, (insomnia was often present and difficult to treat). His appetite improved together with that of the whole general condition. Within 10 days of the beginning of the illness he was convalescent. The temperature might , however, have remained high, the general condition become worse, the heart dilated, cyanosis increased, the cough gradually diminished simply because the patient had no strength to cough, or because the reflexes became paralysed, and an audible gurgling begun in the threat. The lung complication which by this time was invariably present would become worse and the patient would gradually pass into the Typhoid state, and die either from heart failure or asphyxia. In the latter case the patient was practically"drowned in his own secretion". This was specially seen in the Confluent Bronchopneumonic type of case.

COMPLICATIONS.

Lung 1. Congestion from a slight to extreme degree, with large quantities of bright red frothy sputum. This was seen in 37 out of the 100 cases.

2. Broncho-pneumonia and confluent Broncho-pneumonia. This occurred in 27 out of 100 cases.

3. True Lobar Pneumonia seen in 2 cases out of the 100.

Septicaemia was seen in 4 cases out of the 100 cases.

The Broncho-pneumonic cases showed all the physical signs of ordinary Broncho-pneumonia, but in addition there were signs of congestion in part of or the whole of the rest of the lung. The breathing was very harsh, with prolonged expiration. The Confluent Bronchopneumonic cases showed a condition which one might describe as:- "Of the whole lung bordering on consolidation". In some parts one heard signs of Broncho-pneumonia but it was combined with an element of extreme congestion just short of consolidation. In fact it was impossible to draw the dividing line, and I classified my cases according to the predominating condition found.

The septicaemic class were those cases seriously and rapidly ill from the first, where the lungs were comparatively clear except for perhaps one or two small areas of consolidation; the remainder of the lung being free from any exudation, and the breathing very harsh.

These cases became Cyanotic early, were prone to delirium which was of the quiet muttering type. Diarrhoea usually set in towards the end, and the heart failed rapidly. These cases invariably proved fatal. No treatment was of any avail. (See charts later).

Secondary Complications or Sequalae.

1. Empyema. I did not see a single case.
2. Increased pulse rate with signs of Cardiac dilatation, was seen in some cases. A form of Myocarditis.
3. "Neurosis" was seen in many cases. For both the latter I found a trip to the sea for 6 weeks very beneficial.
4. Relapses were often seen. The relapse proved fatal in many cases, when it was caused by getting out of bed too soon i.e. before the temperature was normal or before it had been normal for more than 4 days.
5. Tuberculosis of the lung following on Epidemic Influenza I did not see in any of my cases.

I may here state that one practically never sees Tuberculosis either of the lung or of any other part of the body in SE-nekal O.F.S., except it be in cases from elsewhere. I did see tuberculosis of the lung in two European cases. The history was, that it followed on an attack of Epidemic Influenza. As both cases however, came from the Cape Province where they had lived previously to, and during the epidemic, and as I know that a good deal of pulmonary tuberculosis does occur there, I was not certain whether it followed on, or preceded the attack of Epidemic Influenza.

TREATMENT.

The general treatment for fevers was carried out as far as possible. Rest in bed, in well ventilated airy room. Cold sponging, and ice packs if necessary, for temperature. Light diet, varying with the appetite and digestive powers. Grated "Biltong" was found the most useful.

After a brisk purge, enemas were used for the bowels. Constipation was nearly always troublesome.

Diaphoretics I found of doubtful value, they certainly did not keep the temperature down and often distressed the patient.

Creosote with or without potassium Iodide I used often but was not much impressed by its effects. Creosote rubbed into the skin underneath the armpits had a good effect in a few cases.

Emetics, as a means of cutting short an attack, were tried, but were of doubtful value. Emetics did sometimes relieve the congestion temporarily. Expectorants etc. were also used.

I did not employ drugs as a rule, vaccine having been found much more beneficial.

Stimulants. Camphor in oil given hypodermically I found the most useful. Digitalis and Strychnine were also used. Alcohol was not often prescribed.

Morphia had at times to be used to control the patients and I never found it to do any harm when used judiciously and

and with care.

Vaccine. The vaccine mostly used was that prepared by the Clinsearch Laboratories Johannesburg, (Dr. J. Pratt Johnson, Director.);--"This vaccine is prepared from a large number of virulent strains (not less than 120) of B.Influenzae Pneumococcus, Streptococcus, Micrococcus Catarrhalis, Streptococcus Mucosus Capsulatus, Staphylococcus, B.Friedlander, and B.Septus.

" "The strength of this preparation is standardised so that each organism is present in a curative dose in the vaccine issued for the treatment of Influenza and Pneumonia and other complications. The prophylactic vaccine is roughly 10 times this strength. It has been found that different methods of preparing vaccine profoundly modify their action so that it is necessary for each laboratory preparing vaccines to standardise their own preparations from the point of view of therapeutic action, as numerical microbe content is quite unreliable when applied to vaccines prepared by different techniques."

The Prophylactic or Prevention Vaccines , contained 250 million organisms in each c.c.

The Treatment Vaccine contained 25 million organisms in each c.c.

For Prophylaxis ½ c.c. was injected subcutaneously and 5 to 7 days later a second dose of 1 c.c. was given, and may be repeated in doses of 1 c.c. after the same interval.

For Treatment no hard and fast rule can be laid

down, but it was usual to begin with ½ c.c. (for adults) with intervals of 24 to 48 hours after each injection. After watching the effect of the first dose I found no difficulty in deciding on the amount or size of the second dose, and the interval after which it should be given.

The vaccine supplied by the Government which was also used in a few cases by me, was composed of:-

Pneumococcus	800 million	)
Micrococcus catarrhalis	300 million	) in each
B. Influenzae	100 million	) c.c.
Streptococcus	100 million	)

The directions given were:-

For treatment ½ c.c. increased to 1 c.c. every 24-48 hours.

For prevention ½ c.c. increased to 1 c.c. every 5-7 days.

The same strength of vaccine being used for treatment and prevention.

This vaccine I did not use often because:-

1. I did not like the big dose.
2. I did not approve of using the same strength for both treatment and prevention.
3. The reaction both local and constitutional was too marked.

The vaccine (Clinseards) was supplied in 25 or 50 c.c. bottles. The mouth of the bottle was covered with an indiarubber cap and over this was a layer of wax. Before use the top of the rubber was disinfected with iodine. The needle of the hypodermic Syringe was then thrust through the rubber and the required quantity of vaccine withdrawn. After use the opening in the wax was sealed again by applying a lighted match

The reaction produced was a little swelling, and redness over a small area round about the point of injection. The constitutional effect was never very marked. A few patients had to lie up for a day after the inoculation. But in the majority of cases nothing uncomfortable or only a slight headache or feeling of general malaise was experienced.

With Government vaccine, both the local and constitutional effect was much more marked, as I can testify from personal experience.

I never had a case in which an abscess was produced, as the result of my inoculations.

The Bacteriology I will not discuss except to say that I considered B. Influenzae as the causal organism, and that the complications were in every case due to a mixed infection caused by the organisms mentioned, and contained in the Polyvalent Vaccine used by me.

Prophylactic Treatment by Vaccine.

The use of prophylactic vaccine in ordinary respiratory conditions, such as Hay Fever, colds or Coryza had been found of value in preventing their occurrence for a number of years previous to the Epidemic.

Prophylactic vaccine was found of value in whooping cough, not so much in preventing an attack, as in preventing the dangerous lung complications.

When therefore Epidemic Influenza was spreading so rapidly throughout South Africa, causing many deaths through lung

complications, and it was found that the lung complications were being produced by a mixed infection, I decided to use a mixed vaccine, containing all the organisms found in the lungs of those patients who had died.

I inoculated patients with this vaccine in the hope of preventing the fatal lung complications, rather than to prevent an attack of the disease. I was lucky enough to be able to start inoculating, those who were willing, 12 days before the Epidemic had actually taken hold of the inhabitants of Senekal.

The prophylactic or prevention Vaccine was used for this purpose. Nobody was inoculated who showed any signs of being ill, or who had a slight temperature, in those cases a dose of Treatment Vaccine was given.

I prophylactically inoculated children from the age of 18 months upwards, the dose varying according to age. For an adult ½ c.c. of vaccine was given subcutaneously in the upper arm, and after 5-7 days, a second dose was given of 1 c.c. always providing the patient showed no signs of being ill. In this manner I inoculated prophylactically between 1000 and 12000 cases. It was impossible to find out definitely how many of these afterwards contracted the disease, but I do know that only two died of the disease during the 1st Epidemic Oct-Dec. 1918.

The first patient who died had only received one dose viz. the 1st of ½c.c. Four days afterwards he was taken ill with a typical mild attack but disobeying instructions he got out of bed to attend to his farm, before the tem-

perature had settled down, with the result that he had a relapse and developed Broncho-pneumonia of which he died, in spite of all treatment.

The other (see S.G.V. chart at End) had received $\frac{2}{3}$ dos. of Clinsearch vaccine and also ~~one~~ $\frac{2}{3}$ doses of the Government Vaccine. He developed the Septicaemia type of the disease of which he died in spite of all treatment.

Nearly the whole of the Senekal district suffered badly during the first Epidemic in 1918, except an area to the South East of the town extending from North to South for from 5-10 miles. This area was bounded on the South East by a low range of hills and on the North by an interrupted range of hills. East and West by two main roads leading to neighbouring towns. In this area during the first Epidemic (Oct.-Dec. 1918), there was practically not a single bad case of Epidemic influenza, certainly not a single death This fact I could prove because I knew all the farmers ~~xxxx~~ living there and made very careful enquiries. The Second Epidemic (June to Aug. 1919) started in this area going from east to west and spread very rapidly. Within the first 14 days there were 10 deaths and altogether 20 died. The total white population in this area was between 500 and 600. In contrast to this was the fact that not a single death or bad case occurred in that area which suffered so badly during the First Epidemic in 1918.

The Europeans who lived in the area above referred to and those who escaped the first Epidemic in the town of

Senekal, were nearly all prophylactically inoculated before the First Epidemic really started, but were not again prophylactically inoculated when the Second Epidemic began. Firstly because they would not believe that the Second Epidemic was really another Epidemic of Influenza, and secondly because they thought they would escape again as they had done in the First. I advised reinoculation but could not persuade the majority. Some, however, did submit to reinoculation and all of these, as in the First Epidemic either escaped altogether or had a mild attack.

From this I concluded that the 1st inoculations given seven months previously, no longer gave protection, The protection, however, afforded by prophylactic inoculation in Oct. 1918 did last at least 3 months viz: until beginning of January 1919 when the 1st Epidemic ended, and may have lasted longer, but it did not last till June 1919, when the Second Epidemic started.

Neither in the town of Senekal, nor in that part of the district which suffered so badly during the first Epidemic, did I find a single authentic case, where a patient who had had one good attack of the disease, developed another during the second Epidemic..

From this I concluded that one good attack of Epidemic Influenza did produce an immunity which in my cases lasted at least 6-8 months i.e. the time from the First to the Second Epidemic, and may have lasted longer. In this my experience agreed with that of the New South Wales Dept. of Public

Health:- "One attack of Influenza appears to afford a high degree of immunity, which was not, however, very lasting" (vide B.M.J. 1920 p.481.)

It may clear up some doubts if I point out that I knew all the European inhabitants of the town and district of Senekal, having practised amongst them for five years previous to and eighteen months subsequent to the Epidemics. I was accordingly in a position to verify all my facts and conclusions.

Charts of Cases which Contracted the Disease after Receiving Prophylactic Vaccine.

Those cases which had received Prophylactic inoculations, and afterwards did contract the disease, had a mild attack in most cases, as will be seen from the following charts: ---

Chart of J.H.

NAME.	RESIDENCE.	AGE.	SEX.	OCCUPATION.
J.H.		18	M.	Student.

DISEASE. Epidemic Influenza (Had prophylactic Vaccine 2 doses)

19 18 — DATES OF OBSERVATIONS.

Oct.	31.		1		2		3		4		5		6.	
	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M
Cent. Fahr.	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10
41° 106														
40° 104														
39° 102														
38° 100														
37° NORMAL 98.2														
36° 96														
Pulse per minute.		116 96	100 80 60	82 80	78 78 80	76 72 76	74 68 68	70 68	68	64 68	58 60 58			
Respirations per minute.														
Urine Ozs.														
Spec. Grav.														

1. J.H. had two prophylactic inoculations, he contracted the disease in hospital, acting as an orderly. He was employed in sponging patients, giving them food, making their beds, and generally attending to their needs. He was put to bed within a few hours after taking ill. It will be seen that his temperature did not rise to 102° and that it only remained raised above normal for 3 days. He had a slight cough, but no physical signs in the lungs.

Chart of S.M.C.H.

NAME. S.M.C.H.	RESIDENCE.	AGE. 40	SEX. M.	OCCUPATION. Civil Servant.

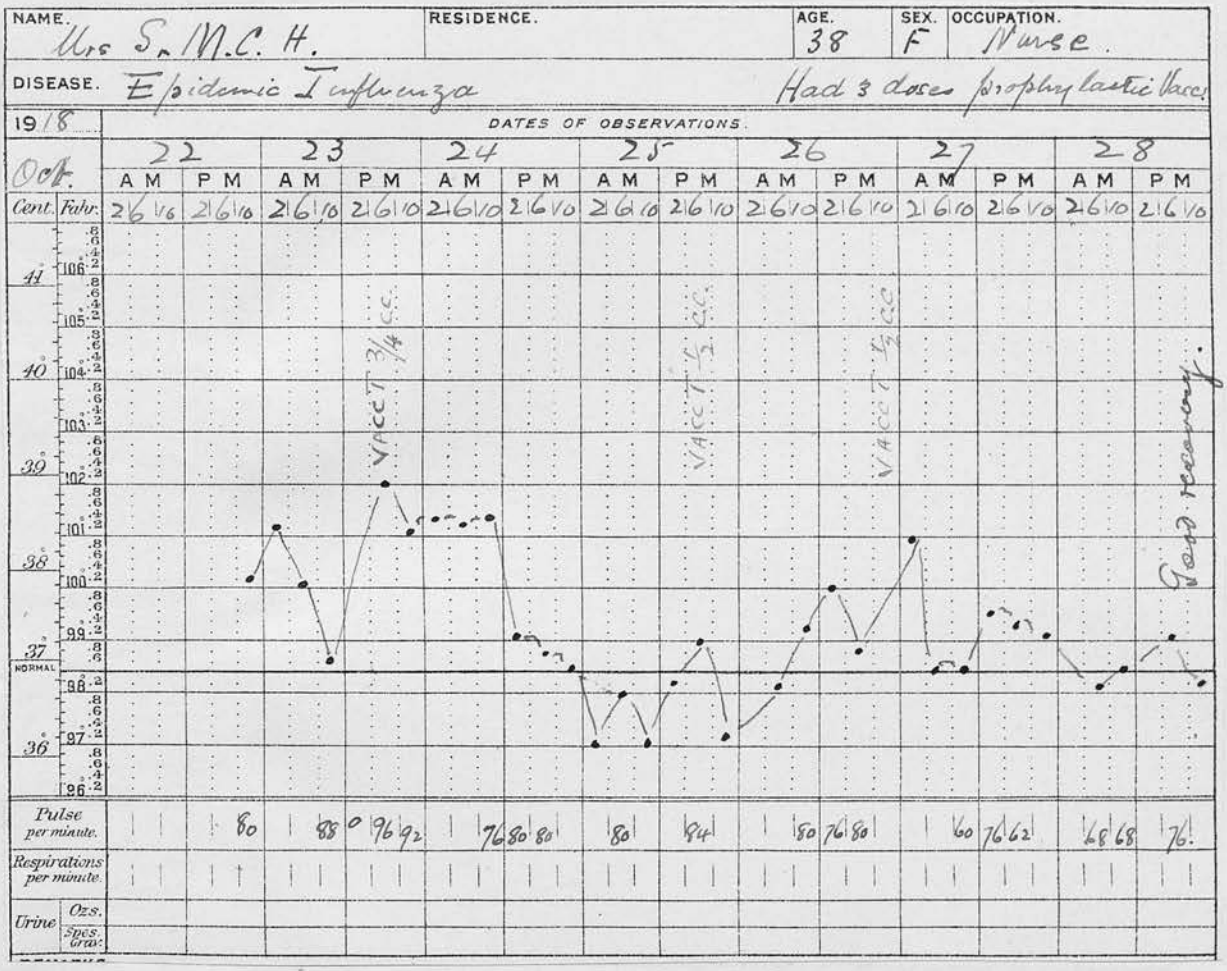
DISEASE. Epidemic Influenza (Had prophylactic Vaccine (3 doses)

19 18 — DATES OF OBSERVATIONS.

Oct	31		1		2		3		4		5		6	
	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M
Cent. Fahr.	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10
41° 106														
105														
40° 104														
103														
39° 102														
101														
38° 100														
99														
37° NORMAL														
98														
36° 97														
96														
Pulse per minute.		88 100	88	100 72	94	88 80	76	72 80 72	60	68	60			
Respirations per minute.														
Urine Ozs.														
Spes. Grav.														

2. S.M.C.H. had three prophylactic doses, and was taken ill five days after receiving the last. He acted as general superintendent of the hospital and was constantly busy removing patients from their homes to hospital. Again in this case it will be seen that the temperature did not reach 102° nor did it remain above normal for more than three days. No physical signs in the lungs. In every respect the case was that of an ordinary mild attack of influenza.

Chart of Mrs. S.M.C.H.

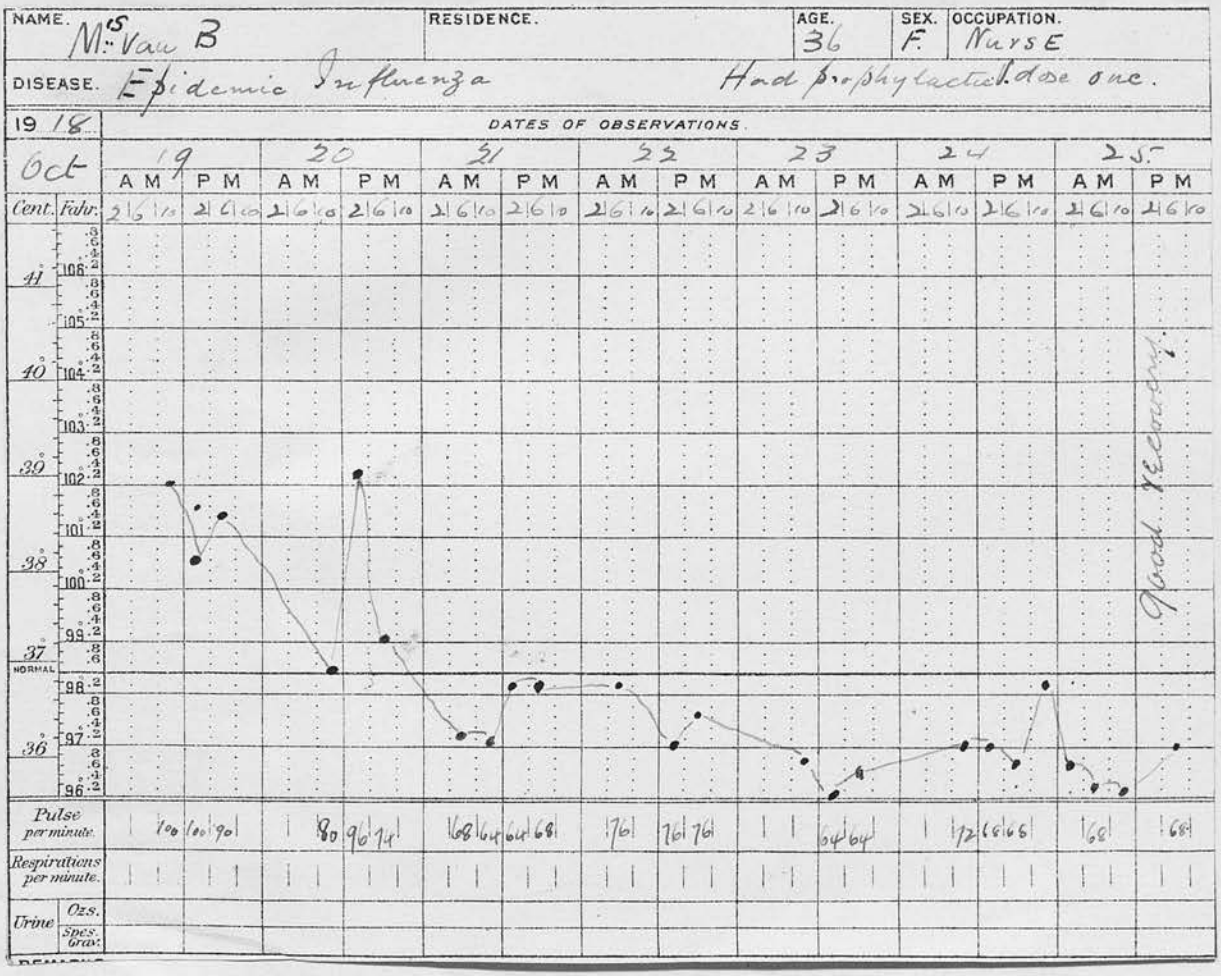


3. This case had three prophylactic doses. She was head nurse in the Hospital, and contracted the disease within a f few days of receiving the last dose. In this case the temperature reached as high as 102° F. She was given three doses of treatment Vaccine, as will be seen from the Chart. She developed slight congestion of the lower lobe of the left lung and had a cough with blood stained frothy sputum.

From my experience I am certain this case would have had a very bad time, had she not received the prophylactic doses. She was overworked, being on duty for 20 hours

more or less every day and thus physically far below par. Just the sort of patient who would have taken the disease badly.

Chart of Mrs. v.B.



4. Mrs. v.B. was a nurse and had been nursing six patients single-handed for 10 days. She had received one Prophylactic dose, and was brought into hospital 24 hours after taking ill. Again it will be seen that the attack was a mild one. No physical signs in lungs.

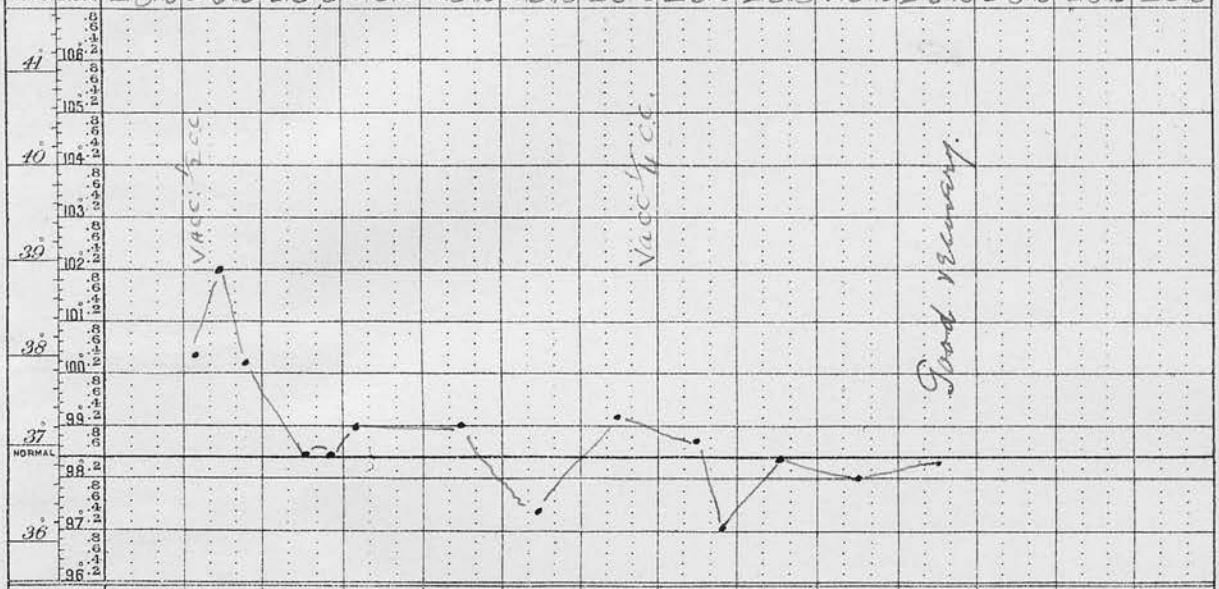
Chart of Mrs. S.

NAME.	RESIDENCE.	AGE.	SEX.	OCCUPATION.
Mrs. S.		34	F	House wife.

DISEASE. Epidemic Influenza. Had 2 doses prophylactic Vacc.

19 18 — DATES OF OBSERVATIONS

Nov.	7 AM	7 PM	8 AM	8 PM	9 AM	9 PM	10 AM	10 PM	11 AM	11 PM	12 AM	12 PM	13 AM	13 PM
Cent. Fahr.	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0	2 1/6 1/0
Pulse per minute.		96 96	88 84 88		76		92	72	84	80	72			
Respirations per minute.														
Urine Ozs.														
Urine Spes. Grav.														



5. Mrs. S. had received two doses Prophylactic Vaccine and was taken ill three weeks after receiving the last dose. She was given two small doses of Treatment Vaccine. No Physical signs in lungs.

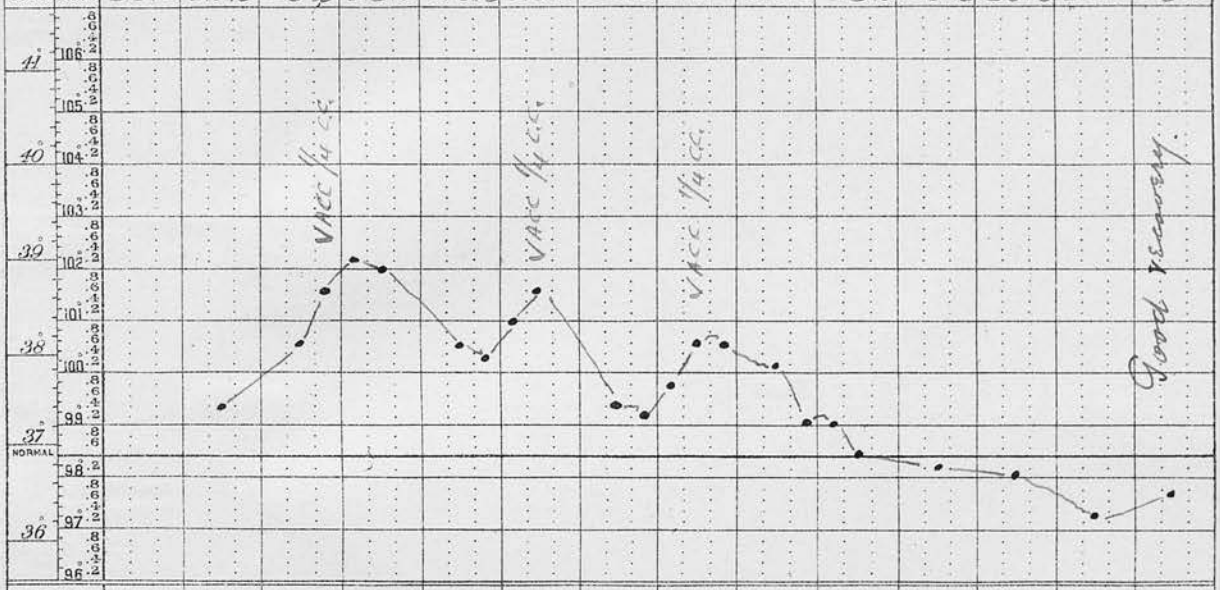
Chart of F H.S.

