

"THE INFLUENZA PANDEMIC - 1918

As observed in the Punjab, India

by

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In India at the beginning of the "Hot Weather" of 1918 the newspapers announced the appearance in several countries of a new disease which was popularly known as "Spanish Influenza" - but, at first not a great deal of attention was paid to the announcement until later, when it was described as having spread from country to country and that it had made its appearance amongst our troops in France. It finally appeared in India and was first observed in Bombay, having been conveyed there from an infected ship.

Influenza has been known as a common complaint for many years but has occurred as a serious epidemic and pandemic on more than one occasion. The last great epidemic was in the years 1889 to 1892, but there are records of previous epidemics before this. Not only in England but they have become world wide.

The writer can only relate his observations on cases seen in one station and the surrounding districts, namely Jullundur in the Punjab : but, on comparing notes with other Medical Officers, Assistant Surgeons and Sub-Assistant surgeons, the cases seen in this one station appear to be very much the same as cases seen in other parts of India.

Influenza is stated to frequently follow on an outbreak /

outbreak of plague. In India it certainly did so, for the writer was transferred from duty with British troops to do duty with Indian troops in the cold weather of 1917-18 amongst whom both Bubonic and pneumonic plague had broken out. Plague was also causing great ravages amongst the native population. This outbreak of plague was, however, more or less confined to the Punjab.

The writer regrets that he was unable to carry out more research work in connection with the Bacteriology of Influenza, but all other Medical Officers were off duty with an attack and owing to stress of ordinary routine work and extra work thrown on the writer's shoulders and that, finally the writer was put off work for a relapse of Malaria and Dysentery, the opportunity for further investigation was denied.

As stated before, Influenza made its appearance first in Bombay. As was observed in other countries, the first wave was of a mild type, and caused much anxiety, not on account of the mortality, for there were few deaths in first wave, but on account of the dislocation of business in Post Office, Telegraph Offices and large business concerns. In any place where many were collected, the disease ran through the entire staff with few exceptions. From day to day the appearance /

appearance of the disease was reported from other places and made its appearance in the Punjab about the middle of August, when it was also of a mild variety. Meanwhile it had quietened down in places where it had been rampant. Up to this time it had not shewn itself to be a virulent type, but in September the disease broke out afresh in places already visited and in places not visited before, and exhibited characters of great virulence. It is chiefly of cases of this second wave that the writer intends to deal.

India, as is known, is a country in which epidemics of disease are common. As stated before, the Punjab had recently come through a bad outbreak of plague, but this outbreak of Influenza caused far greater mortality and alarm, especially amongst the natives, than the outbreak of plague had caused. The natives fled from their villages when the disease made its appearance, and incidentally materially aided its spread.

The first cases of Influenza reported in Jullundur occurred amongst the sepoy's of a Pioneer Battalion. These cases were not under the writer, but being in charge of the Brigade Laboratory and Specialist in the Prevention of Disease for the Brigade Area, was /

was called in a few days after the outbreak started. At first it was thought that these were cases of Malaria, and, according to routine, blood smears were sent to the Laboratory for examination for malaria parasites. These all proved negative on three consecutive days. A day or two later some cases presented signs resembling pneumonia, and one or two sudden deaths occurred. This gave rise to the suspicion that there might be another modified outbreak of pneumonic plague, which had visited the station the previous winter. All slides of sputum failed to exhibit B. Pstis. It was decided that these must be cases of the disease which was causing such ravages elsewhere. It may be stated here that no information had been received, either from other stations or from England which would help in diagnosing the disease. Nothing was known except what had been seen in the newspapers.

The disease had been introduced by sepoy's returning from leave. The actual patients were isolated as soon as the blood smears proved negative. The disease, however, spread through the unit, to the other native units in the station and to the native population of the Bazaar and surrounding villages, but at first the European population escaped entirely. The /

The cases amongst Europeans came from a Practice Camp about 25 miles away, where two Brigades of Artillery, Pioneers, Army Service Corps Detachments and others were for Field Firing and Training prior to Divisional Manoeuvres. As was usual, all cases of illness requiring Hospital Treatment were dispatched to Jullundur Station Hospital by motor ambulance. The first case admitted from Camp arrived several days after disease had spread through the entire native population of the station, but not a single European in the Station had contracted the disease. It is interesting to note that the first case (three occurred on same day) occurring in a European in the Station, occurred in a Nursing Orderly who was attending the cases sent in from Camp. As stated three Orderlies contracted the disease about 48 hours after commencing to attend patients suffering from the disease. Again, later, (the local British Unit, being free from disease) the Regular Nursing Staff was so reduced by sickness and the number of patients so many, men were asked for from the British Unit to help, especially as regards looking after delirious patients, to keep them from getting out of bed, and replacing thrown off bed-clothes. In two or three days of commencing, their duties

duties, they commenced to go sick with Influenza.

In the Punjab alone there were over one million deaths. Some native villages were very badly attacked by the disease. One of about nine thousand inhabitants lost about three thousand through Influenza. The native fared worse than the European, and the disease ran through the population very rapidly; a factor which attributed to their high death roll was the fact that the monsoon failed, so there was shortage of fodder for the cows, and so little milk, the natives were poorer than in other years, and the cost of living had gone up, so they were poorer nourished than usual and could not afford or get sufficient milk for the sick. A great reason for the rapid spread amongst them was that at this time the nights were becoming cold and they were beginning to sleep indoors, in the little mud huts where there was overcrowding and no ventilation. In the hotter periods almost all sleep out of doors and chiefly on the flat roofs of their huts.

The number of cases treated amongst Europeans in the British Station Hospital, Jullundur numbered three hundred and sixty; besides these, however, many cases were seen by the writer in the Indian Infantry Hospitals /

Hospitals and amongst the natives of the Bazaar.

Incidence:-

The disease appeared to attack both sexes equally, old and young, healthy and unhealthy were attacked about equally.

Incubation:-

This appeared to be short. In accordance with what has been stated earlier regarding the appearance of the disease in Nursing Orderlies, the writer is inclined to put the Incubation period down at about 48 hours