NAME.	RESIDENCE.	AGE.	SEX.	OCCUPATION.
F.H. S.		36	M	Police Constable

DISEASE. Epidemic Influenza — Had 2 doses prophic Vacc:

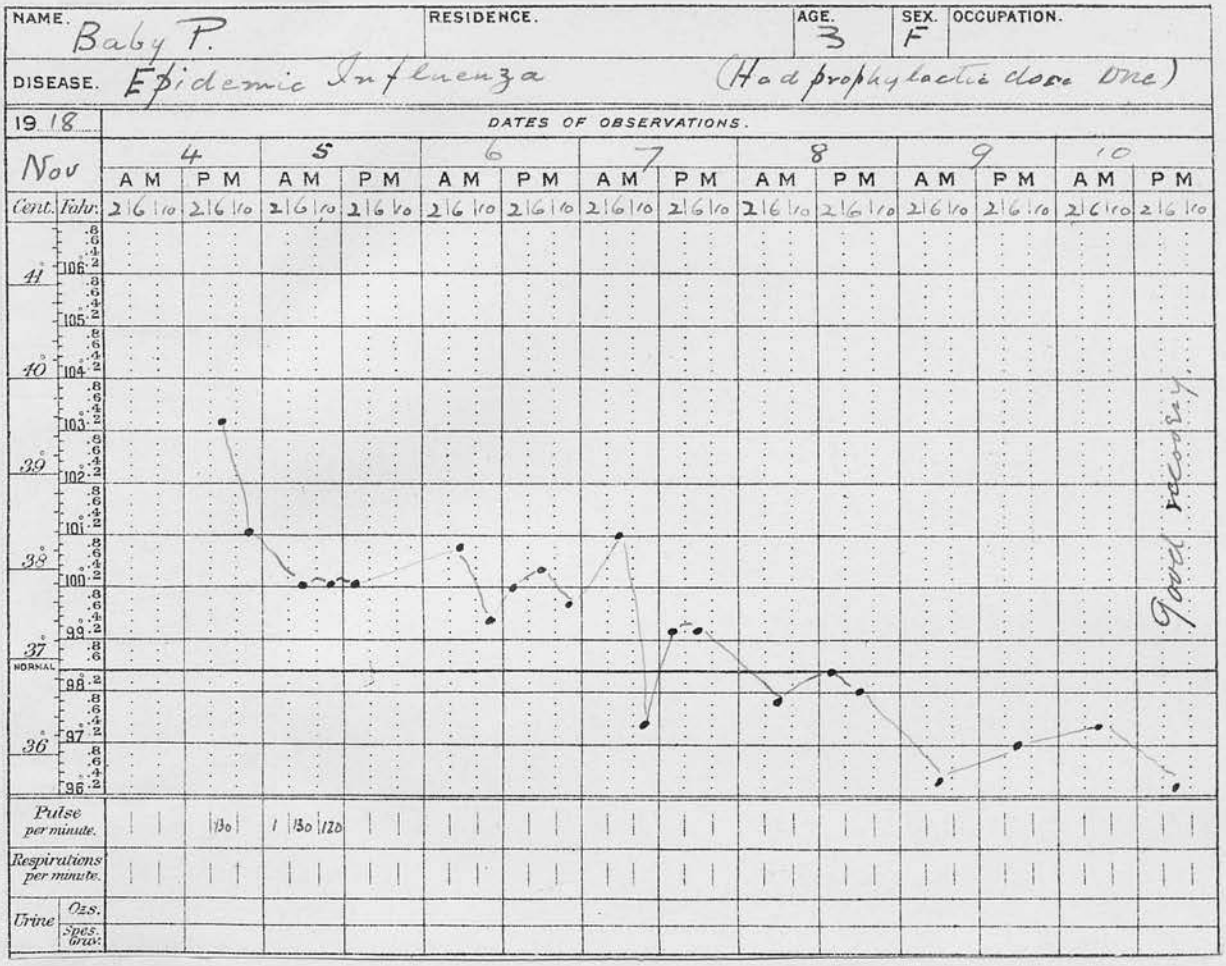
19 18 — DATES OF OBSERVATIONS.

Nov	4		5		6		7		8		9		10	
	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M	A M	P M
Cent. Fahr.	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10
41° 106														
105														
40° 104														
103														
39° 102														
101														
38° 100														
99														
37° NORMAL														
98														
36° 97														
96														
Pulse per minute.		80		92 96		80	84		72	76 80		68 60 68	64	72	60	72
Respirations per minute.														
Urine Ozs.														
Spes. grav.														



6. F.H.S. husband of the last, a police constable was taken ill sixteen days after receiving the last dose. He was given three small doses of Treatment Vaccine as will be seen from the chart. From my experience later I do not think this was necessary.

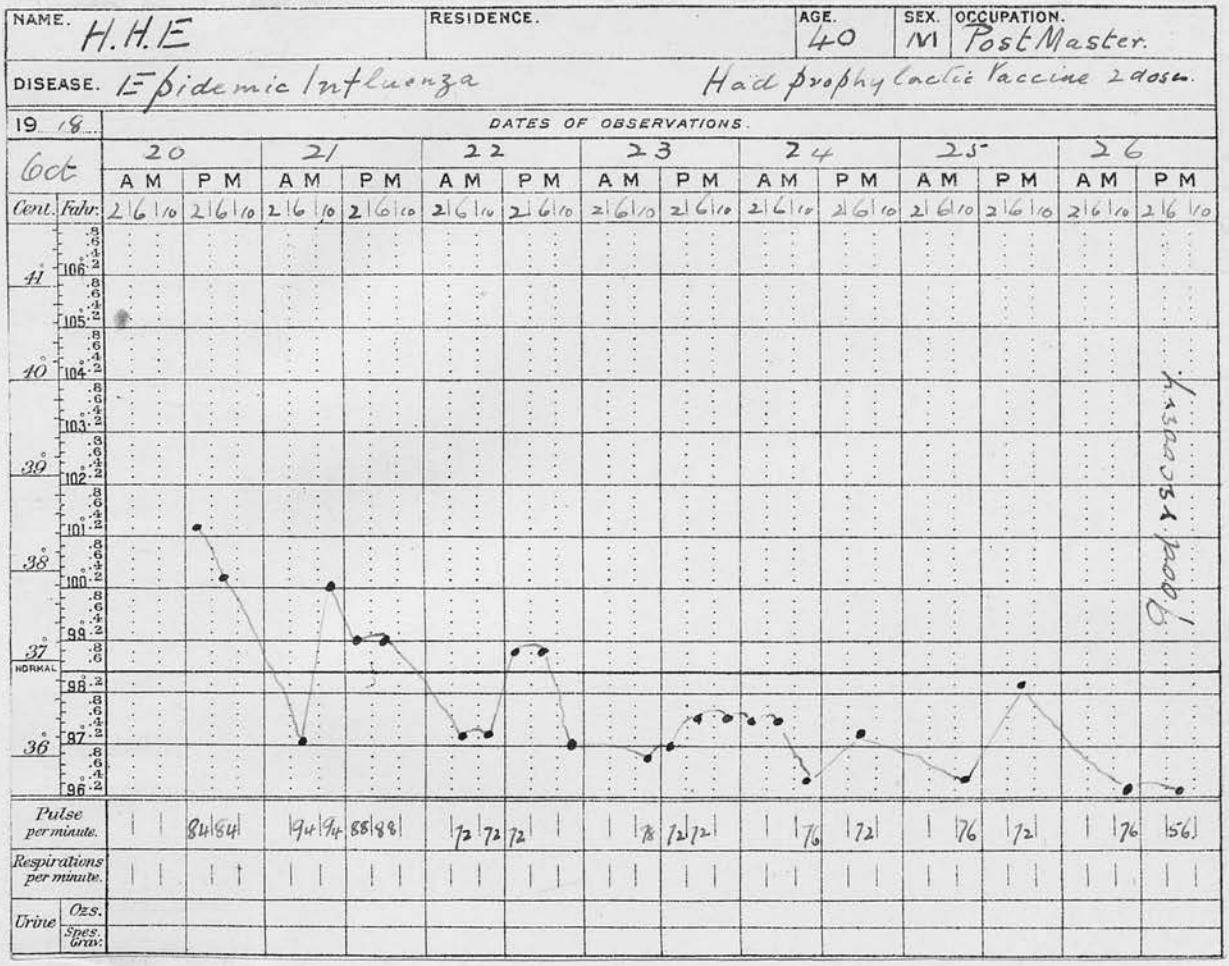
Chart of Baby P.



7. Baby P. (3years) had one prophylactic dose, and was taken ill 14 days afterwards. From the Chart it will be seen that she had a mild attack. Temperature remaining up for 6 days.

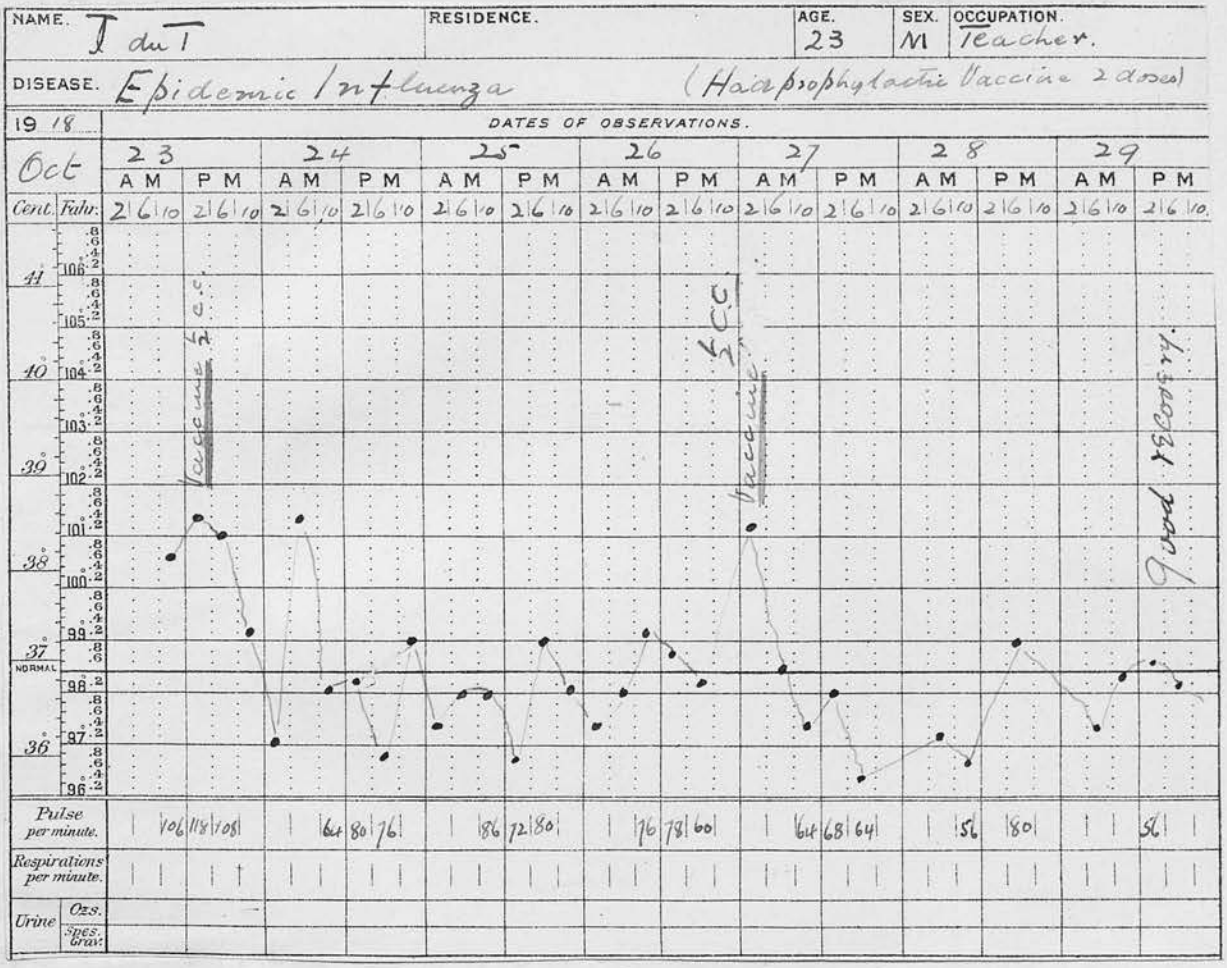
Chart of H.H.E.

NAME. H.H.E	RESIDENCE.	AGE. 40	SEX. M	OCCUPATION. Post Master.
DISEASE. Epidemic Influenza		Had prophylactic Vaccine 2 dose.		



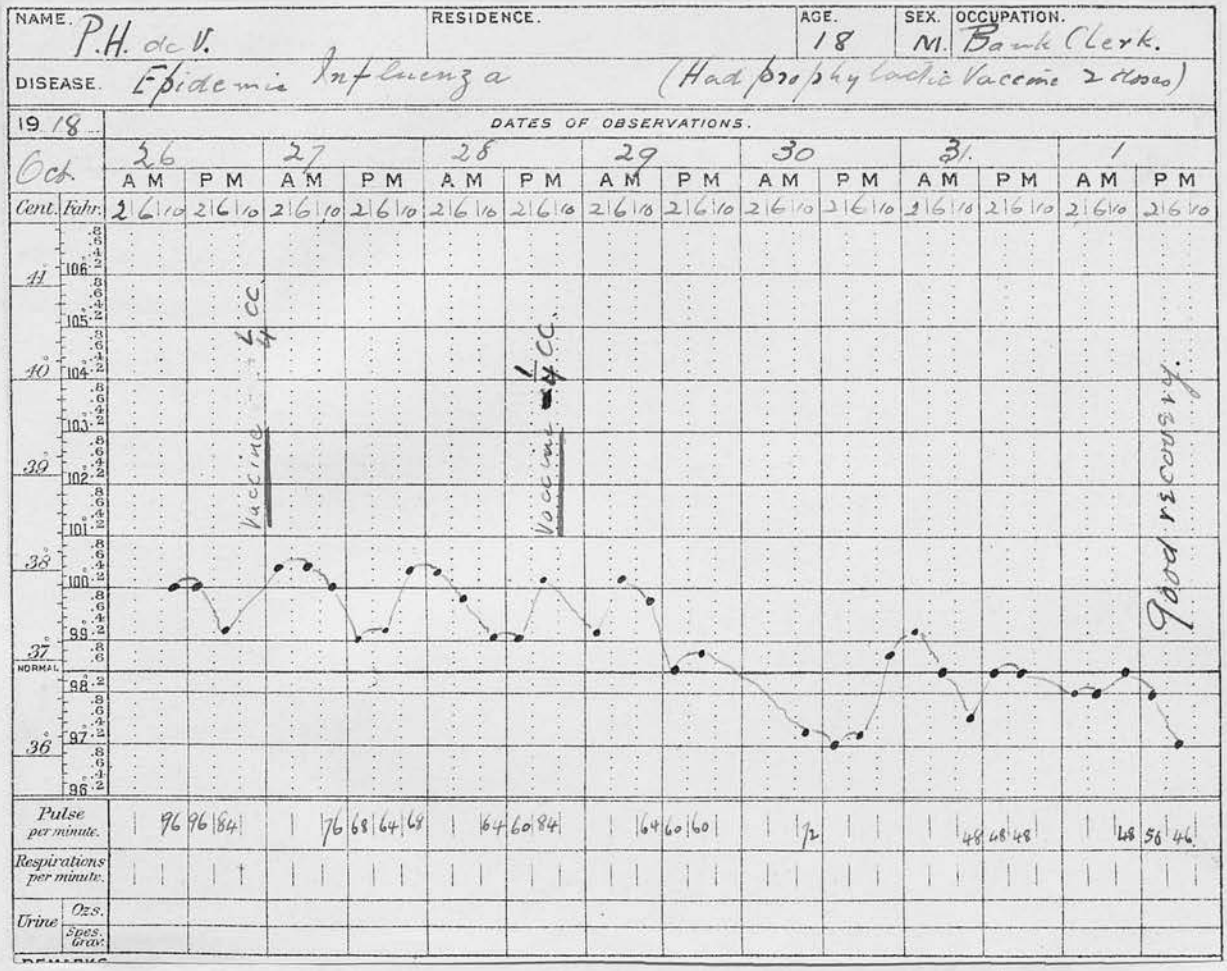
8. H.H.E. had two prophylactic doses, and was taken ill three days after the last. No further treatment was employed. It will be seen to have been a mild case.

Chart of J. du.T.



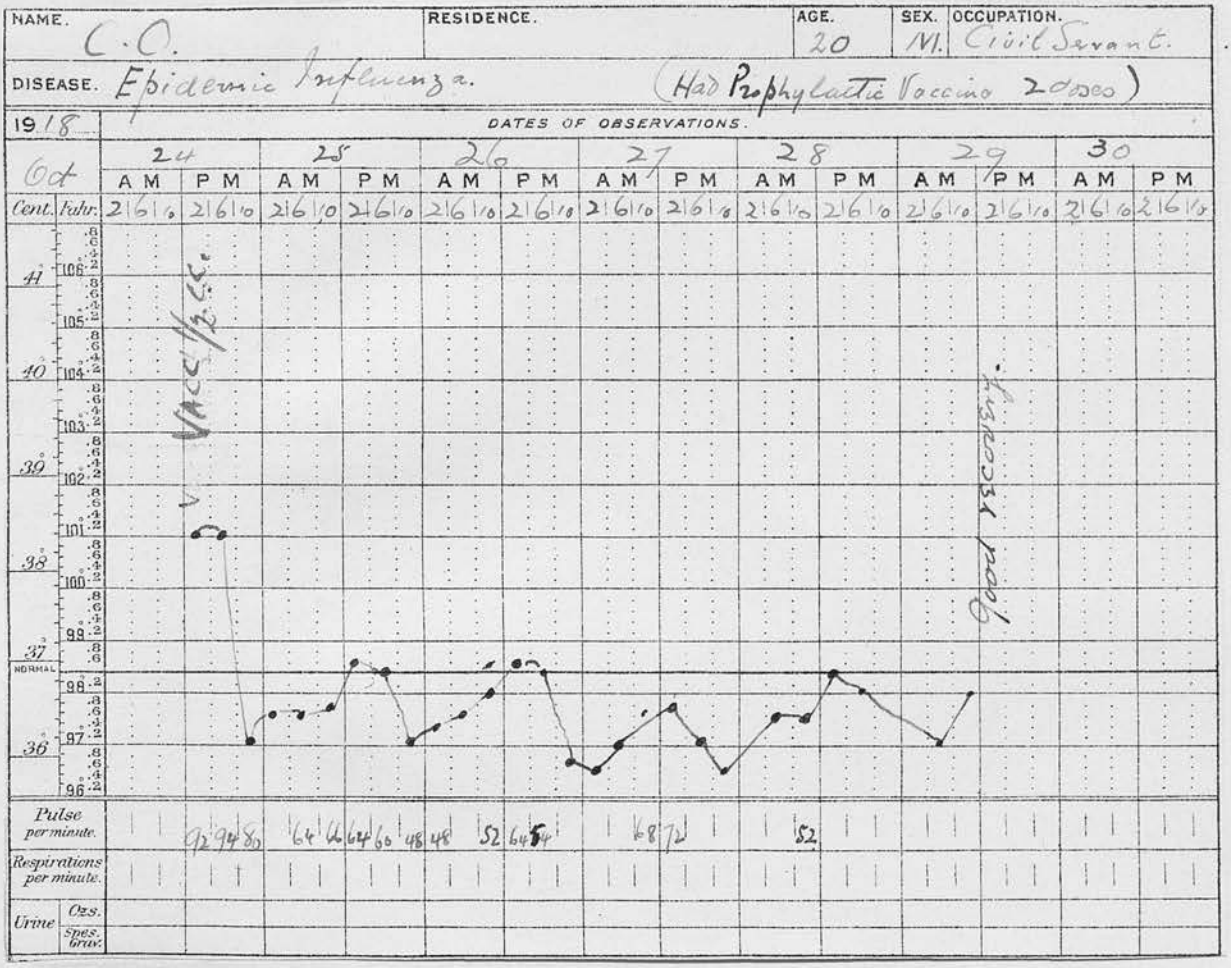
9. J. duT. had two prophylactic doses, and was taken ill while serving in Hospital as an orderly, and after working very hard for a week. He received two doses of treatment vaccine during his illness. No physical signs in lungs.

Chart of P.H.de V.



10. P.H.de V. had two prophylactic doses, and was taken ill in hospital while acting as an orderly. Had been working very hard for 8 days before. Again a very mild attack with no physical signs in lungs.

Chart of C.O.



11. C.O. had two prophylactic doses, and was taken ill in hospital while serving as an orderly. Was much overworked. Again a mild attack.

NAME. L.v.d.M. RESIDENCE. AGE. 17 SEX. M OCCUPATION. Student-

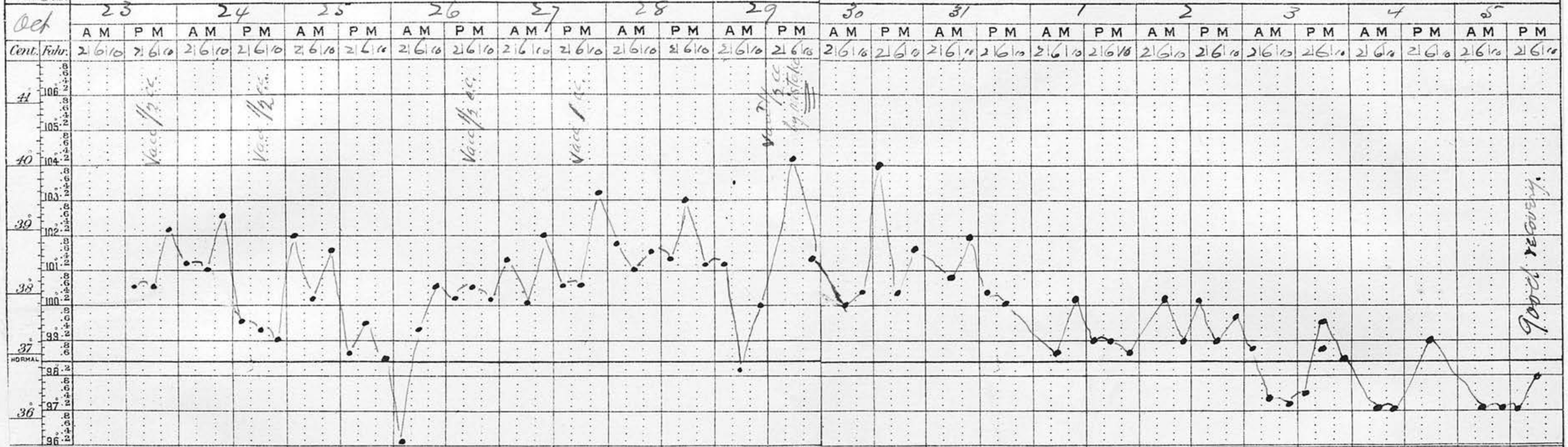
DISEASE. Epidemic Influenza. Had 2 doses proph'ylic Vaccine.

19 18 Oct — DATES OF OBSERVATIONS.

L.v.d.M.. RESIDENCE. AGE. 17. SEX. M. OCCUPATION. Student

Epidemic Influenza

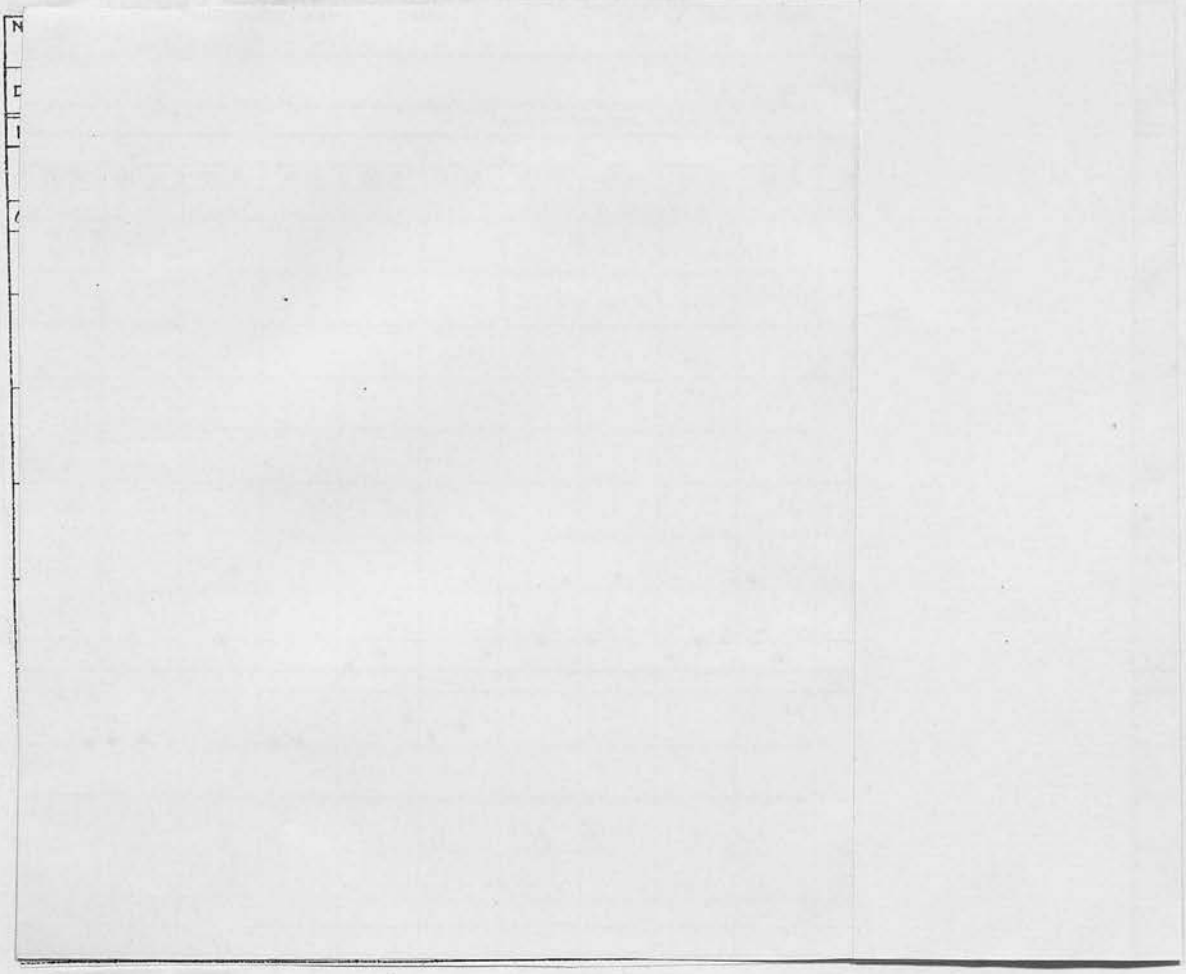
DATES OF OBSERVATIONS.



Date		Pulse per minute	Respirations per minute
23	AM		
23	PM		102
24	AM		
24	PM		96 84 72
25	AM		96
25	PM		76 76
26	AM		84
26	PM		80
27	AM		96
27	PM		96 80 88
28	AM		
28	PM		92 88 88
29	AM		84
29	PM		96
30	AM	96	
30	PM	106 92	
31	AM	100	
31	PM	106 106	
1	AM	92	
1	PM	86 84	
2	AM	82	
2	PM	84	
3	AM	64	
3	PM	76	
4	AM	68	
4	PM	80	
5	AM	76	
5	PM	72	

Urine Ozs. Spec. Grav.

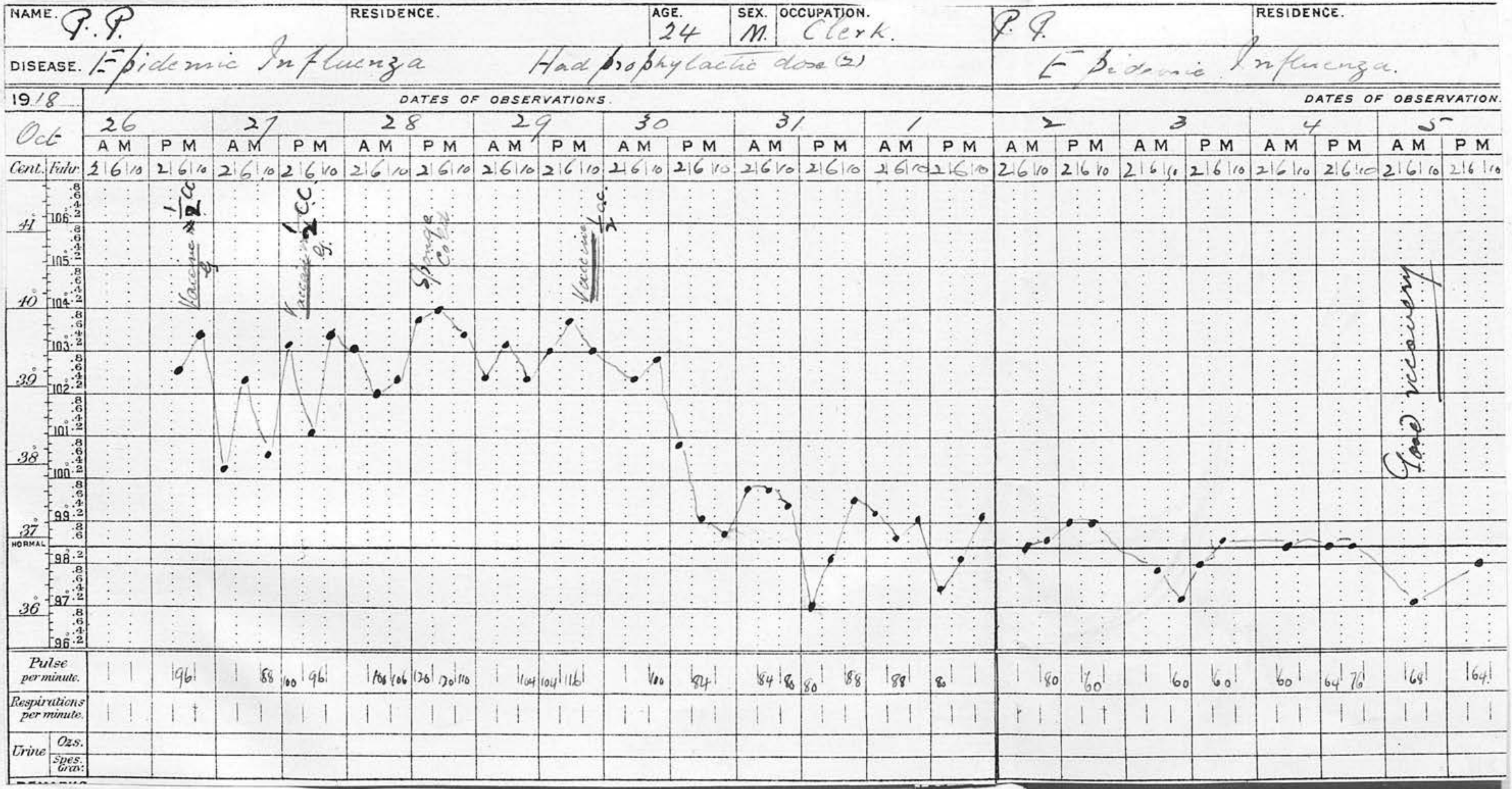
Chart of L. v.d.M.



12. L.v.d.M. had two prophylactic doses, and was taken ill in hospital while acting as an orderly. He was very much overworked and had been for days doing 20 hours a day.

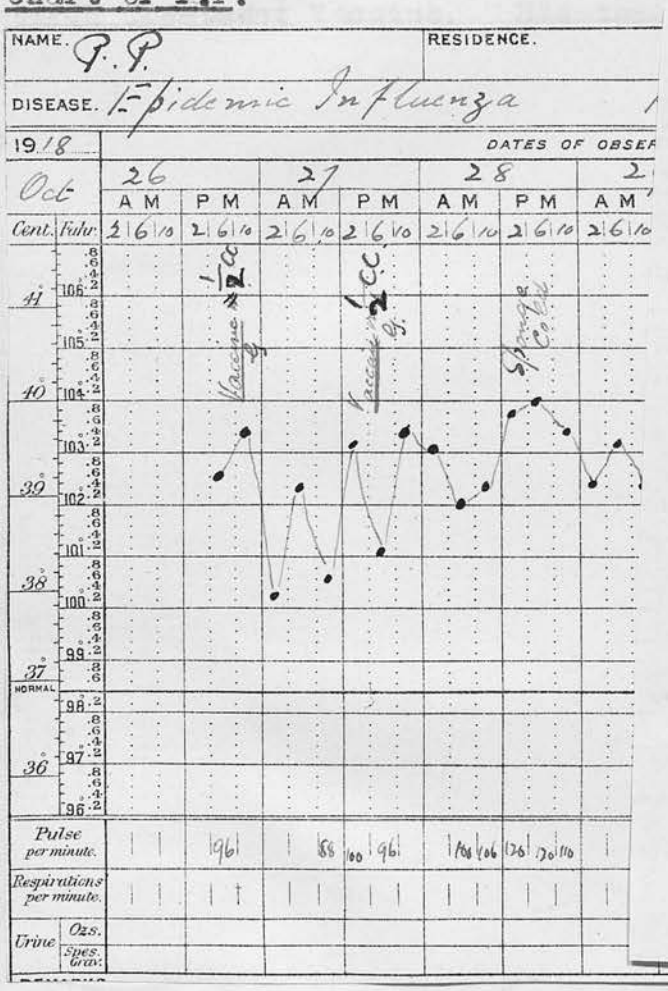
In this case Treatment Vaccine was used which seemed to improve condition at first, but the doses given on 26th and 27th seem to have sent temperature up. In this case I was certain the Vaccine produced Anaphylaxis and had no doubt about it when a dose given by mistake on the 29th sent up the temperature to over 104°. On the 28th I had not given vaccine and both temperature and pulse showed an improvement.

Chart of P.P.


NAME. P. P.
RESIDENCE.
AGE. 24
SEX. M.
OCCUPATION. Clerk.
DISEASE. Epidemic Influenza
Had prophylactic dose (2)
P. P.
RESIDENCE.
Epidemic Influenza.
1918
DATES OF OBSERVATIONS.
DATES OF OBSERVATION.
Oct
26
27
28
29
30
31
1
2
3
4
5
AM
PM
Cent.
Fahr.
HORMAL
Vaccine 1/2 cc
Vaccine 1/2 cc
Sponge
Vaccine 1/2 cc
Good recovery
Pulse per minute.
96
88
100
96
108
106
120
120
110
104
104
116
100
84
84
86
80
88
88
80
80
60
60
60
60
64
76
68
64
Respirations per minute.
Urine
Ozs.
Spec. Grav.

After the 29th no more vaccine was given and the patient was soon convalescent. This patient on the 27th had congestion of both lungs and expectorated a fairly large amount of blood-stained sputum. In treating patients who had had prophylactic vaccine, start with a very small dose of Treatment vaccine and watch the effect before giving a second dose.

Chart of P.P.



13. P.P. had two doses of prophylactic Vaccine and was taken ill in a neighbouring town where he had gone to assist in the temporary hospital. He was ill in that hospital for 2 days and was then brought to my hospital by motor a distance of 25 miles. He had an admission

He had on admission a typical lobar pneumonia of the left lower lobe. He did not however appear very ill and was given two doses of Government Vaccine which, however, appeared to have no effect.

On the 29th as his temperature showed no signs of dropping and his pulse rate was increasing, I gave him ½ c.c. of Clinsearch Treatment Vaccine. His temperature came down with a typical crisis and the pulse became very slow, which was often the case, as will be seen from other charts.

Chart of J.H.

NAME. J.H. RESIDENCE. AGE. 25 SEX. M. OCCUPATION. Merchant.

DISEASE. Epidemic Influenza Had Prophylactic Vaccine.

1918 DATES OF OBSERVATIONS.

Oct	23 AM	23 PM	24 AM	24 PM	25 AM	25 PM	26 AM	26 PM	27 AM	27 PM	28 AM	28 PM	29 AM	29 PM
Cent. Fahr.	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10
Pulse per minute.		72	92	92 60	88	76 84	88	84 76	76	72 78	92	80	80	
Respirations per minute.														
Urine Ozs.														
Urine Sps. Grav.														

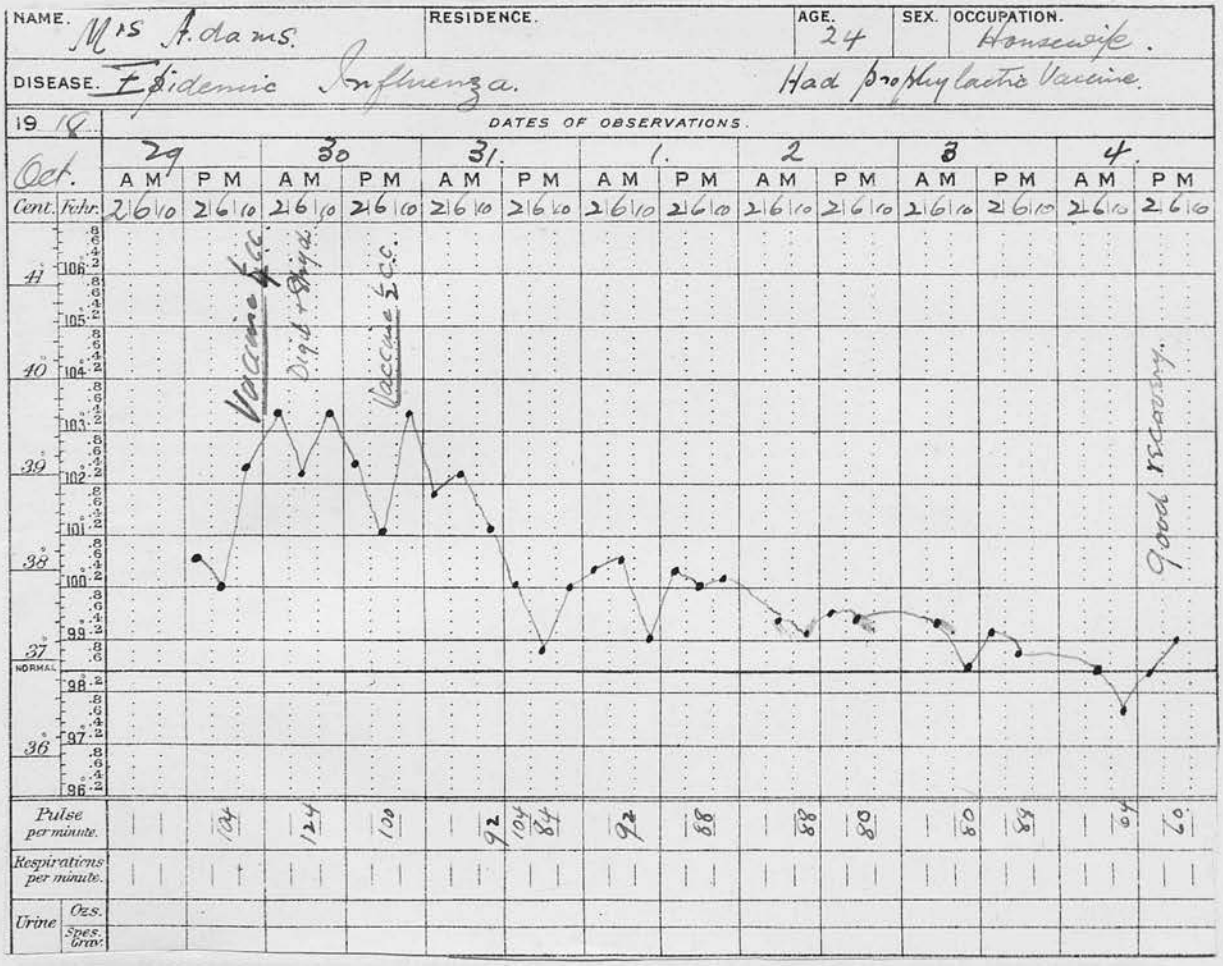
Vaccine ½ c.c.

Vaccine ½ c.c.

Normal Temperature

14. J.H. had prophylactic vaccine. From the Chart it will be seen that he received two small doses of Treatment Vaccine also that he had a very mild attack of the disease.

Chart of Mrs. Adams.



15. Mrs. Adams, had two doses prophylactic vaccine. Temperature remained over or below 103° for 24 hours, but soon dropped after receiving a dose of Treatment Vaccine.

This patient on the 30th developed congestion at both bases, and was spitting up blood-stained frothy sputum.

Out of my 100 cases there were 30 cases of the ordinary mild type of the disease, of these 20 had received prophylactic inoculation either one or more doses. Of the remaining 10 cases five were in children below 10 years of age. Children below that age I found generally had a mild attack whether they had received any prophylactic vaccine or not.

	No. of cases		Deaths.	
	Inoculated	Not inoculated	Inoculated	Not Inocu
Broncho-pneum:and Confl: Bro. pneumonia.	1	26	1 alcoholic	5
Pneumonia	1	1		1
Septicae-mia	2	2	2	2
Congestion	6	31	0	0
No compli-cations	20	10	-	-
Total	30	70	3	8

Amongst my cases who developed congestion of the lungs I found six had received prophylactic vaccine. Of these there was hardly one that caused me much anxiety.

One case developed a pneumonia and recovered. Two inoculated patients developed the Septicaemic type of the disease and both died. Of these two, one I know had received "Clinsearch" vaccine, the other one I am not certain of, as he was inoculated by one of my colleagues and neither he nor the patient could tell me what vaccine had been used. These charts show how a mild attack did develop in most

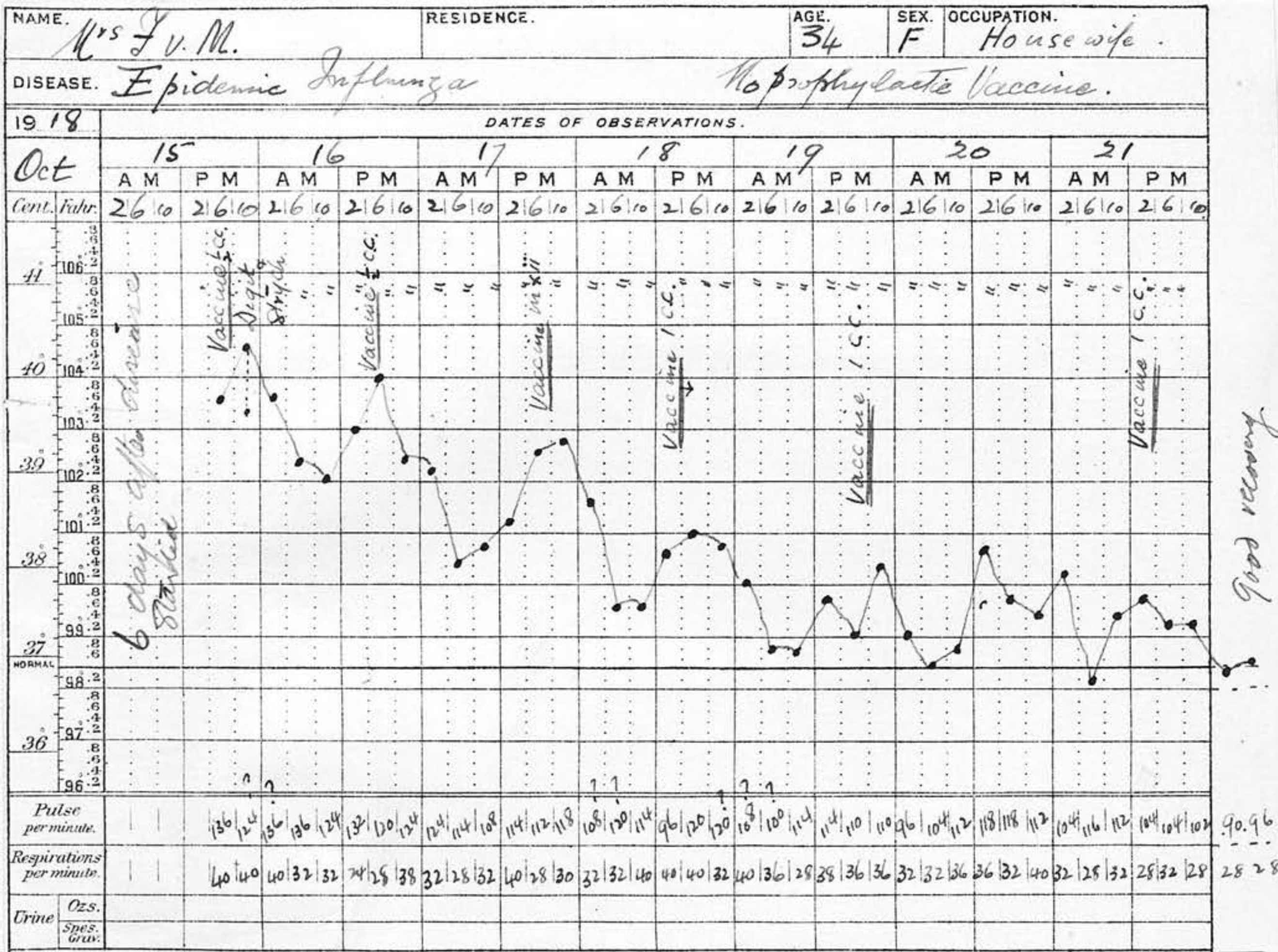
cases, and that was my experience in all my other patients, who had received prophylactic inoculation. Those charts shown above were those of hospital orderlies who at the time were very much below par having been for eight days, working very hard with practically no sleep, and constantly exposed to a most virulent infection. In those cases I was particularly struck with the benefit produced by prophylactic inoculations. And was thoroughly persuaded in my own mind that had they not had that vaccine, many would have died.

Treatment with Vaccine in Uninoculated Cases.

I shall now in the following cases show what I consider the benefit derived from using vaccine (Clinsearch Treatment) in the treatment of Epidemic Influenza.

Chart of Mrs. F.v.M.

Chart of Mrs. F.v.M.



1. The first case in which I used the treatment vaccine was that of Mrs. F.v.M. whom I saw six days after she was taken ill. On the afternoon of the 4th day of her illness, although her tempt. was not mormal yet, she ,got out of bed and had a walk in the garden. She got a chill and <u>felt</u> it too. That night she got worse and I saw her the following day on the 15th Oct. This patient was in a neighbouring village 26 miles from Denekal. Her condition when I saw her in the afternoon of the 15th was very bad indeed. She had Broncho pneumonia in both lungs, xxxxxx

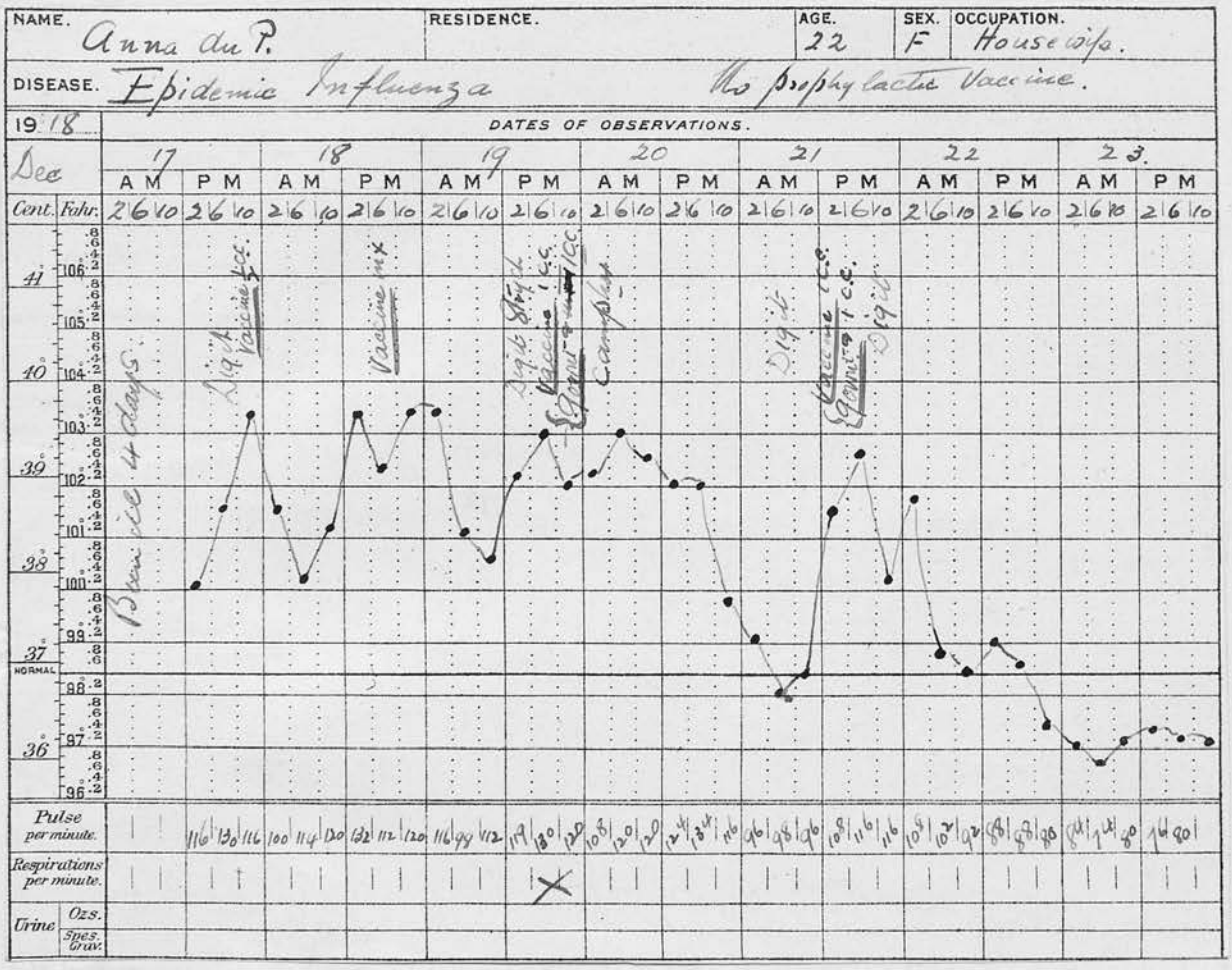
Her heart was dilated, pulse irregular, ~~and~~ (136 per minute,) and Cyanosis was well marked, breathing 40 per minute. Her heart, as the result of repeated attacks of Rheumatic fever, was organically diseased. In fact her condition was so bad when I saw her, that I told the husband the prognosis was bad and that I did not expect her to last ~~thro~~ through the night. She was so bad that she might have died any minute.

The effect of vaccine in this case is seen from the ~~char~~ chart. She made a complete recovery without any further complications. The heart did give a little trouble a s will be seen from the question marks, which meant irregularity and difficulty to count accurately.

2. Anna du Plessis (See Chart next page.), was brought in from the country after having been ill on the farm for 4 days. While she was ill she was attending to her husband who was very ill and who died in hospital 2 days after admission. On admission she looked bad and much worse than would appear from the temperature. She was six months pregnant and had Broncho-pneumonia in one lung and extreme congestion in the other.

The effect of the first dose of vaccine is clearly seen. The second dose given 24 hours later did not produce much effect either on the temperature or the general condition until the following morning. At 6 p.m. on the 19th she was seen by a colleague, during my absence in the

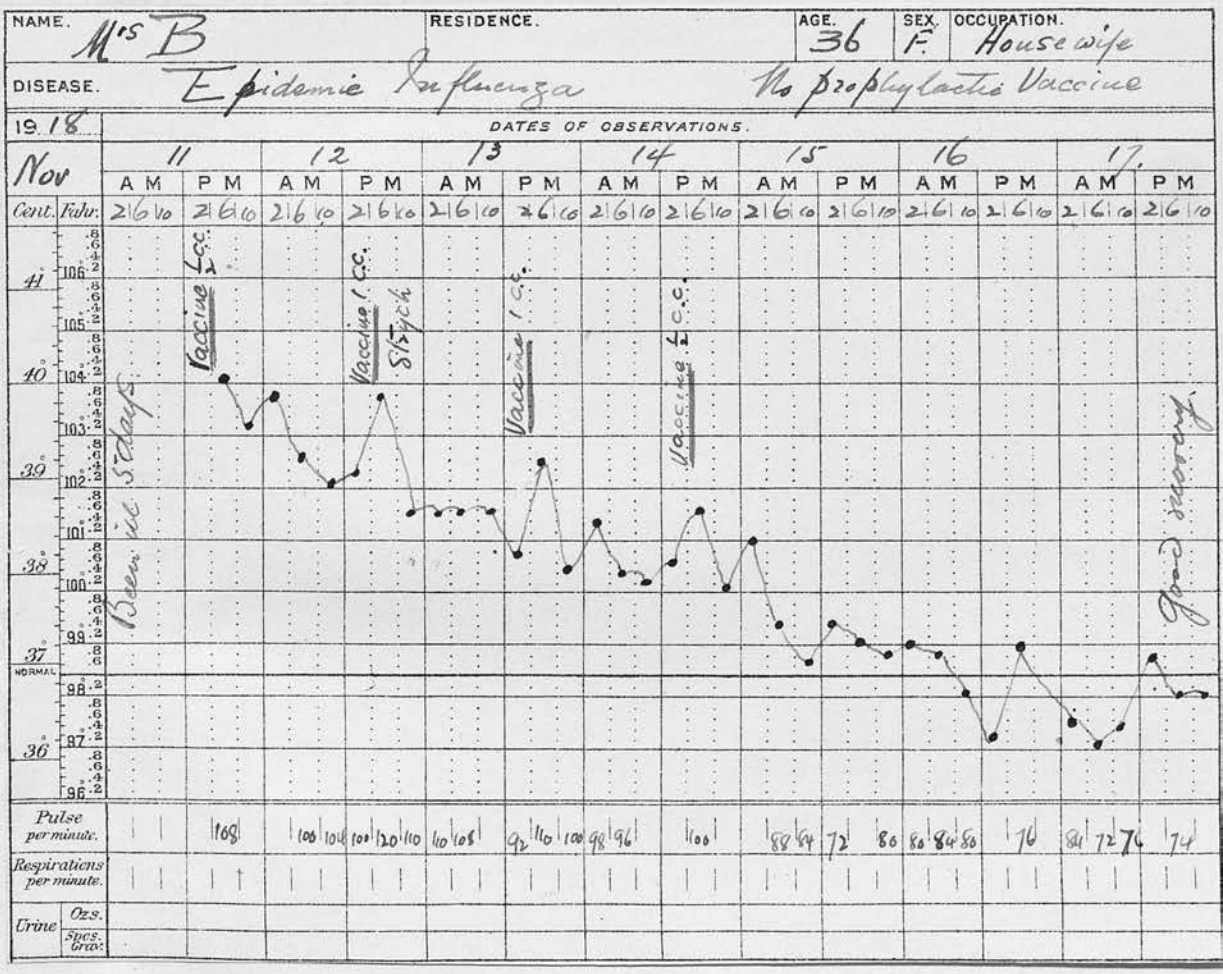
Chart of Anna du Plessis.



country, and he told her relations she was dying and would not last long. I saw her a few hours later and found her extremely cyanosed, breathing very fast, pulse bad and lungs all over showed Broncho-pneumonia and extreme congestion. I personally did not like her condition, but having seen the good effects produced in ~~some of such~~ similar cases by vaccine, I gave her a 1 c.c. of Govt. vaccine, and a 1 c.c. of Clinsearch vaccine (Treatment), one C.c. in each arm. The effect will be seen from the chart. In fact when I saw her 24 hours after I could hardly believe it was the same

patient. On the 21st her temperature again went up and her general and lung condition were again bad, I repeated the same dose of vaccine, again with the same beneficial results. The patient made a good recovery and when I delivered her in her confinement ~~the~~ three months later, she was perfectly healthy. In this case I was at the time firmly convinced in my own mind that had it not been for the vaccine she would have died.

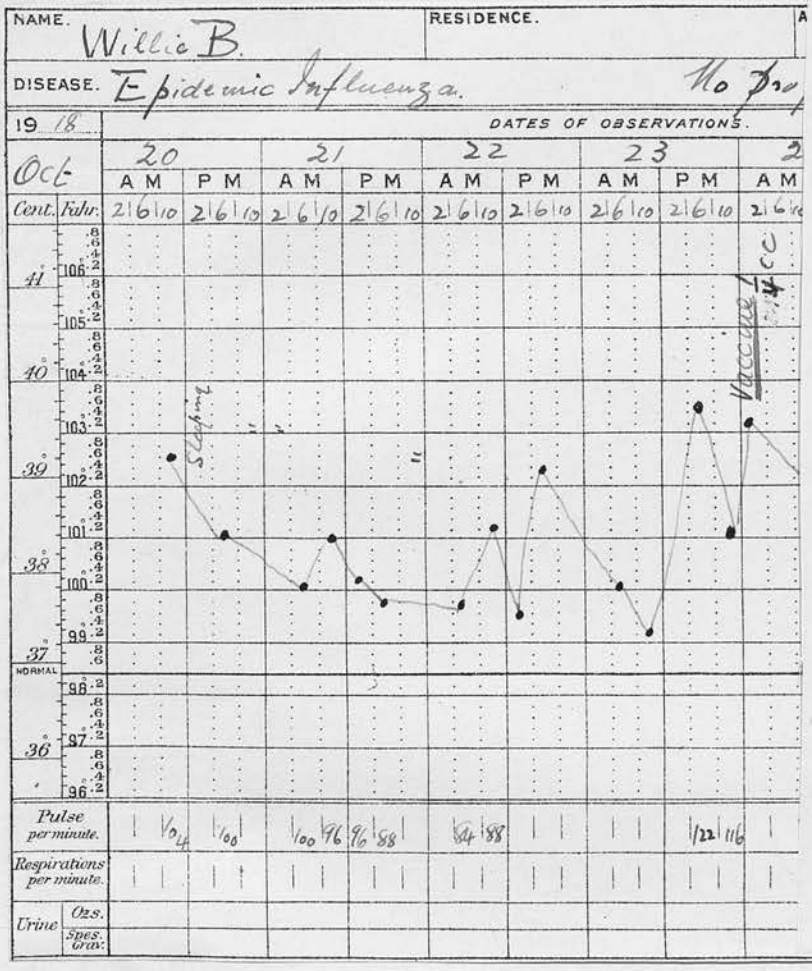
Chart of Mrs. B.



3. Mrs. B. had been ill for 5 days before admission. On admission she had double Broncho-pneumonia. The effect of

vaccine is again clearly shown in this case. She made a ~~go~~ good recovery with no after effects. In this case the temperature began to fall about 4 hours after the injection of the vaccine, after an initial rise.

Chart of Willie B.



4. Willie B. as will be seen, was not given any vaccine until the 4th day after admission. Although the patient was ill he seemed to be getting on nicely. His lungs were clear, although he had a cough which was troublesome at times. When I saw him during the night of the 23rd-24th, he was looking very ill and had congestion in the right lung and

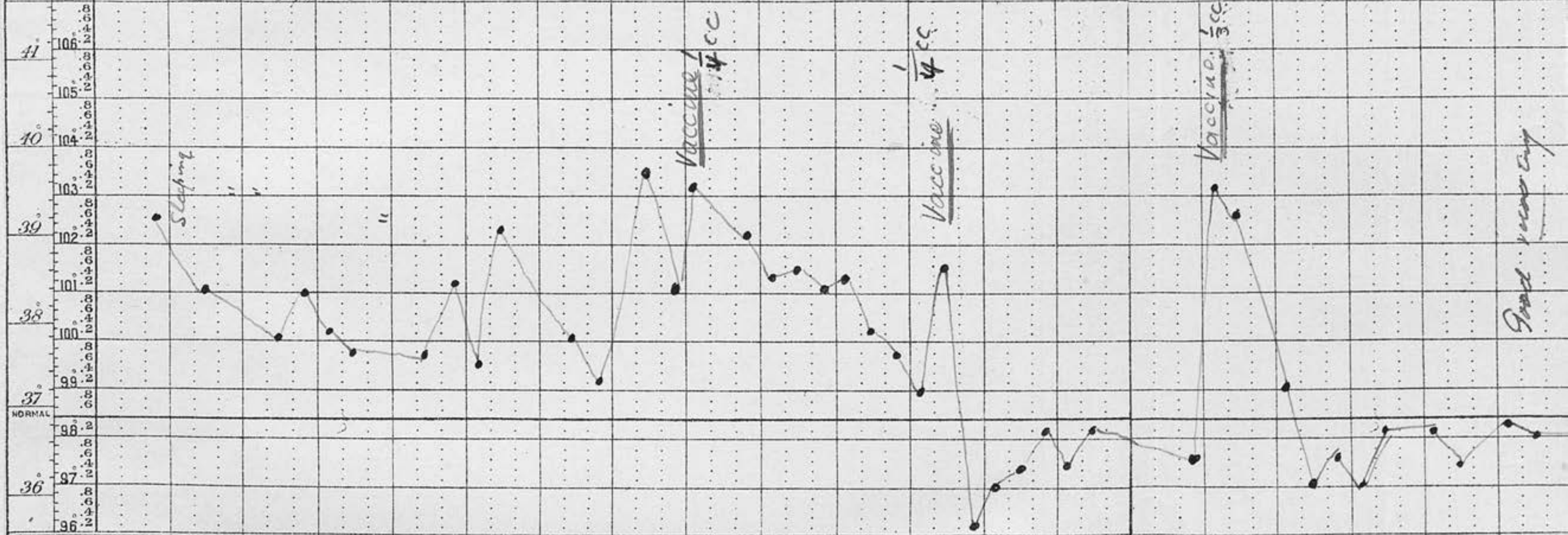
NAME. Willie B. RESIDENCE. AGE. 10 SEX. M. OCCUPATION.

Willie B. RESIDENCE.

DISEASE. Epidemic Influenza. No Prophylactic Vaccine.

19 18 DATES OF OBSERVATIONS.

Oct. 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 — AM / PM — 2 6 10



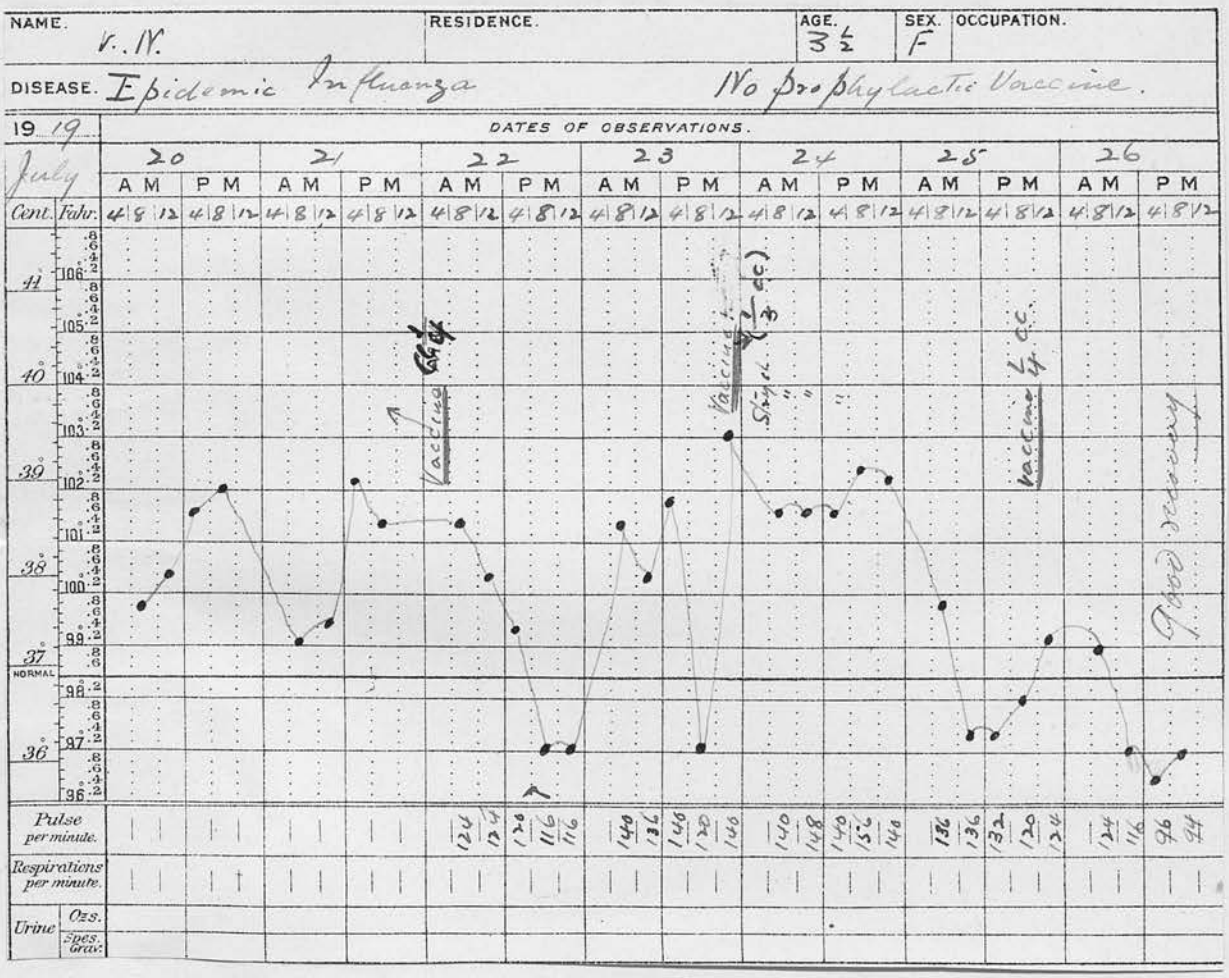
Pulse per minute. 104 100 100 96 96 88 84 88 122 116 110 118 104 106 120 104 96 96 80 100 132 104 80 72 80 84 80 72 72

Respirations per minute.

Urine Ozs. Spes. Grav.

showed distinct signs of developing mischief in the left. I then gave him a small dose of vaccine which improved him very much, both generally and his lungs. On the 25th he ~~as~~ again had a slight rise with increased pulse rate. He was given a similar dose of vaccine with the same good result. He again had a rise of temperature on the 27th when a slightly larger dose of vaccine was given with the result as shown in the chart.

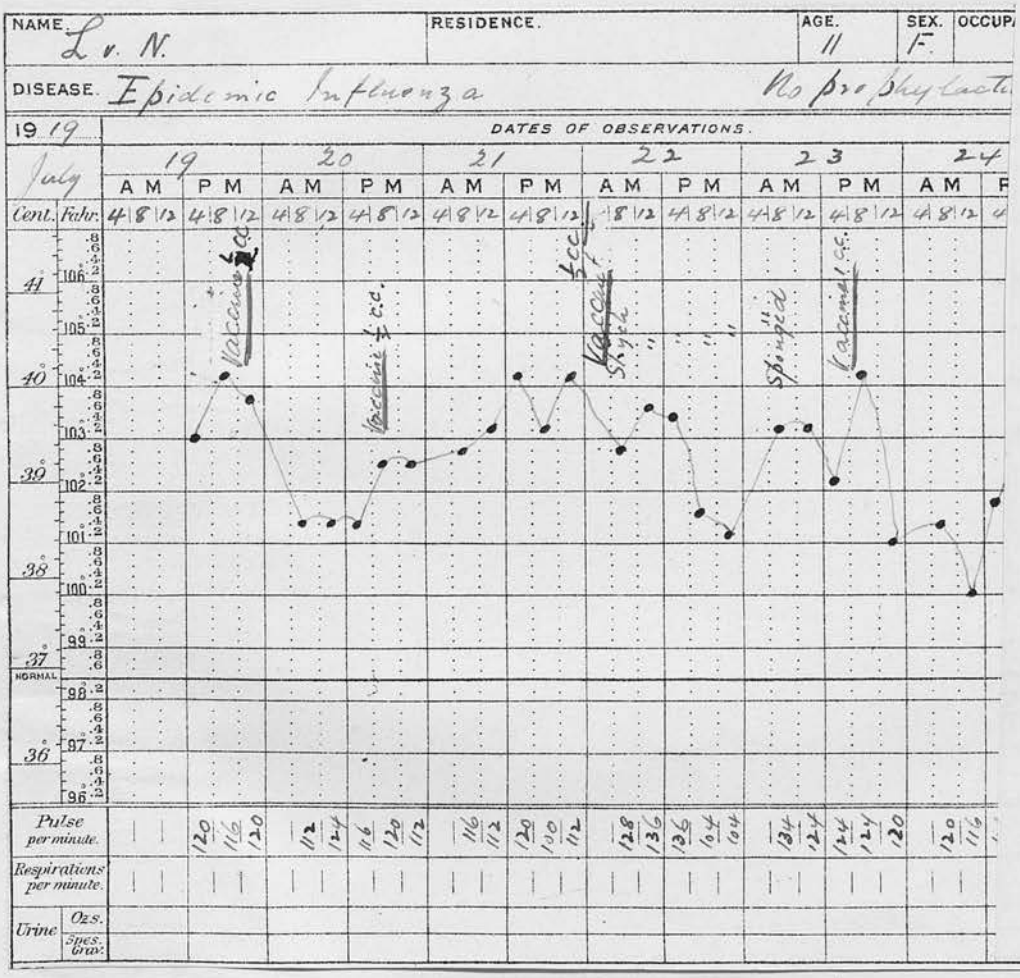
Chart of V.N.



5. V.N. a small baby of 3½ years. Congestion of both lungs with developing Broncho-pneumonia. The effect of the

first dose of vaccine given on the 21st is shown. On the 23rd the lungs were not quite clear and in one part distinct signs of consolidation were heard. The second dose of vaccine was bigger than the first. The effect was good. She was given strychnine for the heart.

Chart of L.v.N.

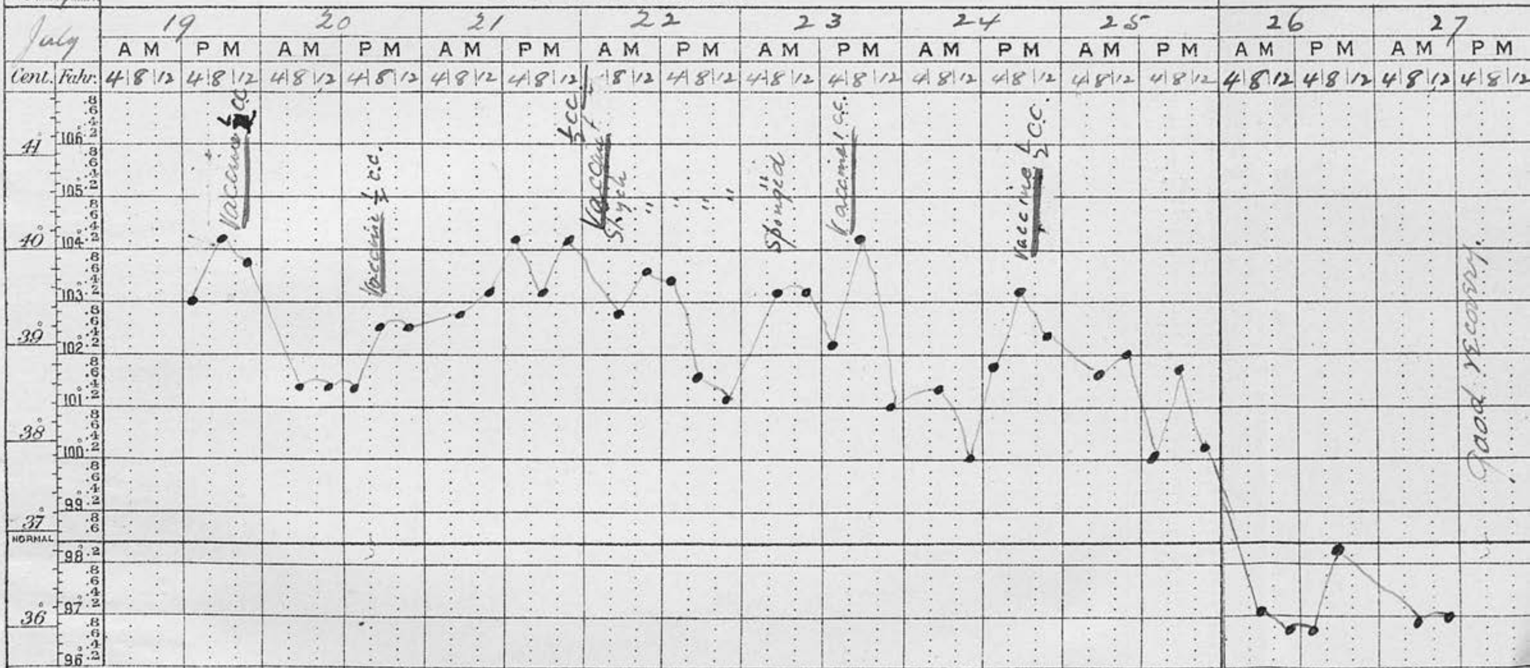


6. L.v.N. was a case of bad Broncho-pneumonia, with a weak heart after Rheumatics. After the second dose of vaccine which apparently had no effect, I did not give any more until 2 days later when her condition was distinctly worse; pulse was bad, she was cyanosed and her lungs were both affected

NAME.	RESIDENCE.	AGE.	SEX.	OCCUPATION.	
L. v. N.		11	F.		L. v. N.

DISEASE. Epidemic Influenza — No prophylactic Vaccine.

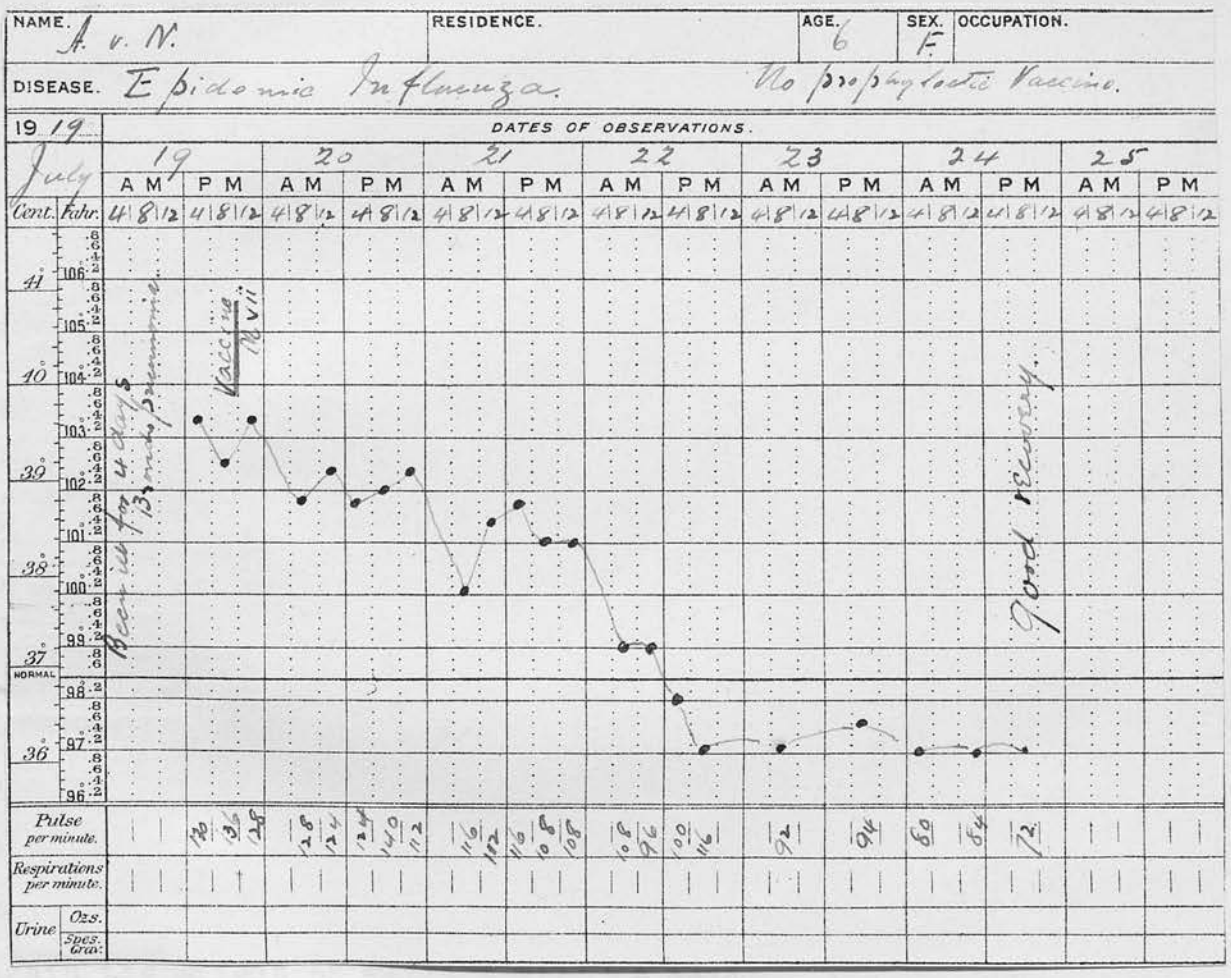
1919 — DATES OF OBSERVATIONS.



July	19 AM	19 PM	20 AM	20 PM	21 AM	21 PM	22 AM	22 PM	23 AM	23 PM	24 AM	24 PM	25 AM	25 PM	26 AM	26 PM	27 AM	27 PM
Pulse per minute.		120, 116, 120	112, 124	116, 120, 112	116, 112	120, 100, 112	128, 136	136, 104, 104	134, 124	124, 124, 120	120, 116	116, 120, 110	112, 112	112, 114, 104	92, 76	96, 96	92, 76	
Respirations per minute.																		
Urine Ozs.																		
Urine Spec. Grav.																		

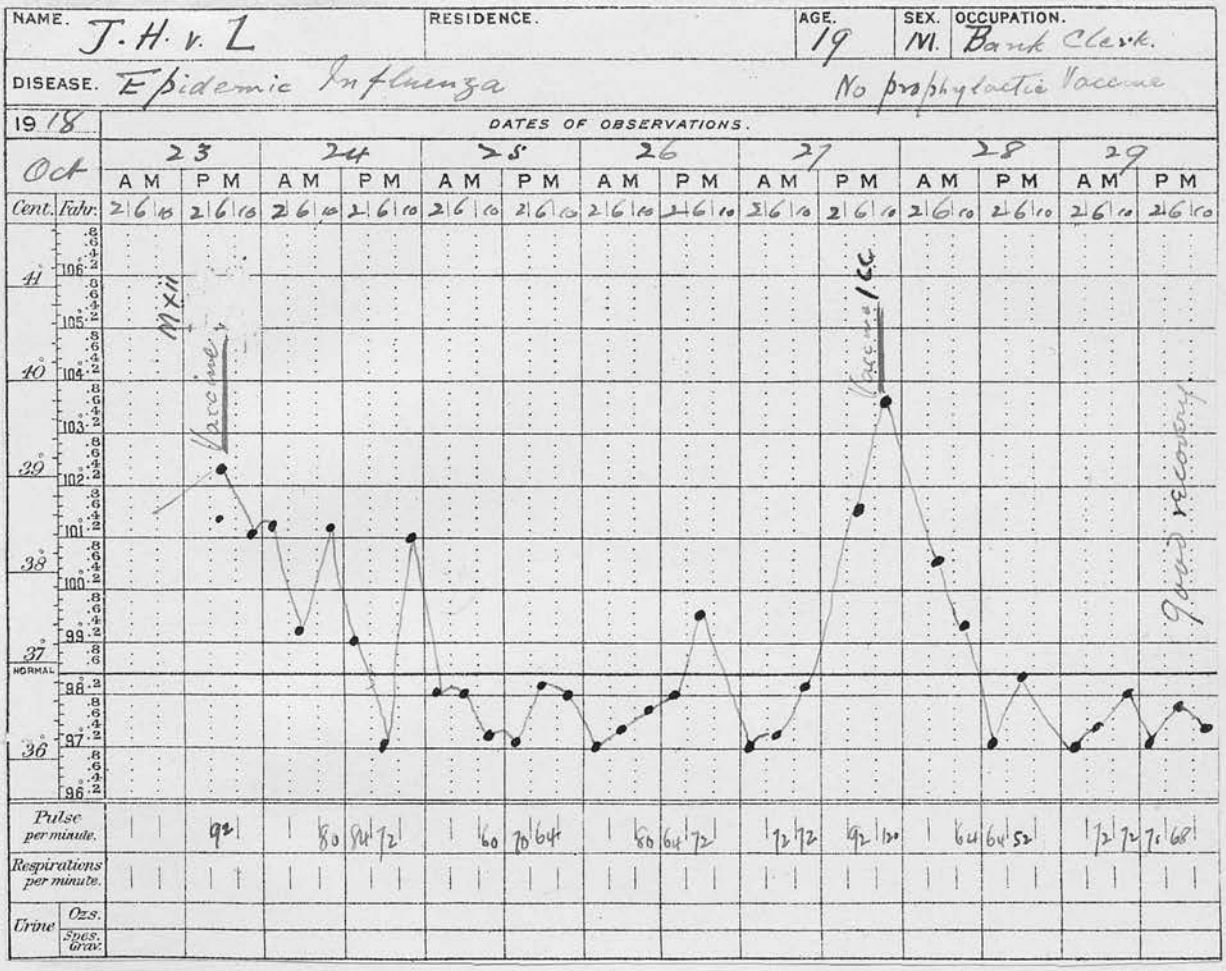
(Broncho-pneumonia). In this case again I was of opinion that the vaccine had produced a marked benefit. She required a dose bigger than either the 1st or 2nd on the 23rd and again on the 24th, after that she made a good recovery without any further trouble.

Chart of Anna v.N.



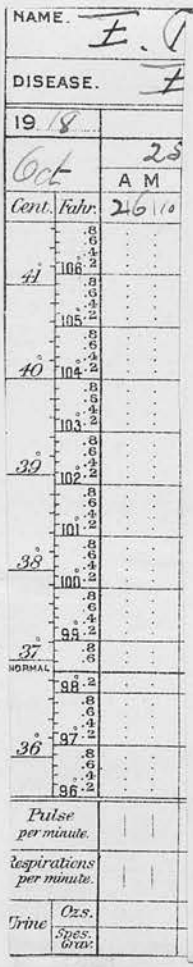
7. Anna v.N. had been ill 4 days. Broncho-pneumonia of both lungs. In this case I gave one dose of vaccine only, She was given no more because she gradually got better, the lungs gradually cleared up as the temperature went down.

Chart of J.H.v.L.



8. J.H.v.L. After the first dose of vaccine the temperature came to mormal. A few says later he had a relapse and the sudden rise of temperature is seen, which I found very characteristic of all cases with relapses. In this case again the effect of vaccine will be seen.

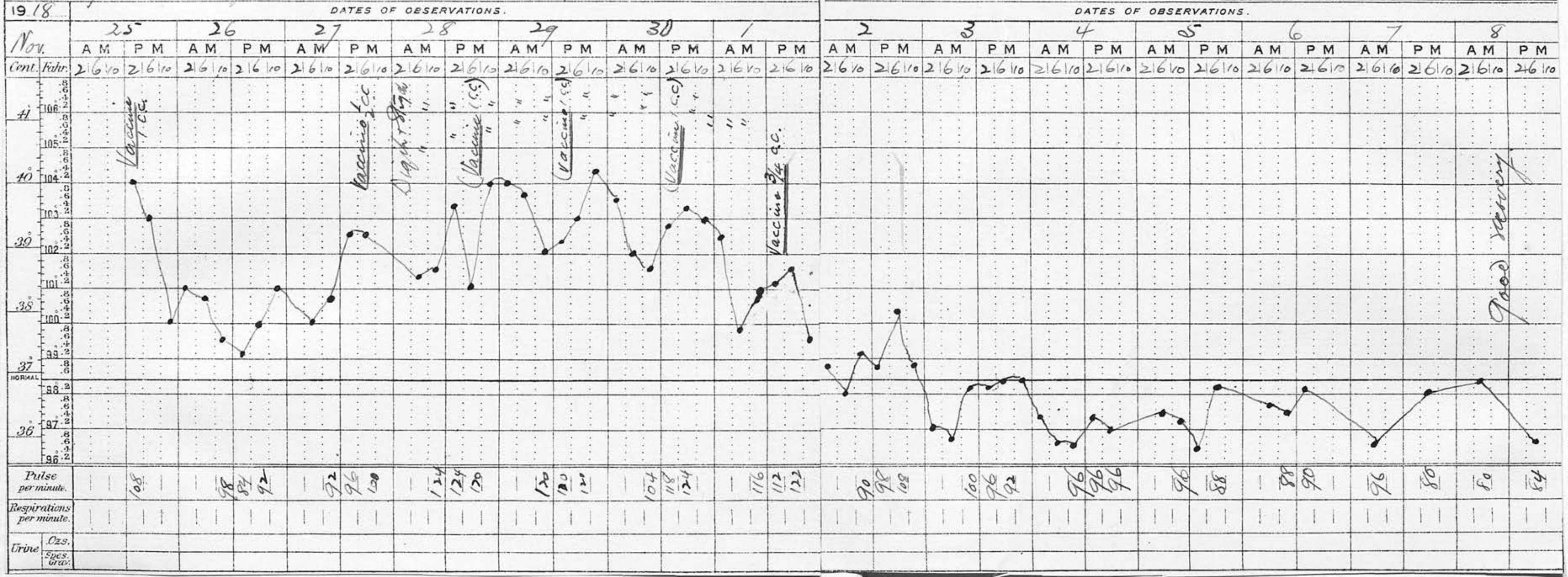
Chart of E.P--f--n.



9. E.P--f--n's case is put in to show, what was sometimes seen and where I could find no cause for the temperature not settling down. The only thing I found to help was to let the patient get up and play about the room. I only saw this in young children. At first I thought it might be due to vaccine but stopping the vaccine did not help matters.

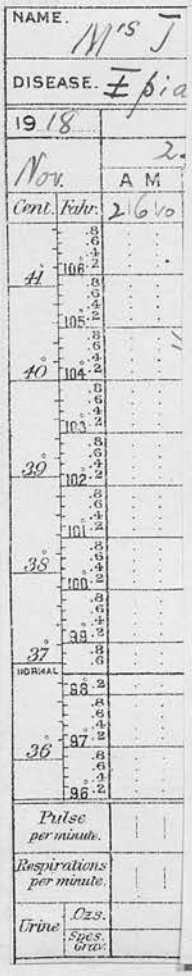
NAME. M^rs J. v. d M. | RESIDENCE. | AGE. 40 | SEX. F. | OCCUPATION. Housewife

DISEASE. Epidemic Influenza. No prophylactic Vaccine



RESIDENCE. | AGE. | SEX. | OCCUPATION.

Chart of Mrs. J.v.d.M.



10. Mrs. J.v.d.M. was a case in which Broncho-pneumonia developed with congestion on the 27th, after I thought she was going to get well on the 26th. In this case the vaccine produced a marked benefit, and at the time I was sure that the result might have been different had she not received vaccine. She made a good recovery without any further lung trouble.

NAME. Mrs J v. d M. | RESIDENCE. | AGE. 40 | SEX. F. | OCCUPATION. House wife.

DISEASE. Epidemic Influenza. No prophylactic Vaccine

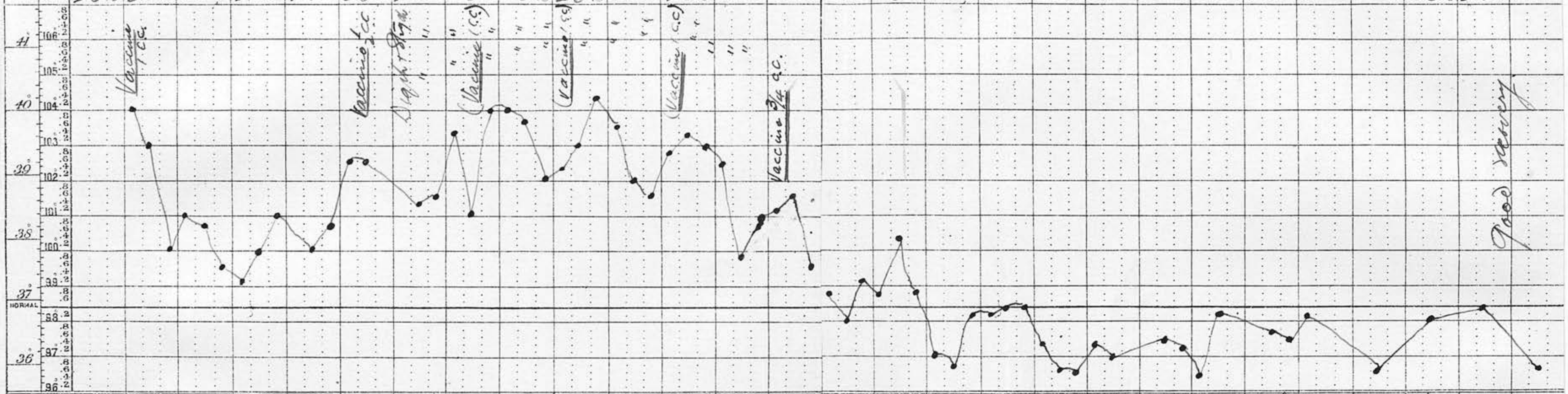
Mrs J v. d M. | RESIDENCE. | AGE. | SEX. | OCCUPATION.

Cont:

19 18 — DATES OF OBSERVATIONS.

Nov.

	25		26		27		28		29		30		1		2		3		4		5		6		7		8	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Cent. Fahr.	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10	2 6 10



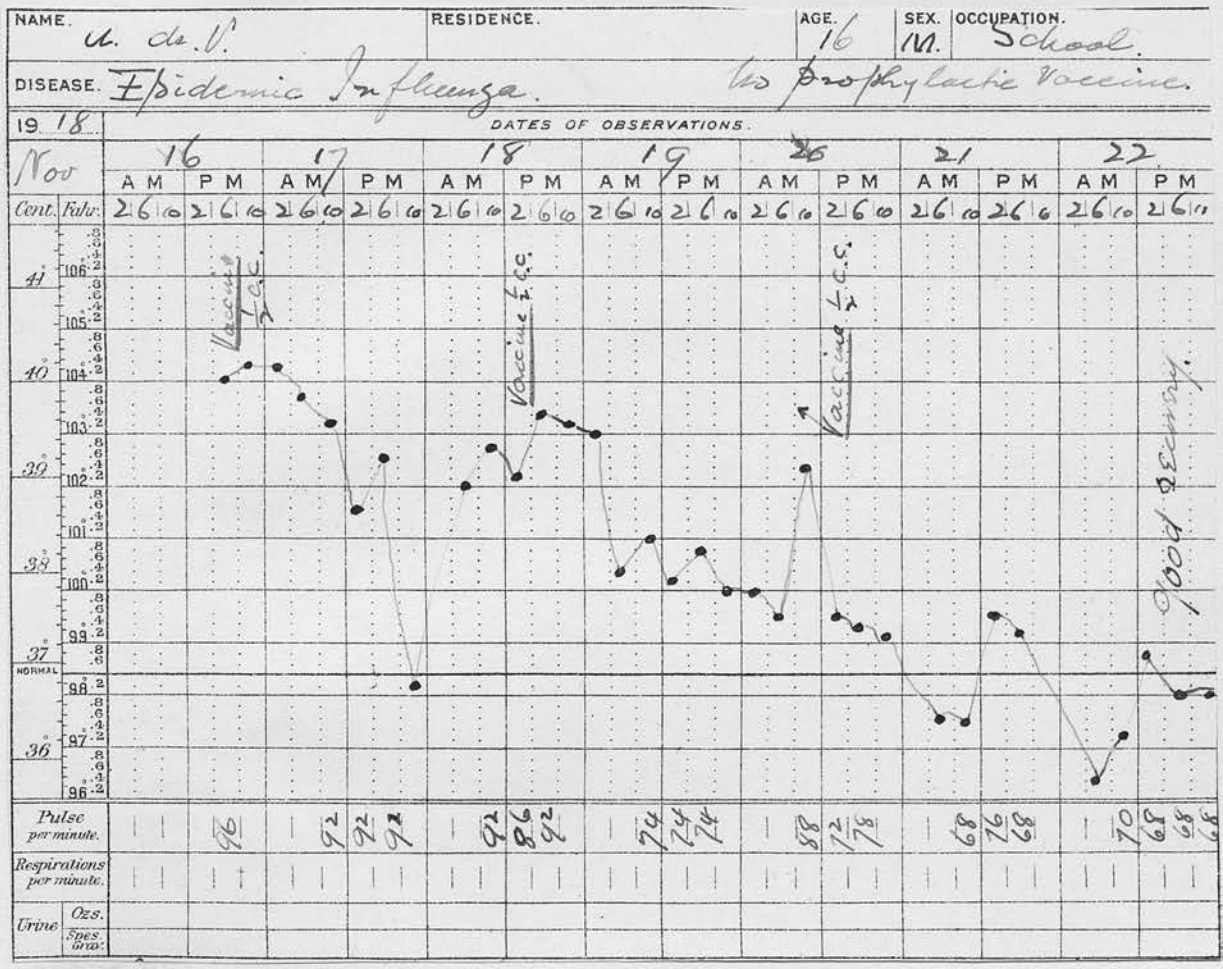
Pulse per minute. 108 98 84 92 92 96 100 114 124 120 120 130 120 104 118 124 116 112 122 90 98 108 100 96 92 96 96 96 96 88 88 90 96 80 80 84

Respirations per minute.

Urine Ozs.

Spec. Grav.

Chart of A de V.



11. A. de V. had been ill for a few days before admission When I saw him he had a bad Broncho-pneumonia of both lungs. Vaccine certainly produced a marked improvement. In this case it will be noticed that the pulse did not always correspond with the temperature.

From the above cases it will be seen that vaccine treatment undoubtedly had a beneficial effect on the course of the disease, and that I am justified in concluding that some would certainly have died had it not been for the vaccine.

EFFECT OF SPONTANEOUS HAEMORRHAGE.

Often during the Epidemic I found that in patients who bled freely from the nose or who, in females, menstruated freely the disease nearly always ran a mild course, or the condition improved immediately after such bleeding had taken place.

Lesné says "the haemorrhages appear to be due to the v vasodilated action of the toxins present in the blood of the Influenza patients and justify large doses of adrenalin".

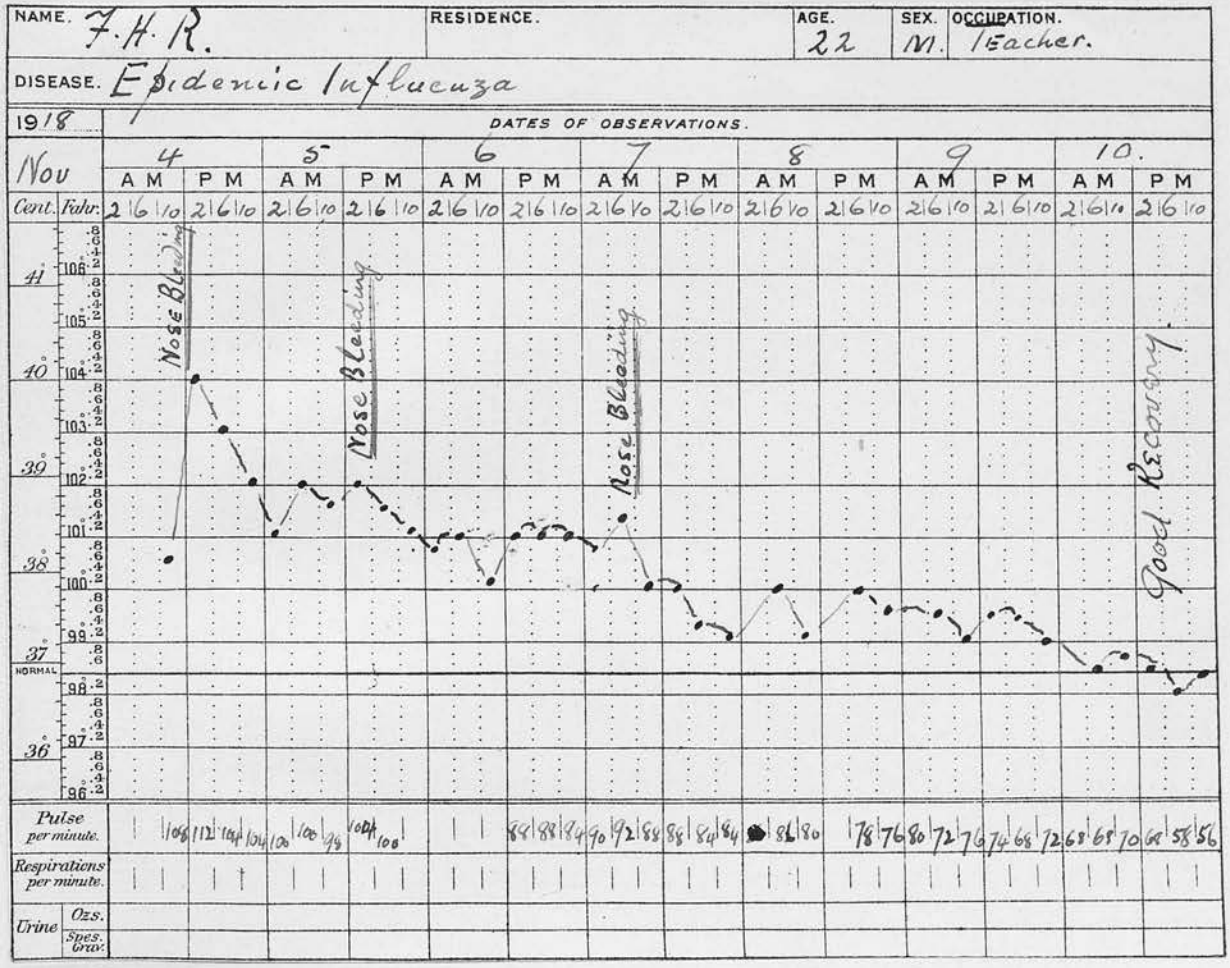
Körach attributes the haemorrhages to changes in the vessels which were first described by Kuskow in 1893, under the name of Endarteritis disquamativa.

Döblin states that "Kantorowicz's view, which is also shared by some Spanish writers (vede Med. Supplement 1919, 2.74) that cases with Epistaxis run a milder course than others, is not confirmed by a study of a large number of cases."

The following cases illustrate the improvement produced by Spontaneous Haemorrhage.

1. F.H.R. (See chart next page), was admitted on the 4th November 24 hours after he was taken ill. During the afternoon his temperature rose to 104°. Soon after that his nose started bleeding and bled so profusely that I was called up to the hospital because the nurse got alarmed, as she could not stop the bleeding.

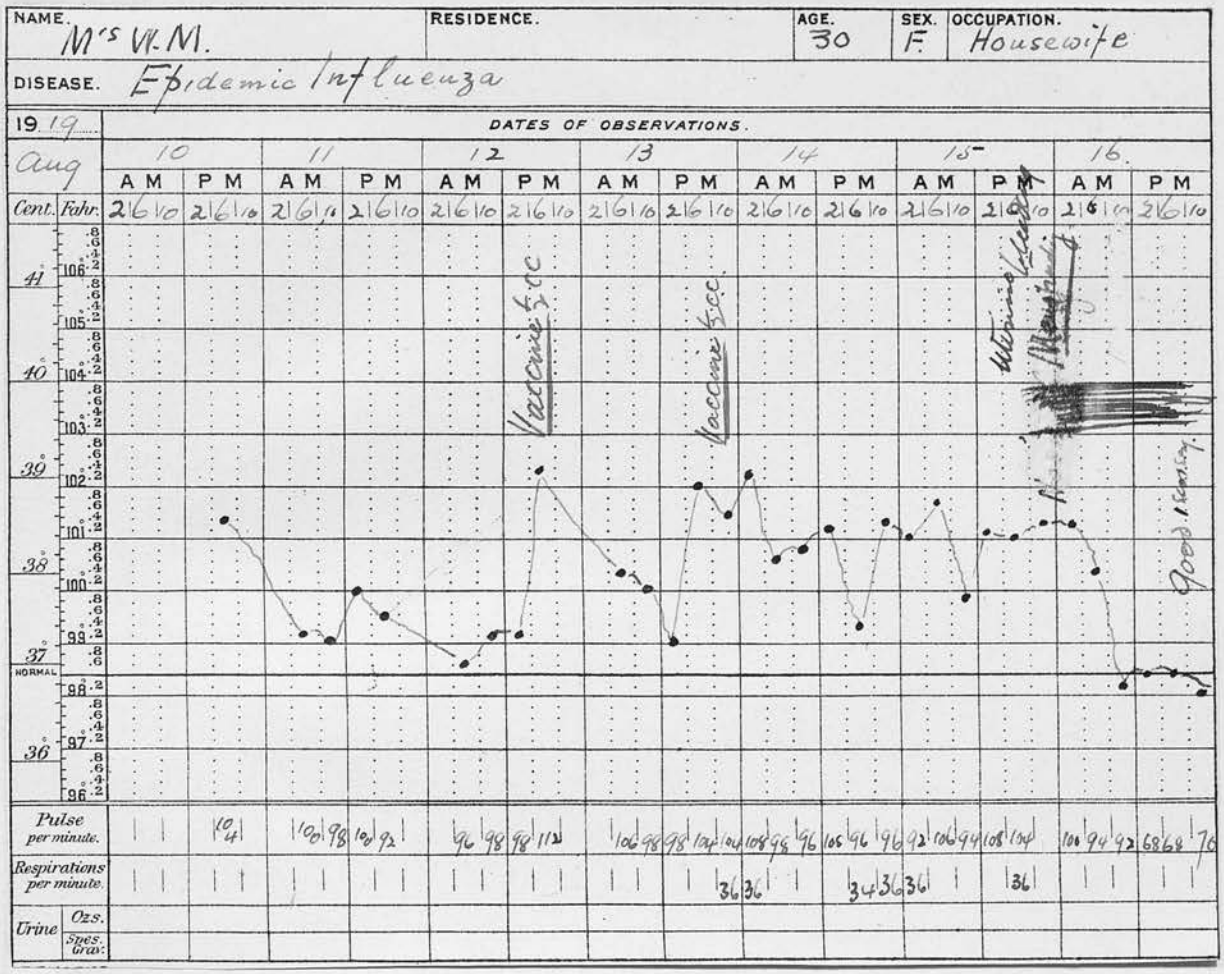
Chart of F.H.R.



The amount was not measured, but I took it to be about 6-8 ounces. The effect on the temperature was remarkable. On the afternoon of the 5th his nose bled again but much less. It did so again on the 7th. On each occasion it was followed, as in the first instance, by a drop in the temperature, a drop in the pulse rate, and a general improvement. In this case there was a cough but very little in the lungs.

I was of opinion that had this patient not bled from his nose he might have developed a bad attack.

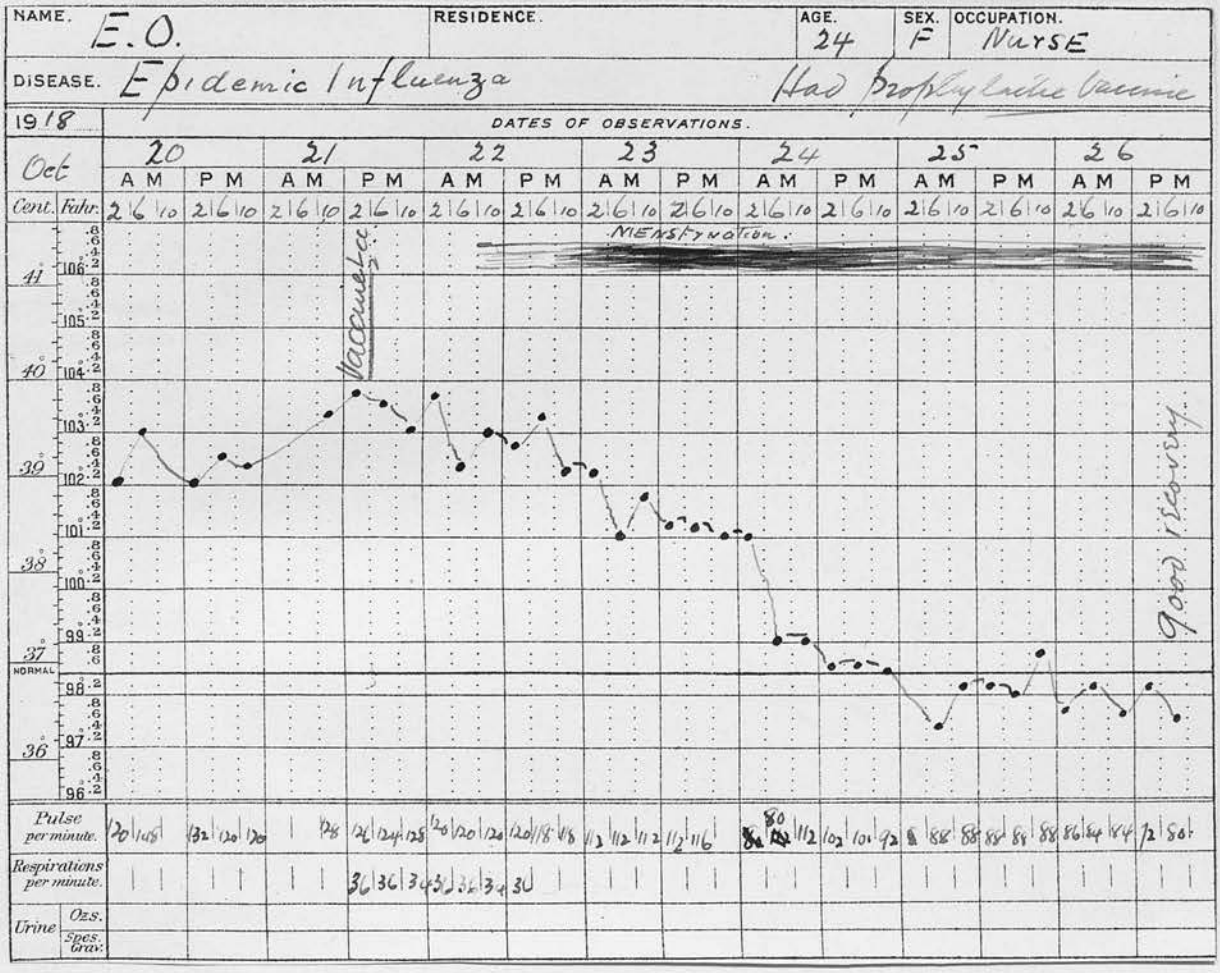
Chart of Mrs. W.M.



2. Mrs. W M. was a case with a comparatively low temperature, slight congestion of both lungs, and blood-stained frothy sputum. Her temperature would not settle down until she had bled freely from the uterus, when it began to fall and soon reached normal.

She had received two doses of treatment vaccine without any marked benefit. She was 5 months pregnant but did not abort.

Chart of E O.



3. E.O. had a good attack with congestion of both lungs, and abundant blood-stained, frothy sputum. The effect of menstruation on the temperature and general condition is shown.

TREATMENT BY VENESECTION.

The beneficial effects produced by bleeding from the nose etc. in the above cases and in others of a similar nature, made me think that venesection might be used with advantage in those cases where the heart failed because it was unable to pump the amount of the blood in the body through the diseased lung. It would at the same time lessen the total amount of toxine circulating in the body.

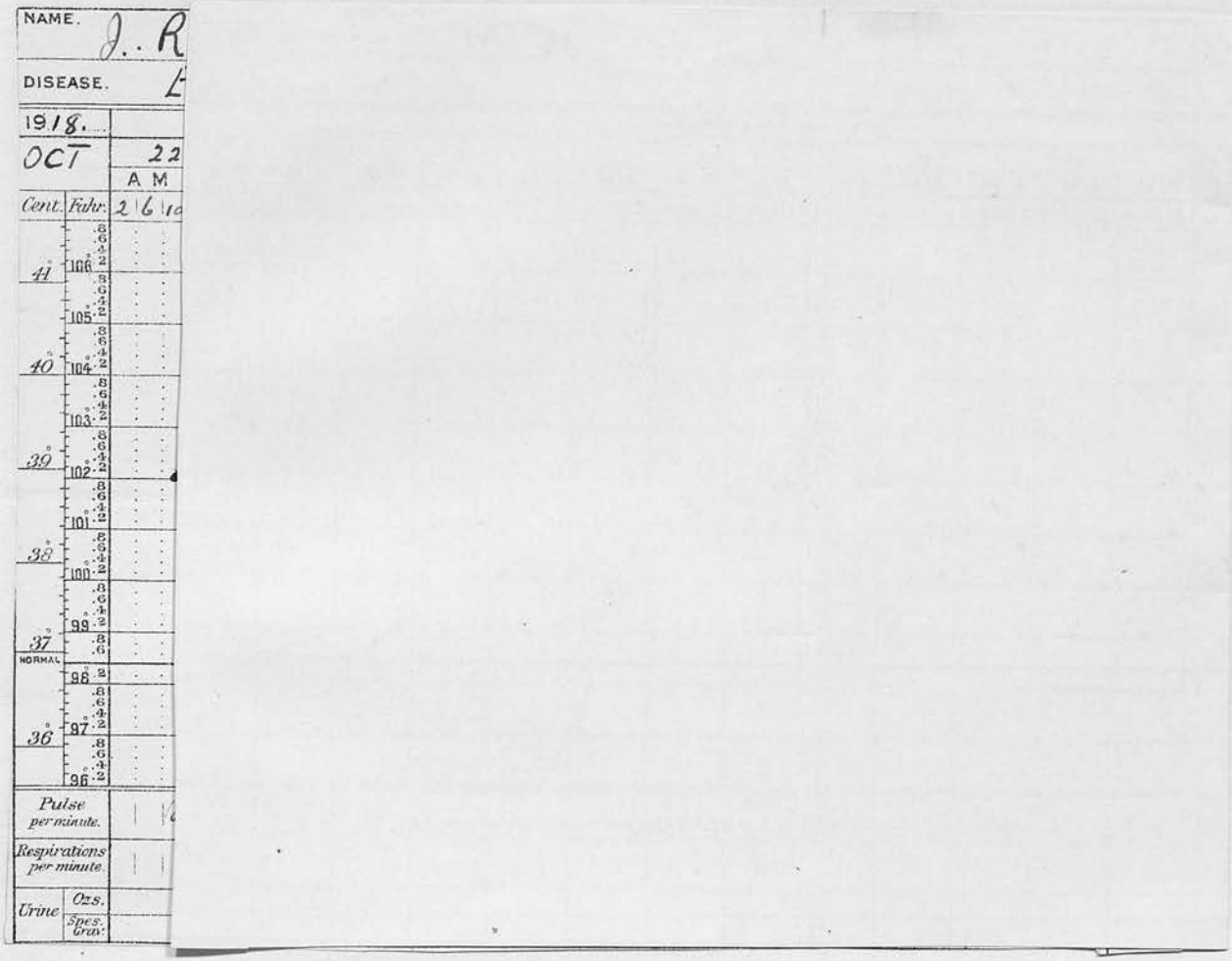
I used this treatment in the following cases.

1. J.R. (See chart next page.) had been ill for some days before admission. He was given vaccine on the 23rd and 25th but the effect was not good. He developed a Broncho-pneumonia with extreme congestion in the left lung, so much so that the whole lung seemed to be one semi-solid mass. His condition on the 26th was very bad. He was badly cyanosed, his face was practically blue, his breathing difficult and hurried, his pulse was very irregular, so much so that it could not be counted. He was gasping for breath, and gave me the impression that he was going to die very soon. I, therefore, decided to try venesection, this being the first case on which I did try it.

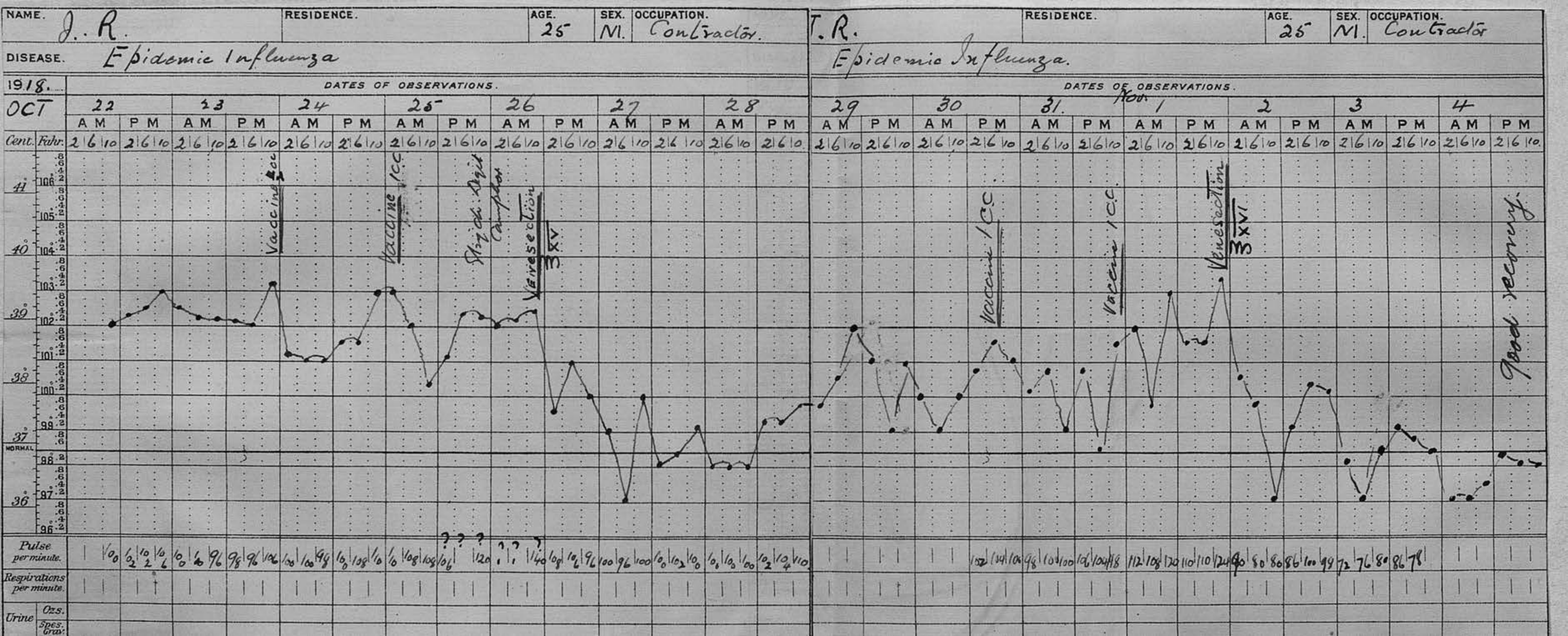
I opened the median basilic vein over the front of the elbow and allowed the vein to bleed slowly with my finger

on the opposite pulse.

Chart of J.R.



To my great surprise and joy, the pulse became more regular when about 5 oz. of blood had been withdrawn. When 10 oz. had been ~~taken~~ drawn off, the pulse was quite regular, the patient was feeling better and his breathing was easier. I withdrew 15 ounces altogether. The effect of this will be clearly seen on the temperature chart. The patient did nicely after this, but on the 29th his temperature rose again and soon afterwards signs of trouble were heard in the


NAME. J. R.
RESIDENCE.
AGE. 25
SEX. M.
OCCUPATION. Contractor.
DISEASE. Epidemic Influenza
1918.
OCT
DATES OF OBSERVATIONS.
22 23 24 25 26 27 28
Vaccine 1cc
Vaccine 1cc
Strych. Digit. Camphor
Venesection ℥xv
J. R.
RESIDENCE.
AGE. 25
SEX. M.
OCCUPATION. Contractor
Epidemic Influenza.
DATES OF OBSERVATIONS.
29 30 31 Nov. 1 2 3 4
Vaccine 1 CC.
Vaccine 1 CC
Venesection ℥XVI
Good recovery.
Cent. Fahr.
NORMAL
Pulse per minute.
Respirations per minute.
Urine Ozs. Spec. Grav.

right lung. On the 31st he had definite signs of Broncho-pneumonia in the right luhg, and on the 1st of November his general condition was not satisfactory at all. I therefore decided to bleed him again. This time I removed 16 ounces of blood from the other arm. Again the temperature and pulse came down soon afterwards, and the patient made a good recovery.

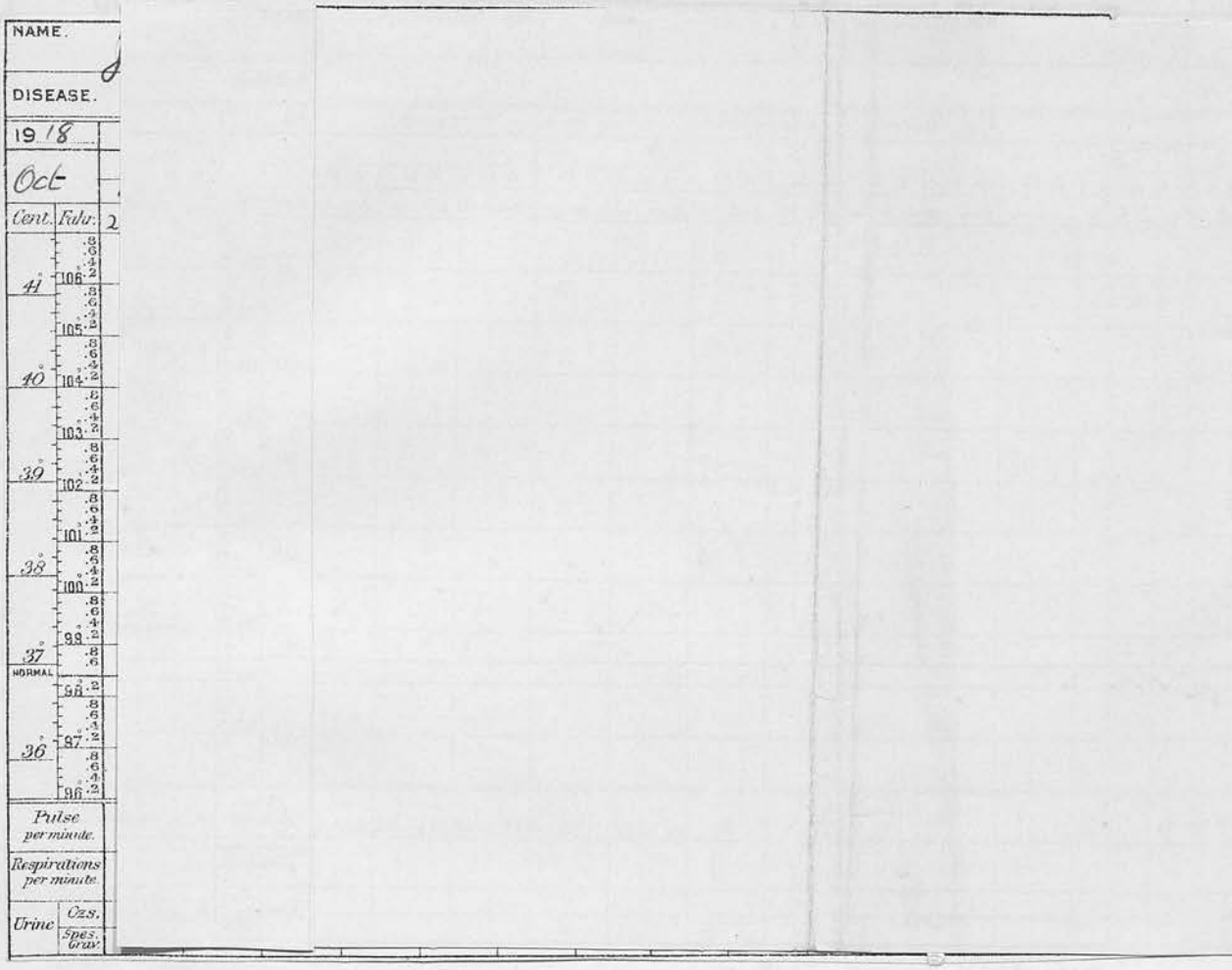
I was firmly convinced in my own mind that this patient would have died, had I not relieved him by venesection. On both occasions the veins bled freely without any difficulty.

Chart of J.S.

(See next page.)

2. This patient did fairly well on vaccine at first, but from the 26th his temperature did not come down as before. He was getting congestion of both lungs and his general condition was not satisfactory. I tried him on different kinds of drugs but again no effect. After the benefit I saw following venesection in the case of J.R. I withdrew 15 ounces of blood from this patient on the 28th. The effect as seen in the first case, was very satisfactory. The temperature remained normal for a few days and then gradually began to swing about again although not so high as previously. He was again developing congestion of both both lungs and the patient began to lose heart and was much afraid that he was going to die.

Chart of J.S.



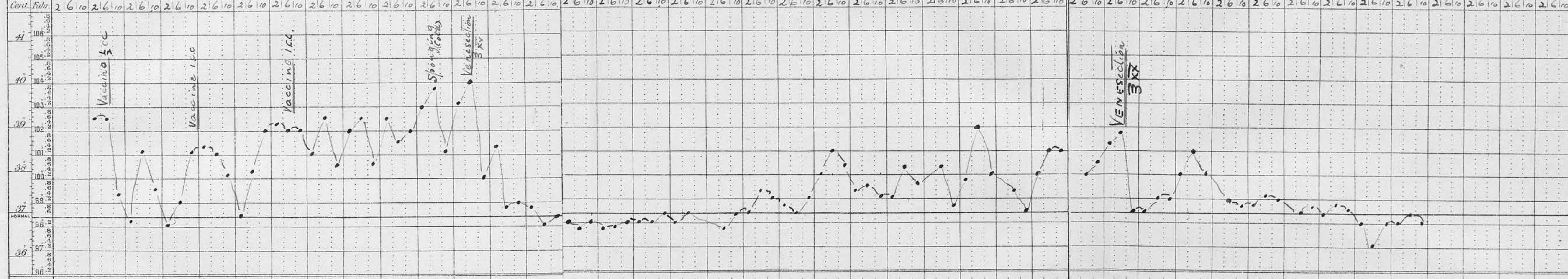
He was a strong healthy man weighing 14 stone and prone to fatty degeneration. On the 6th I again withdrew blood from his arm, this time 20 ounces, I allowed the blood to flow until hex his pulse was decidedly much lower in tension than before. Again the effect will be seen to have been very good. After that the patient made a good recovery. Veins bled freely in both cases.

NAME. J.S. RESIDENCE. AGE. 46 SEX. M OCCUPATION. Fruit Merchant.

DISEASE. Epidemic Influenza

1918 Oct — DATES OF OBSERVATIONS: 23, 24, 25, 26, 27, 28, 29, 30, 31

Nov: DATES OF OBSERVATIONS: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12



Pulse per minute: 94 94 90 88 90 88 72 78 90 90 88 90 86 90 98 90 84 88 78 86 76 84 98 90 98 98 100 110 120 110 120 132 88 90 86 80 82 80 78 80 72 74 80 84 100 90 108 90 100 100 98 100 120 110 110 106 108 106 100 100 110 110 110 110 120 120 96 96 90 96 96 96 94 98 88 86 84 84 80 78 86 76

Respirations per minute.

Urine Ozs.

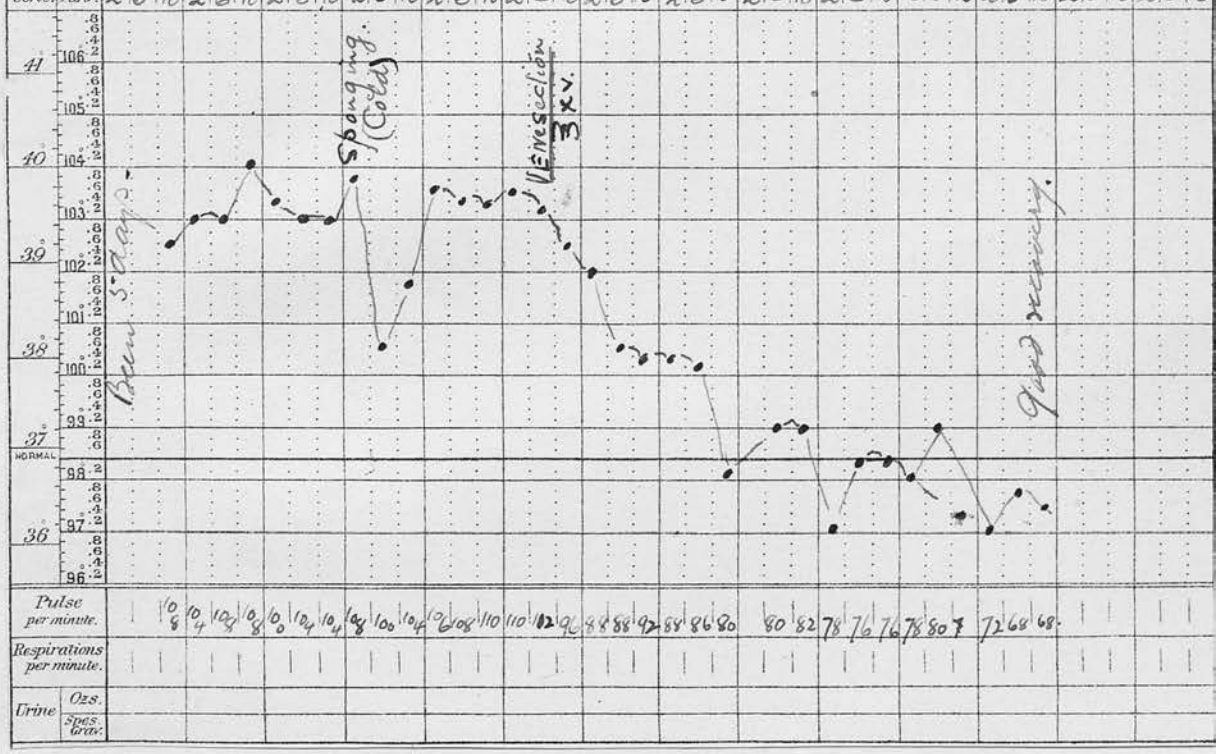
Chart of W.P.

NAME.	RESIDENCE.	AGE.	SEX.	OCCUPATION.
W. P		26	M	Blacksmith

DISEASE. Epidemic Influenza No Prophylactic Vaccine

1918 DATES OF OBSERVATIONS.

Nov 4 5 6 7 8 9 10



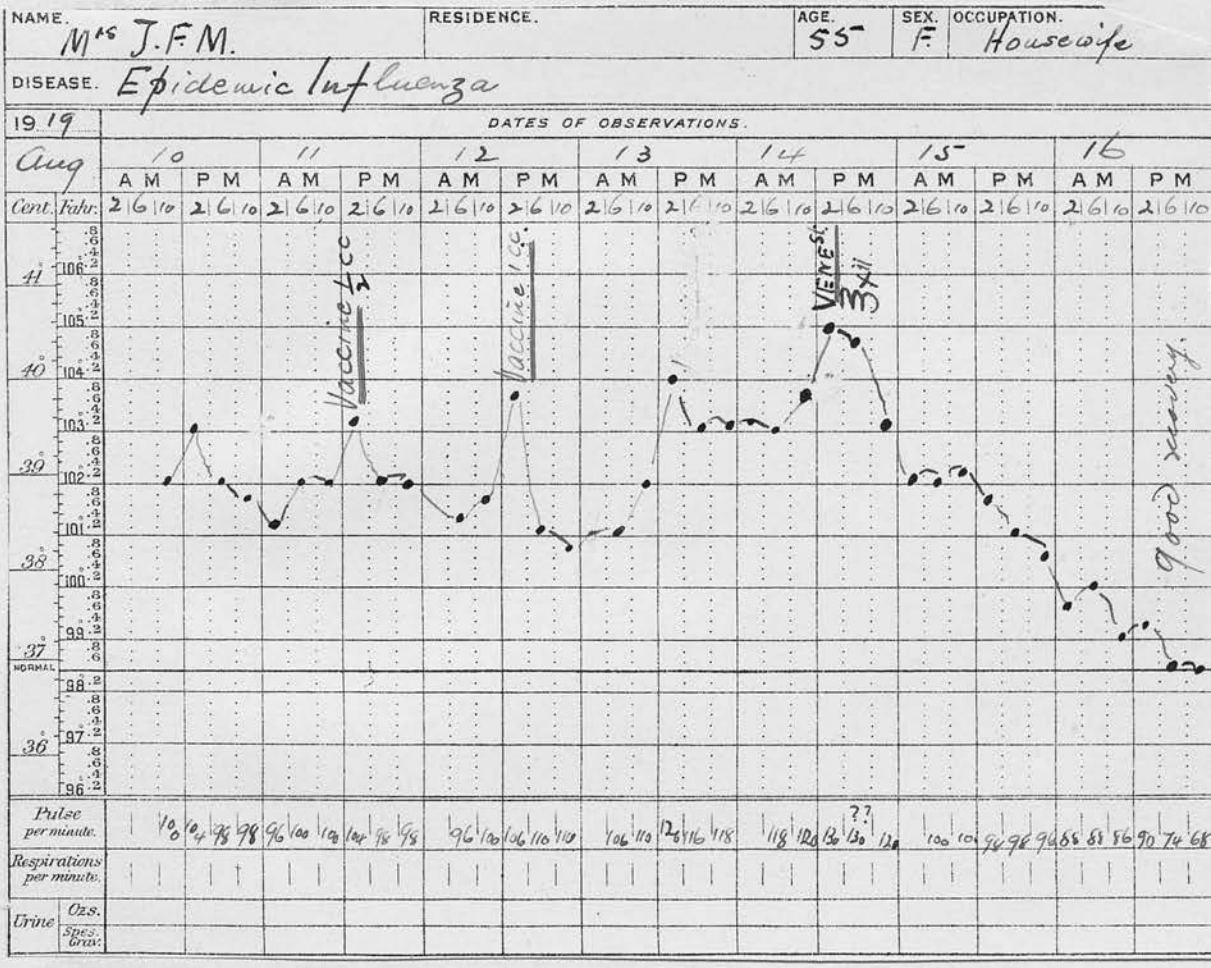
Pulse per minute.

Respirations per minute.

Urine Ozs. / Spes. Grav.

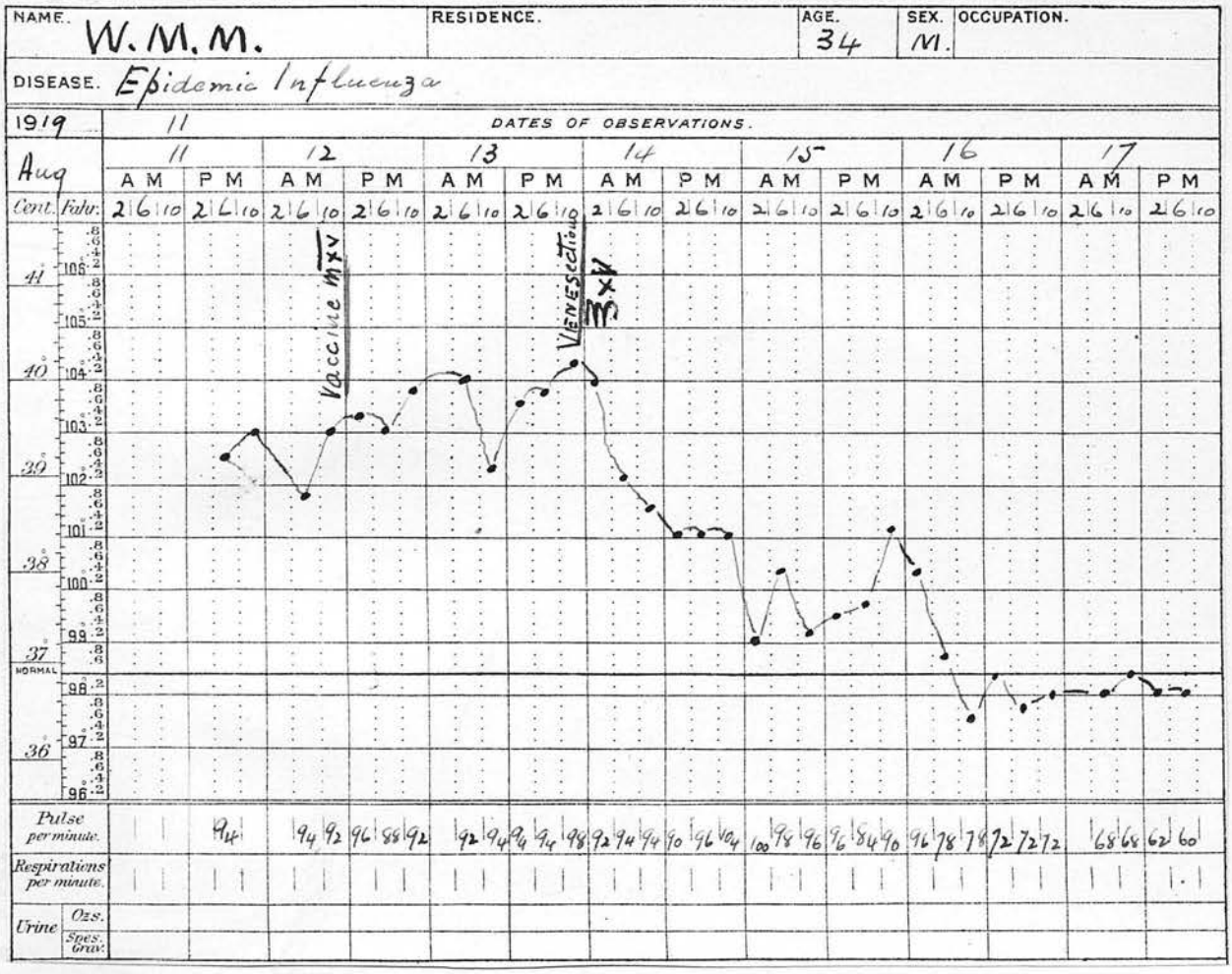
3. W.P. had an extreme congestion of both lungs with partial consolidation at both bases, he was expectorating large quantities of blood-stained frothy sputum, and could not sleep. He was a blacksmith by trade, well built and full-blooded, just the kind of case that would have died. On the 6th his condition was decidedly bad. I decided on venesection and withdrew 15 ounces of blood from his right Median basilic vein. The effect was very good on both temperature and pulse. His lungs at once began to clear and his general condition improved. The patient made a good recovery, the vein bled freely

Chart of Mrs. J.F.M.



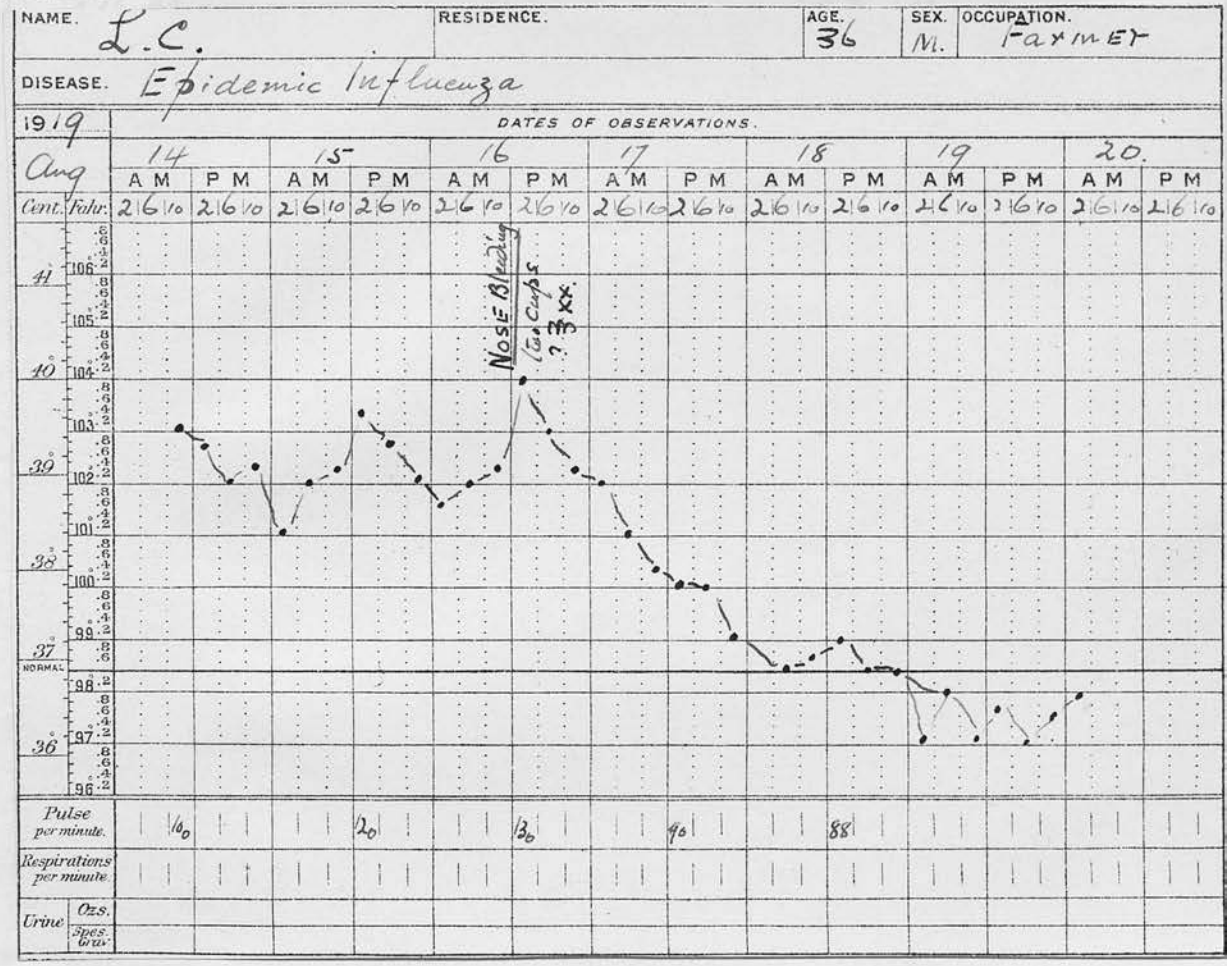
4. Mrs. J.F.M. developed Broncho-pneumonia, Vaccine did not seem to help much. On the 13th as her pulse was failing and she was getting cyanosed I withdrew 12 oz. of blood from her left median basilic vein. The effect as in the previous cases was excellent. She made an uneventful recovery.

Chart of W.M.M.



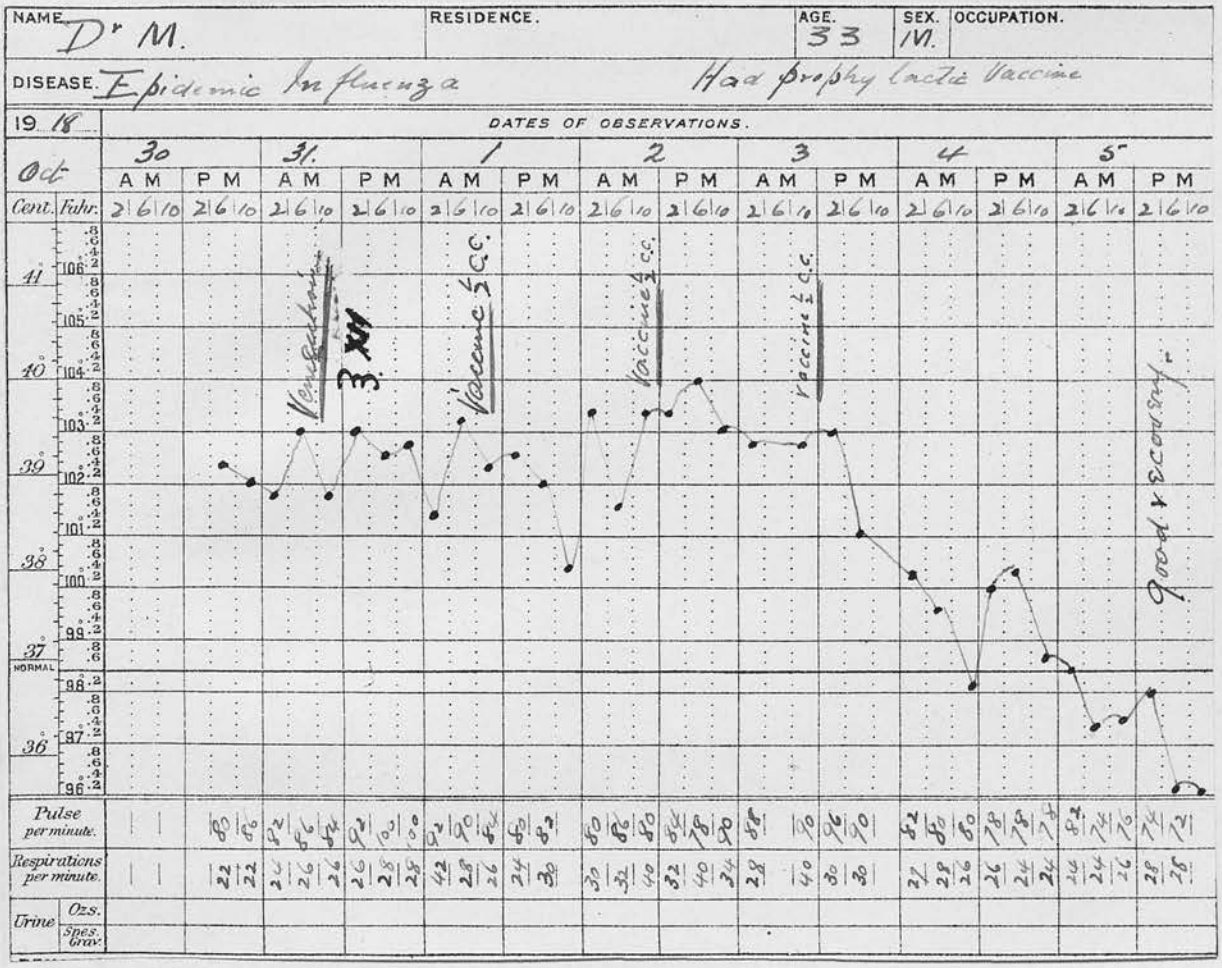
5. W.M.M. son of the last patient, had a bad Broncho-pneumonia in left lung with extreme congestion all over the right. Restless, delirious, could not sleep, and was in all respects very bad. I withdrew 15 oz. of blood from his left vein (median basilic), with the same beneficial results. ~~as before~~. This patient constantly told me afterwards that the bleeding saved his life. As immediately afterwards he felt better and slept for 6 hours at a stretch; soon after I left him.

Chart of L.C.



6. L.C. was a patient with an extreme congestion in both lungs. He being a neighbour of the last case, and having heard of the beneficial effects produced by my venesection in that case, was keen on having himself bled. He, however, told me that he could easily make his nose bleed freely. I told him to proceed. He did, and with such good effect that within an hour he had bled about 15 oz. Again the result was excellent. In all these cases the lungs cleared up soon afterwards, much more so than one would have expected.

Chart of Dr. M.



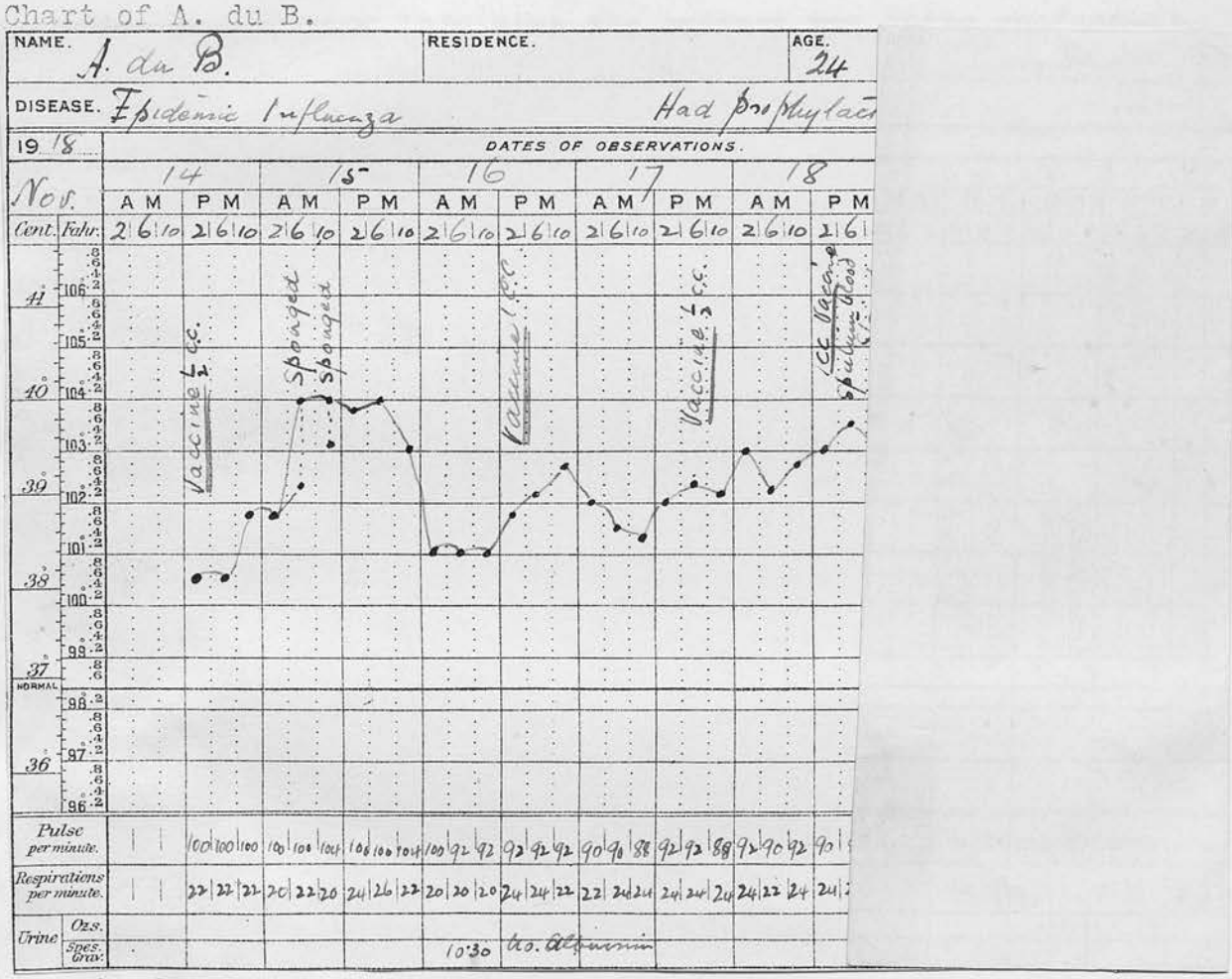
7. Dr. M. had prophylactic vaccine. His last dose was 10 days before he took ill. I did venesection on him early in the course of the disease, viz. on the 31st. after he had been ill for 4 days. It did not bring down the temperature but it certainly relieved the congestion in his lungs. He also had treatment vaccine, the last dose being Clinsearch Vaccine. I was not quite able in this case to decide whether the vaccine was the only beneficial agent. This doctor after he was up in a chair, developed signs of a typical lobar pneumonia in the left base, the lung that was

previously much congested. At this time he had a bad cough which caused him pain in the chest, and with it, he expectorated round lumps of coloured sputum of a prune juice colour One of the two cases where I saw the sputum of that colour.

CHARTS OF THOSE CASES WHICH DIED IN SPITE OF TREATMENT.

I shall now show the charts of those cases where no treatment was of any avail and the disease proved fatal.

Chart of A. du B.



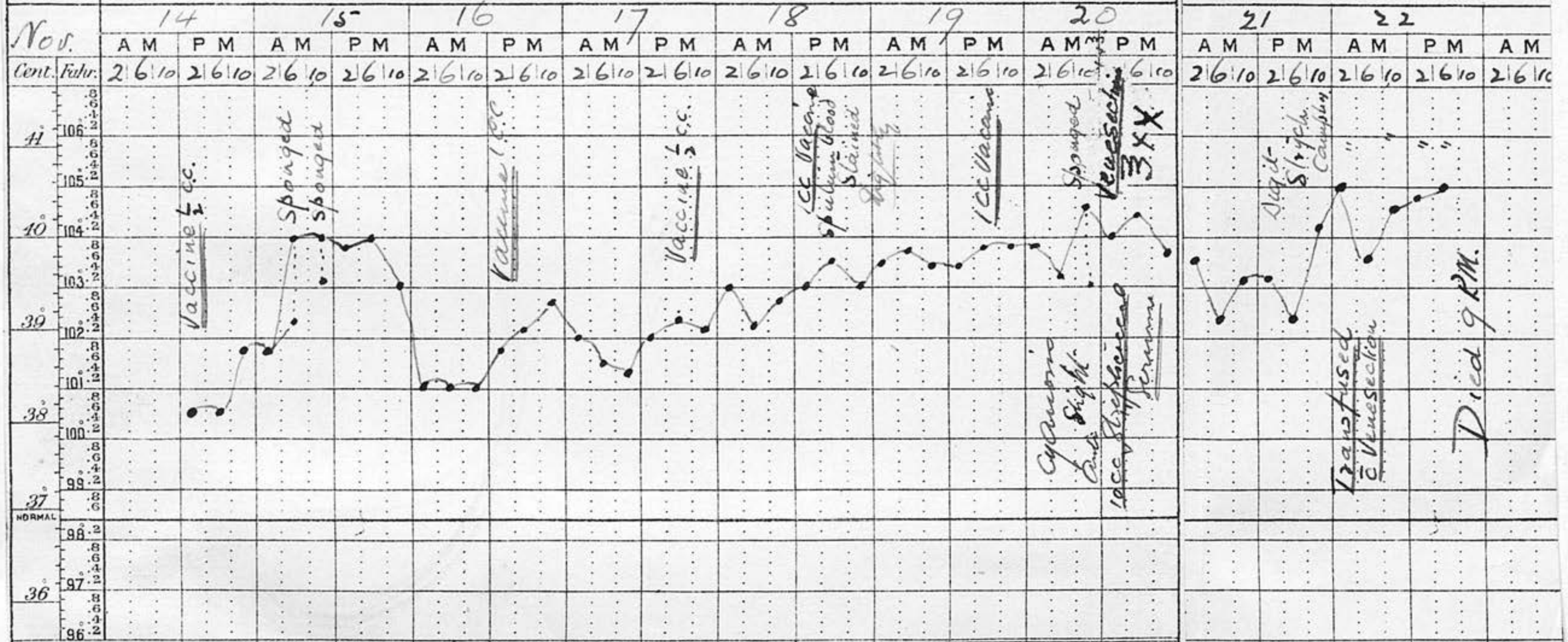
1. A. du B. was an orderly in the Hospital till the beginning of November. When we had obtained sufficient assistance, he was allowed to return to his business. He had

NAME.	RESIDENCE.	AGE.	SEX.	OCCUPATION.
A. du B.		24	M.	Dairying Expert.

A. du B. | RESIDE

DISEASE. Epidemic Influenza — Had prophylactic Vaccine 2 doses.

19 18 — DATES OF OBSERVATIONS. — Nov.



Nov.	Time	Pulse per minute (2 / 6 / 10)	Respirations per minute (2 / 6 / 10)
14	AM	— / — / —	— / — / —
14	PM	100 / 100 / 100	22 / 22 / 22
15	AM	100 / 100 / 104	20 / 22 / 20
15	PM	108 / 100 / 104	24 / 26 / 22
16	AM	100 / 92 / 92	20 / 20 / 20
16	PM	92 / 92 / 92	24 / 24 / 22
17	AM	90 / 90 / 88	22 / 24 / 24
17	PM	92 / 92 / 88	24 / 24 / 24
18	AM	92 / 90 / 92	24 / 22 / 24
18	PM	90 / 88 / 88	24 / 24 / 24
19	AM	— / 96 / 96	— / 24 / 26
19	PM	88 / 100 / 100	24 / 26 / 30
20	AM	88 / 100 / 100	34 / 34 / 34
20	PM	92 / 94 / —	34 / 36 / —
21	AM	100 / 100 / 100	36 / 36 / 36
21	PM	102 / 114 / 100	36 / 36 / 38
22	AM	98 / 108 / 108	40 / 36 / 28
22	PM	114 / 124 / —	26 / 26 / —

Urine — Ozs. / Spes. Grav.: 16 Nov. AM: 10:30 No Albumin

received, as far as I knew, 2 doses of prophylactic vaccine; but what va vaccine he was given, and what dose, I did not know. His last dose was given about the 15th or 16th of October 1918.

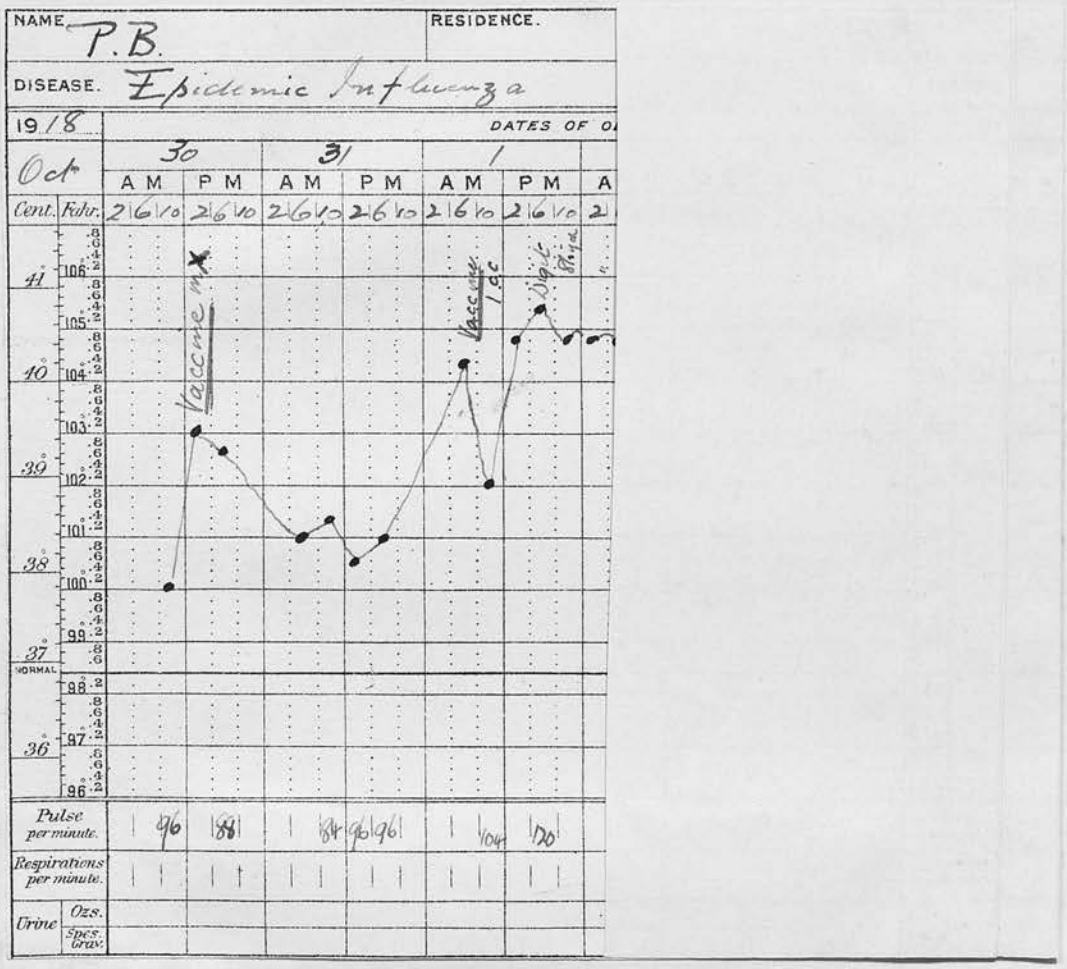
He took ill on the 13th November and I saw him on the afternoon of the 14th. The temperature on the 15th reached 104° F. During this time the patient was quite comfortable and slept well. From the 17th his temperature gradually rose and nothing would bring it down. On the 20th his breathing was over 30 per minute, and he became slightly cyanosed. His lungs were slightly congested, but not to any large extent. On the 21st his temperature fell slightly, but his general condition did not improve. I withdrew 20 oz. of blood on the 20th, and also gave him 10 c.c. anti-streptococcal serum the same day. On the 22nd. I bled him from one arm and introduced saline by the other.

No treatment was of any avail, as will be seen from the chart. He died on the evening of the 22nd at 10 p.m.

This case I considered one of the Septicaemic type. The lungs were never much congested, nor were there in this case any signs of consolidation except towards the end. The breathing towards the end diminished in frequency and became almost Cheyne- Stoke in character. Of this type of case I saw a good few and not a single one recovered. It will be seen that the temperature remained high all the time. There was not much of a remission, as was seen in many of the other cases.

The pulse was never very fast as will be seen from the charts. The heart in this case remained regular and fairly good, until towards the end when it failed rapidly.

Chart of P.B.

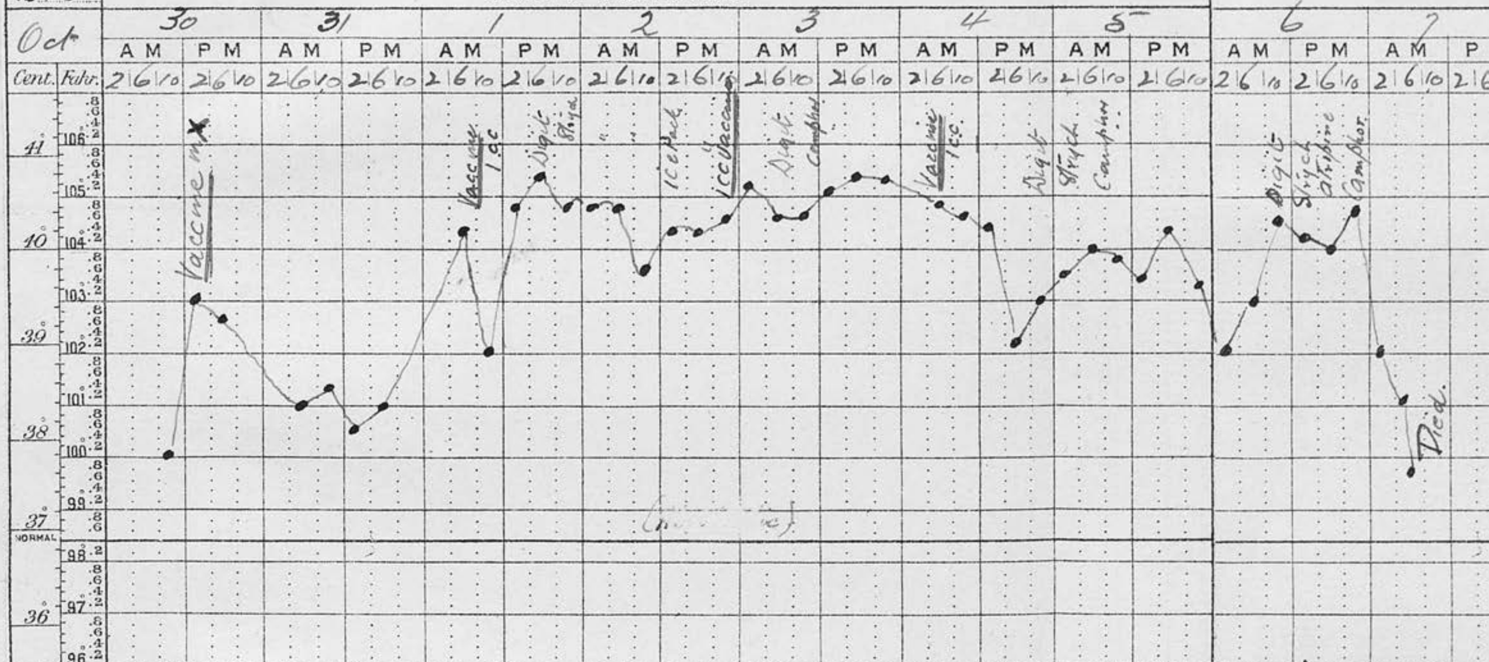


2. P.B. was also an orderly in a hospital in a neighbouring town 25 miles away. She was brought in soon after she was taken ill. This case was almost identical with the last. I tried every means at my dislosal, but could not produce any effect on the temperature or general condition. Her lungs remained clear to within two days of her death, when congestion set in. She was unconscious for most of

P.B. | | 18 | F | School Girl. | P.B.

DISEASE. Epidemic Influenza   No prophylactic Vaccine.

1918   DATES OF OBSERVATIONS.



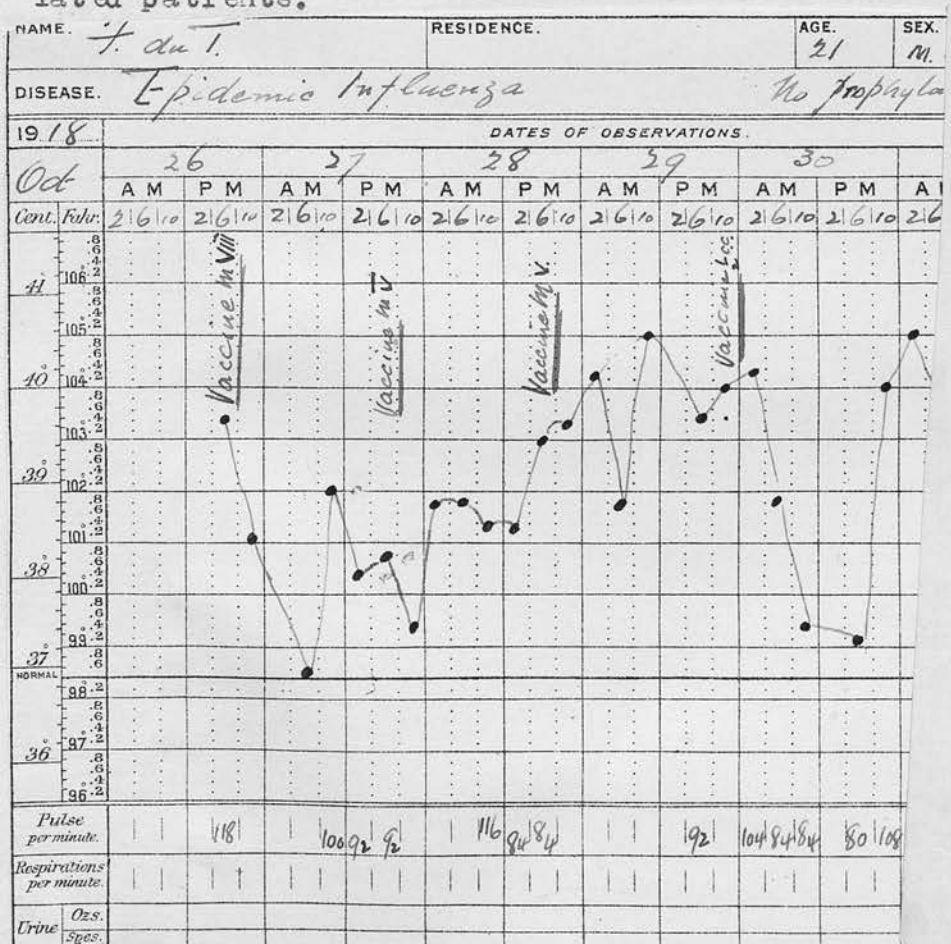
Pulse per minute.	96	88	84	96 96	104	120	112	120 118	124	128 108	112	116 120	120	118 116	120	128? 132?	?	?
Respirations per minute.																		
Urine Ozs.																		
Urine Spec. Grav.																		

He had two small patches of consolidation, one over the right scapular region, and one over the left base, both about 1½" by 1½".

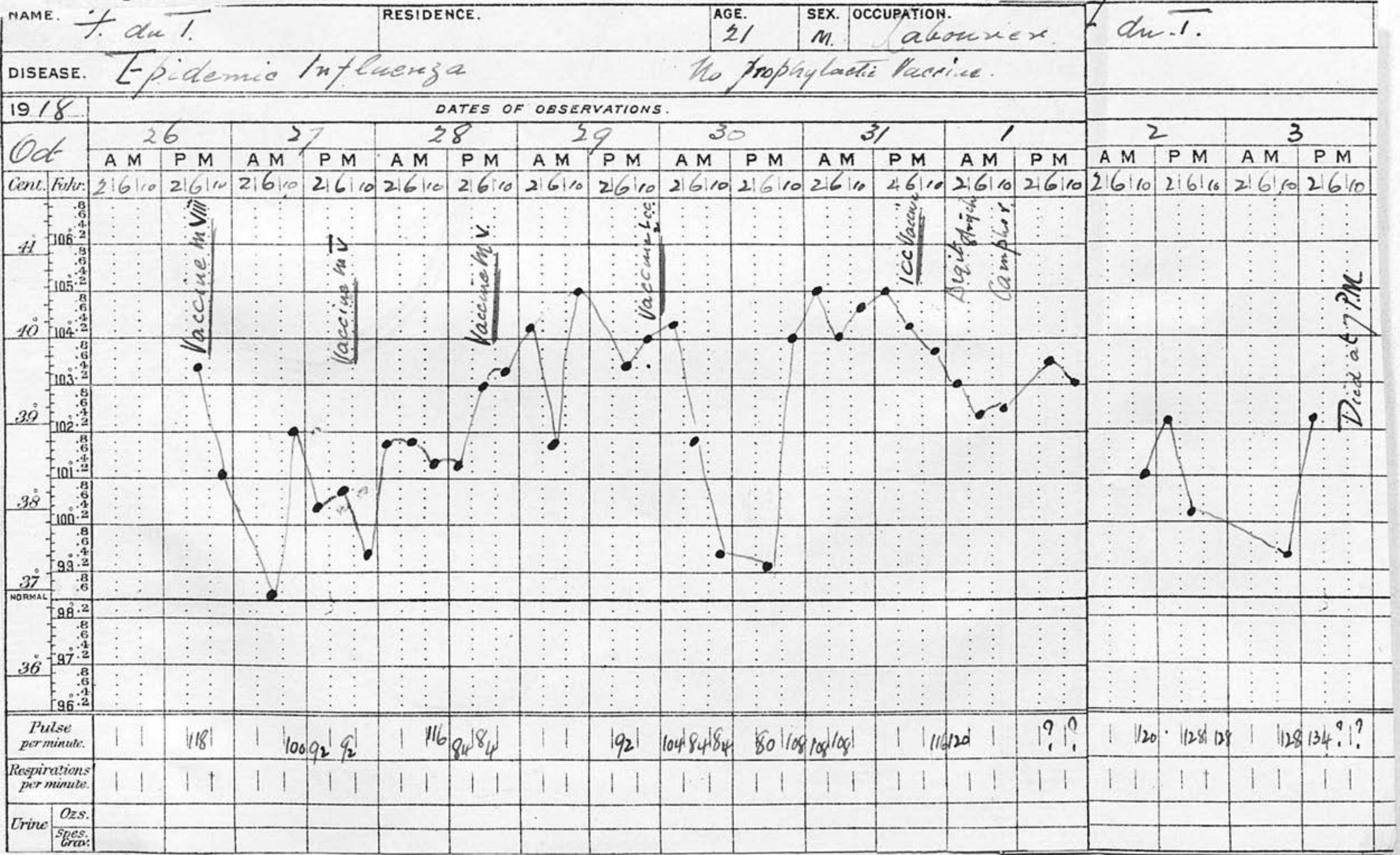
On the 9th I withdrew 15 oz. of blood from his left arm without any improvement. On the 11th I withdrew 10 oz. but the patient did not stand this well.

Later he was given Digit. Strych. Camphor, Oxygen inhalations without the slightest improvement.

This patient had 4 doses of prophylactic vaccine, two doses of Clinsearch on the 8th and 12th Oct. and two Government vaccines on the 17th and 23rd October. He was the six second of the two deaths amongst my prophylactically inoculated patients.



lated patients.

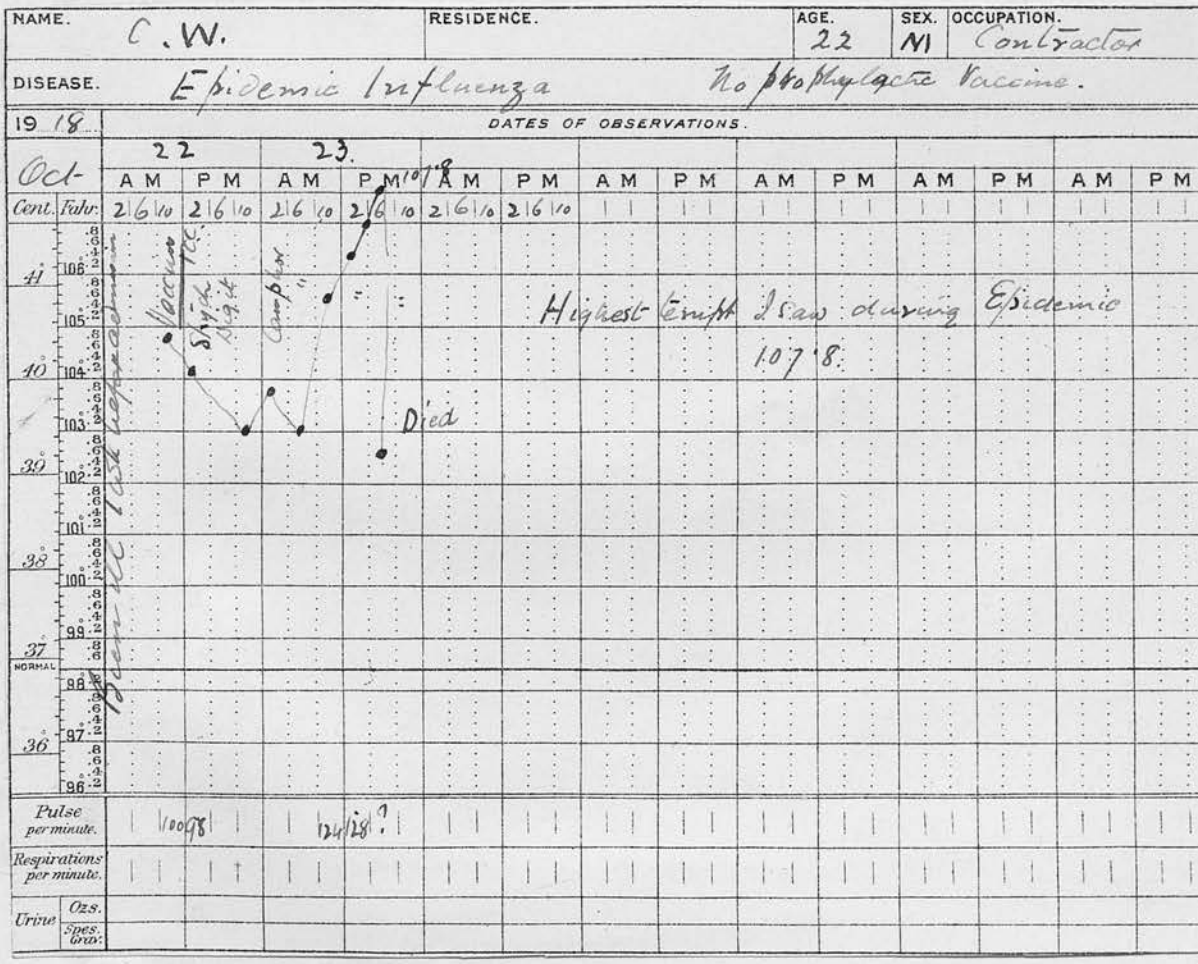


See Chart p 75.

4. F. du T. Case like the 2nd, had no prophylactic vaccine.

This case died of Confluent Broncho-pneumonia with heart failure. The chart will be seen to show a different temperature from the last two. On the 30th I thought he was getting better, but on the 31st his condition was again very bad. No treatment was of any avail. I was sorry afterwards that I did not try venesection in this case. He expectorated a large amount of bright red frothy sputum which was rather sticky when he neared his end.

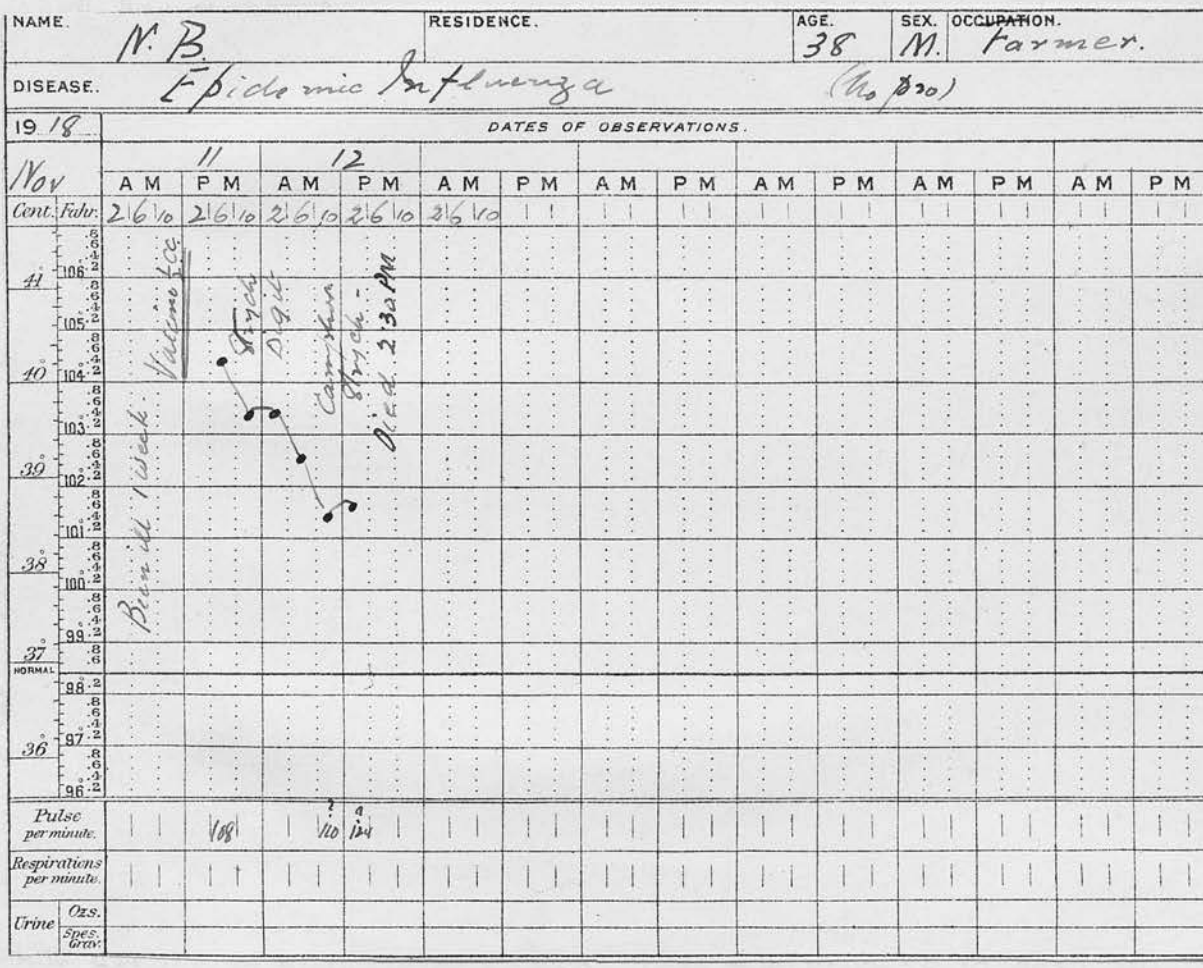
Chart of C.W.



5. C.W. had been lying unattended in a tent a few miles

from the town. When I saw him and took him to the hospital he was in a dying state already. Just before he died his temperature rose to 107°8, the highest I saw during the Epidemic.

Chart of N.B.



6. N.B. and 7. Miss F. were cases brought to hospital practically just to die. They both had Broncho-pneumonia in both lungs.

Chart of Miss F.

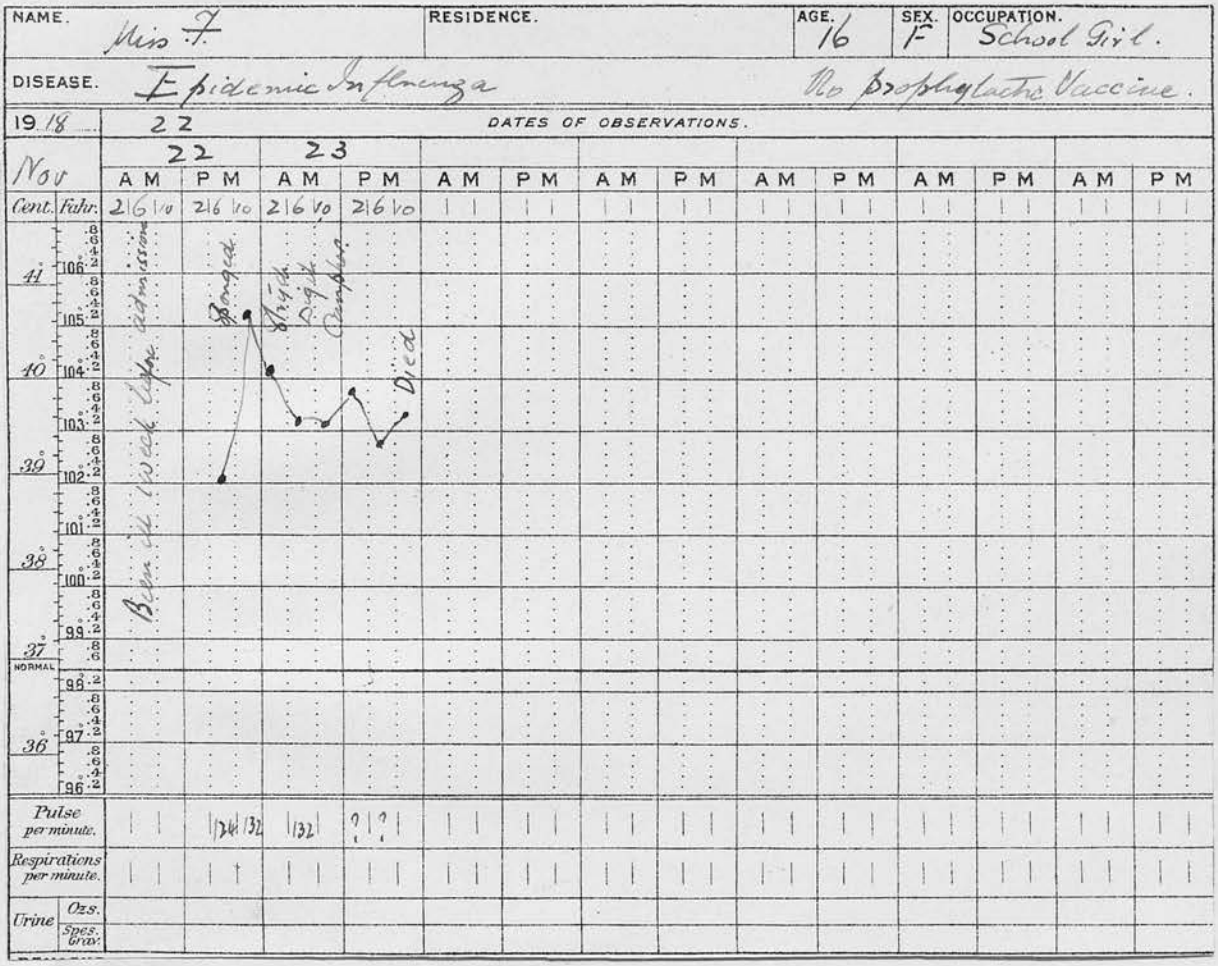


Chart of W.B. (See next page)

8. W.B. father of P.B. had been ill at home for 6 days. He was apparently getting over his attack, when he got out of bed, and started working in his yard. He had a relapse and developed Broncho-pneumonia. He was brought to hospital on the 11th November 1918. At first he was doing well, and I thought he might recover. On the 14th his heart suddenly began failing, and although he lasted a few days longer, no treatment was of any avail.

Chart of W.B.

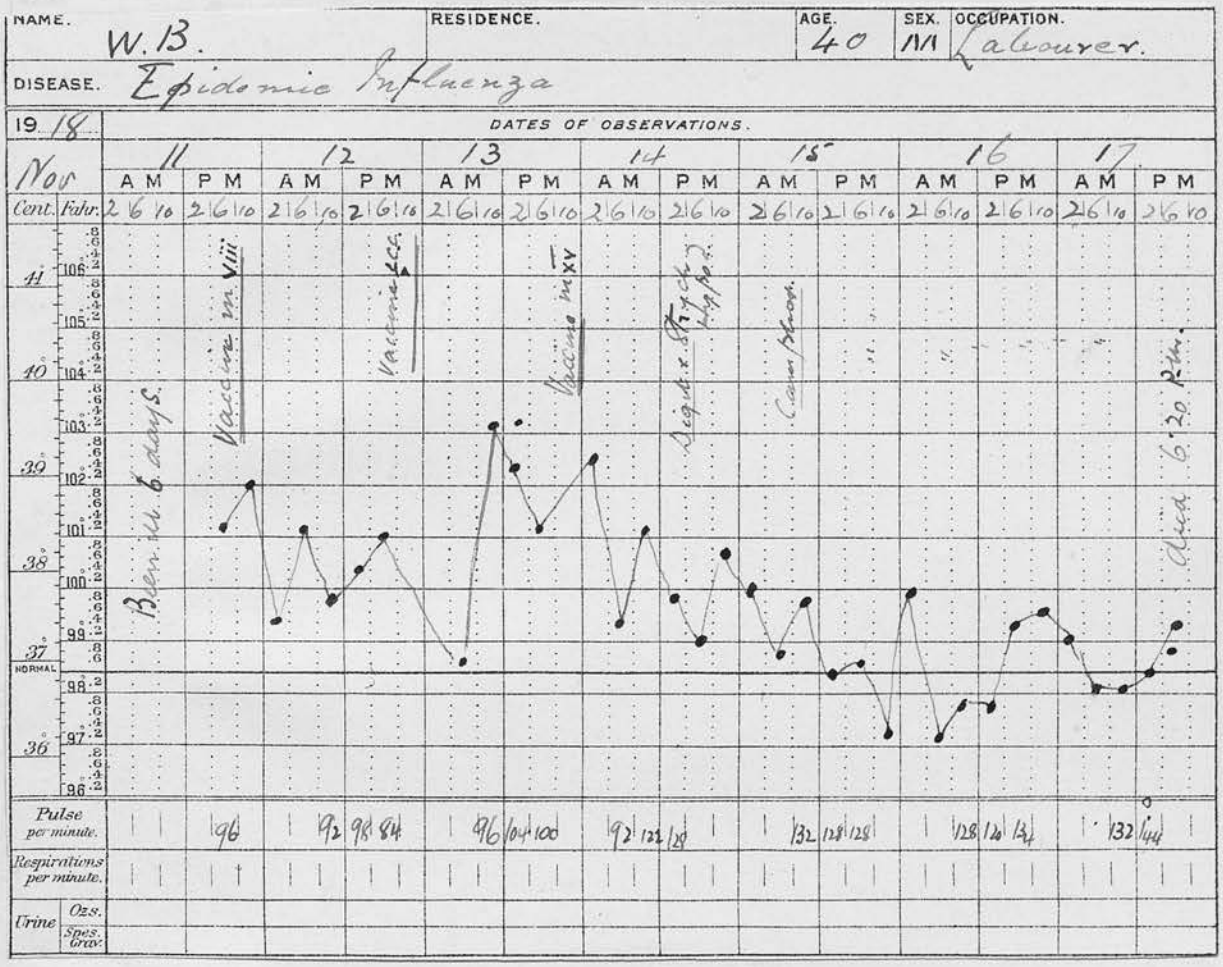


Chart of du P. (See next page)

9. du P. also came in with a relapse following on getting out of bed too soon. He developed a Confluent Broncho-pneumonia and died 4 days after admission.

Chart of du P.

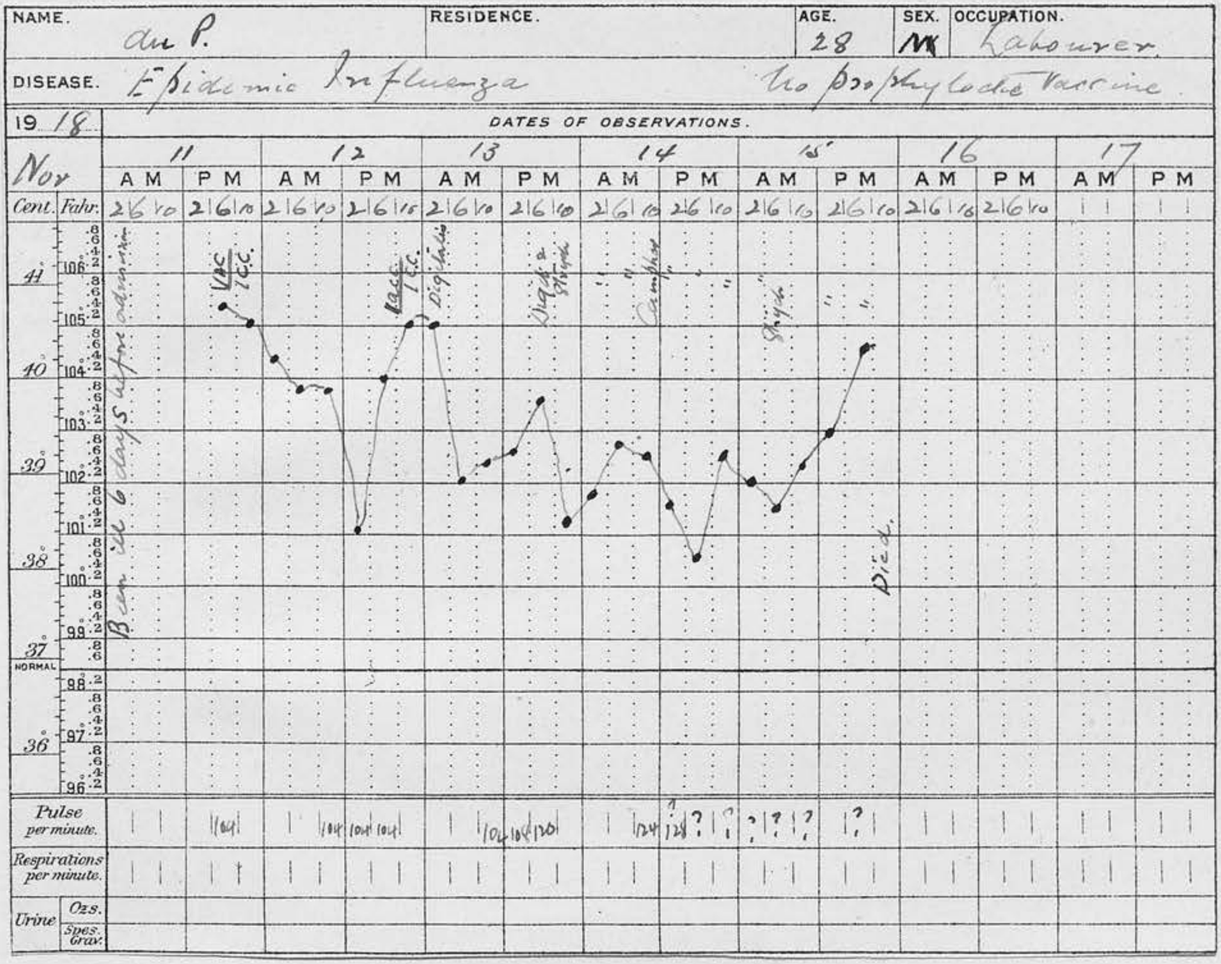


Chart of C.R. du P. (See next page)

10. C.R. du P. was a similar case to the last. Broncho-pneumonia (confluent) He died 48 hours after admission. Th This patient, like a few more who died, was practically brought in to die.

Chart of C.R. du P.

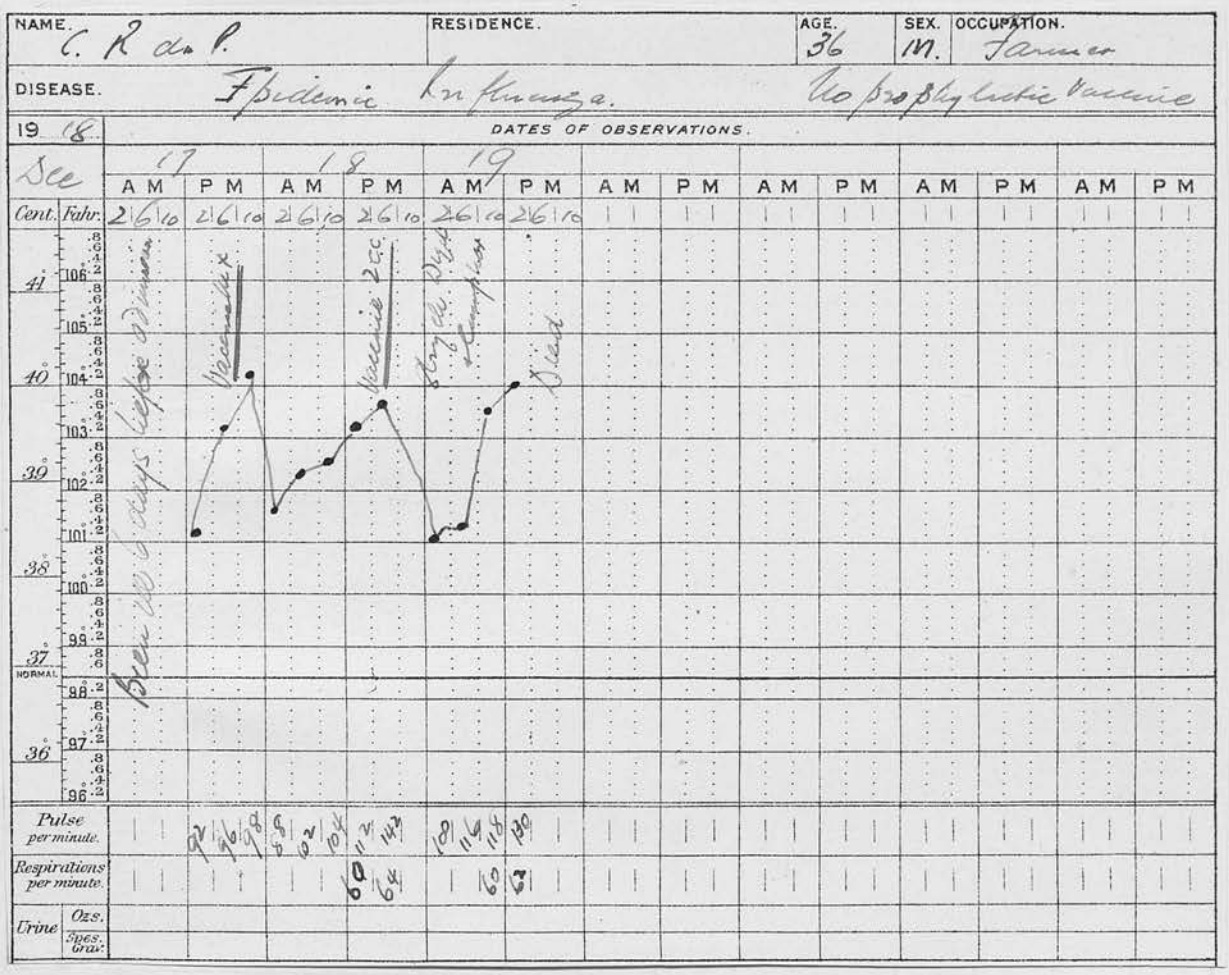
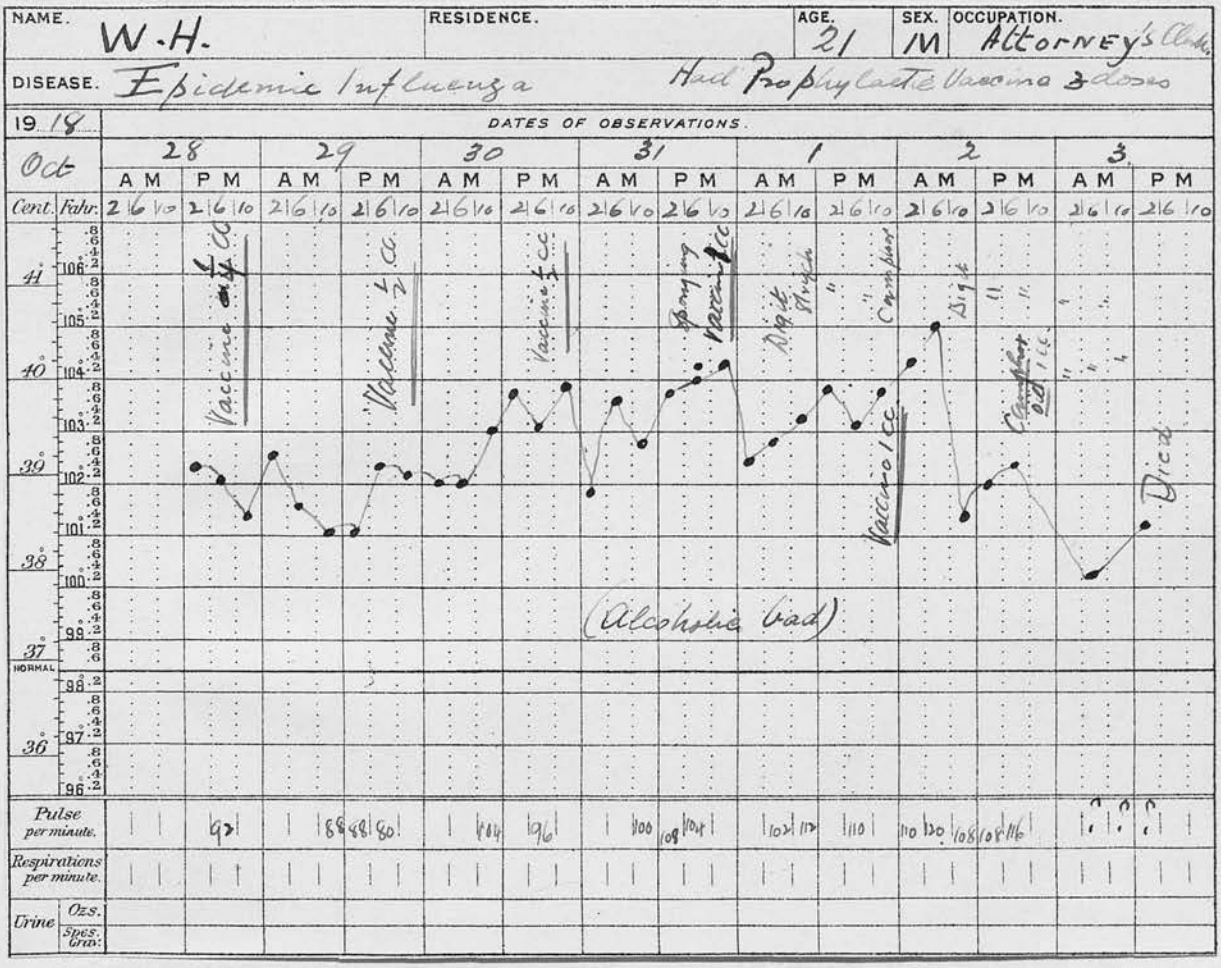


Chart of W.H. (See next page)

11. W.H. had 3 doses prophylactic vaccine, but as I did not ~~have~~ give them, I do not know what kind he had. He was drinking heavily at the time and had been for some time previously. I suggested venesection but the patient refused. The reason given was, that he wanted to die and would not submit to anything I suggested.

~~I have now shown the charts of all the cases who died, but I have shown the charts of all the patients treated who are accurate records were kept. The original number was 132,~~

Chart of W.H.



I have now shown the charts of all the cases who died, b but I cannot show the charts of all the patients treated where accurate records were kept. The original number was 132 (one hundred and thirty two) with eleven deaths. But unfortunately I mislaid thirty-two charts, and will therefore not consider them in giving my statistics.

I have, however, shown the charts of all those patients who developed a fatal attack after receiving prophylactic inoculation.

Of the 100 cases on which this thesis is based:--

30 developed no complications. Of these 20 had received one or more doses of prophylactic vaccine. Five of the other 10 cases were children below 10 years of age.

Children below 10 years of age nearly always developed a mild attack whether inoculated or not.

2 cases had signs of ordinary lobar pneumonia; of these one died. The other had received 2 doses of prophylactic vaccine.

4 cases developed the septicaemic type of the disease. All 4 died. Two had received prophylactic vaccine. Of these one was not inoculated by me, and I did not know what Vaccine was used.

27 had Broncho-pneumonia or confluent broncho-pneumonia Of these 6 died. One of these latter had received prophylactic vaccine.

37 developed congestion i.e. either pure congestion or broncho-pneumonia with congestion. The latter predominated.

It will be seen that 70 % of my cases developed lung complications. This was partly due to the fact that only complicated cases were sent to hospital, the others were treated at home.

Out of 11 deaths, One died 48 hours after admission.
Two died 24 hours " "
One died 36 hours " "

They were all brought in to die. Two had fairly mild attacks and would probably have recovered had they not got out of bed too soon, which caused a fatal relapse.

The conclusions which I drew from my experience, and for which I think sufficient evidence has been submitted, are:-

1. That the prophylactic vaccine, used by me, did in most cases prevent the complications of Epidemic Influenza, although it did not so often prevent an attack of the disease An immunity was thereby produced which lasted at least 3 months, but did not last six months. I personally used vaccine as a prophylactic and also used it for my wife and three native servants. None of us contracted the disease in spite of constant exposure to infection.

Prophylactic inoculation to be effective must consist of 2 to 4 doses at intervals of from 5 to 7 days, and the same must be repeated every time a fresh outbreak, or recrudescence of the disease appears.

2. That one good attack of Epidemic Influenza did produce an immunity which lasted at least 6 months and might have lasted longer. With this Roquier Hamilton, Leonard, and Maillard agree (vide Med. Science abs, and Rev. vol. 1 p. 50)

3. That those who suffered from repeated mild attacks of ordinary influenza, coryza, respiratory catarrh or Hay fev

Fever etc. were much less liable to get an attack of Epidemic Influenza, than the strong and healthy who never get a cold.

4. That those who suffered from asthma, chronic Bronchitis, or chronic suppurating lesions did not get the disease

5. That vaccine used as part of the treatment during an attack, saved many patients and might have been the reason why I did not see a single case develop Empyema.

6. That venesection saved many patients and is a form of treatment that ought to receive more serious consideration in such cases.

I have only shown the results of some cases, and not always the best. Equally good results were obtained with vaccine and venesection in many other cases, but time did not permit me to keep records.

The official Government report states that the number of cases, of Epidemic Influenza, which occurred in Senekal ~~d~~ during the first Epidemic (Oct.--Dec. 1918)was 15000 ~~or~~ (fifteen thousand)

During the worst part of ~~this~~ at Epidemic I was the only medical practioner out of bed, and as the figures for the Second Epidemic (June--Aug. 1919) were not included, it will be easily understood that during the two Epidemics I saw at least 3000 (three thousand)cases.

The charts shown are not specially picked out, nor ~~were~~ were special cases selected in which the results of ~~the treatment~~

treatment were good. The charts give a true and genuine record of some of the cases treated by me.

I wish here to thank Dr. J. Pratt Johnson of the Clindearch Laboratories, Johannesburg, for his valuable aid and assistance in the use of vaccines generally. I was thereby enabled to employ vaccine in Epidemic Influenza, not as a new form of treatment, but as one of which I had had previous experience.

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REFERENCES

BOUDREAU. "L'iode contre la Grippe." J. de Med. de Bordeaux 1919.

BLUM "Traitement de la Grippe par la bleu Methylene." Bull. Aced de Med. 1919.

LOEPER AND GROSSIER. "A propos du traitement de la Grippe, Urotropine et bleu de Methylene." Bull. au mena Soc. Med. d. hop. de Paris, 1918 1067-70.

BAILLIE "A note on the use of intravenous Iodine in Influenza Broncho Pneumonia" Lancet 1919, 1. 423.

MC.GUIRE L.W. AND REDDIN W.R. "Treatment of influenzal pneumonia by use of convalescent human serum." J. Am. M. Ass. 1919. 72. 709-13.

LESNE, BRODIN ET SAINT GIRONS F. "Effets des injections intravenenses de plasma humain sur cours de la Grippe et quelques autres etats pathologiques." Presse Med. 1919, 27. 181-2.

WYNN W.H. "The treatment of influenza broncho-pneumonia with special reference to vaccine therapy." Practitioner, 1919 102. 77-88.

HECTOR MACKENZIE "Influenza as affecting the respiratory system," Practitioner 1919, 102, 53-63.

KOHLER F. "Die behandlung der Grippe mit heissen Vollbadern." Munich. Med. Wochnachr. 1919, 66, 126-8

WANNER F. "Des reactions de defense dans la Grippe." Rev. Med. Suisse 1919, 39.71-7

MERKLEN P. "Quelques remarques sur les abces de fixation chez les Grippes," Bull. soc. de Med. 1919. 4me ser. 24,76-9.

MAURIAC "Le traitement de la Grippe par l'arsenobenzol."

Gaz. hebd. d. Sci. med. de Bordeaux. 1919, 40, 64-5.

ROSS C.W. AND HUND E.J. "Treatment of the pneumonic disturbances complicating influenza:: the transfusion of citrated immune blood." J. Av. M. Ass 1919. 72. 640-5.

FAIVRE "Grippe infectieuse et puerperalite" Gaz. hebd Sci. med. de Bordeaux. 1919, 40. 7-8.

TREMOLIÈRES F. ET RAFFINESQUE M. "Quelques remarques sur l'epidemie de la Grippe." Presse Med. 1919 27. 98-101.

COWIE D.M. AND BEAVEN P.W. "Non specific protein therapy in influenzal pneumonia. A consideration of the typhoid protein." J. Am. M. Ass 1918 72. 1117-4.

HILDEBRANDT W. "Zur Behandlung der Grippelungen entzundungen" Deutsche Med. Wehnschr 1919.45. 489-90.

WYNN W.H. "The importance of immediate specific treatment in influenzal pneumonia and other acute infections." Practitioner 1919 102, 258-94.

HOLST J. "Om behandling av' "Spansk" pneumoni med. rekonvalescent serum." Norsk mag. f. Laegevid, 1918 80.531-61.

STOLL F.H. "Value of convalescent blood and serum in treatment of influenzal pneumonia." J.m.M.Ass. 1919 73 478-82.

OLIVER T.H. AND MURPHY D.V. "Influenzal pneumonia; the intravenous infection of hydrogen peroxide." Lancet 1920 1.432-3.

TOULZE A. "L'emploi de la methode de Fochier (abces de fixation) dans le traitement de l'infection grippale". Theses de Paris 1919-20,7.

REDDEN W.R. "Treatment of influenza pneumonia by use of convalescent human serum." Boston M. and S. J., 1919, 181, 688-91.

FRIEDMANN U. "Therapeutische erfahrungen aus der dies jahringen Grippen Epidemie." Deutsche Med. Wchschr. 1920, 46, 293-5.

LOCHELONGUE. "La vaccine therapie de la grippe." Progrès Med. 1920 3me ser. 82,522-3.

LAVATELLI A. "La vaccino-terapia della influenza medicente il' vaccino antipiogene polivalente Bruschettine." Gazz. d. osp. 1920, 41. 170-2.

GREGOR A. "The scope of certain gaseous disinfectants in the prophylaxis of influenza." B.M.J. 1919 ii 523.7.

HUGHES W. "The value of antistreptococcus serum in influenza." Lancet 1919, ii. 792. 4.

COGLIEVINA "Zur behandlung der Grippe." Med. Klin. 1919, 15, 847-9.

BLACK MILNE AND ROGERS "Influenzal Broncho-pniumonia and pneumonia treated with the army mixed vaccine Feb. to May 1919" Lancet 1919, ii 731-3.

BEAUMONT G.E. "Therapeutic measures in Influenza." The Practitioner 1920. P.263.

CARNEGIE DICKSON W.G. Discussion on Influenza. Royal Society of Medicine Lancet 1918 p.743.

TURNER E.B. Ibid.

DR. LUIGI MEILLE "Auto therapy in Influenza." Il Policlinc Practical Sec. Nov 3rd 1918.

EDGEWORTH. "Antistreptococcal Serum in Influenza." B.M.J. vol.11 1918 p.515.

GUISEPPI P.L. "Camphor in acute Influenzal Bronchitis and Broncho-pneumonia." B.M.J. vol II 1918 p.71t.

O'KELLY DAY Discussion on Influenza, Royal Academy of Medicine in Ireland B.M.J. vol II 1918 p718.

PROCTOR SIMS T.R. "Quinine in Broncho-pneumonia." B.M.J. vol II 1918 p.704.

COOPER COLE C.E. "Report on Influenza Epidemic at Bramshott in Sept-Oct 1918." B.M.J. vol II 1918 p.566.

WELLS C.W. "Intravenous injections of foreign protein in influenzal Pneumonia." J. Am. M. Ass. 1919 72, 1813-5.

BRUHL AND FRANK. "Traitement de formes graves de la Grippe par le Novarsenobenzol." Bull et mém. Soc. méd. d. hop. de Par. 1918 3me sér. 42 1183-5.

HOSENBERG. H. "Zur behandlung der Grippe". Berl: Klin. Wchschr 1919, 56, 220-1

REISE Medical Supplement 1919 2.76a.

LYON. L.P. TENNEY C.F. SZERLIP L. "Some clinical observations on the influenza Epidemic at Camp Upton from Sept. 13th to Decist 1918." J.Am. M.Ass. 1919, 72, 1726-31.

PATSCHKOWSKI H. "Behandlung der Grippe mit intra- musculaeren Milch-injektionen." Munch: med Wchnschr. 1919, 69, 1117-20.

ROBERTS D. CAREY E.G. "Bacterial protein in Influenzal pneumonia" J. Am. M. Ass. 1919 72, 922-4.

DOBLIN "Nasenblutungen bei Influenza". Med. Klin. 1919 15. 146-7.

LESNE "Des hemorragies graves au cours de la Grippe." Bull. et Mém. Soc. méd de hop. de Par. 1918 3me. Sér. 42 1067-70

KORACH S. "Zur Pathologie der Influenza 1918-19 im Vergleich mit der Epidemie 1889-90." Berl. Klin. Wchnschr. 1919,56 , 218-20.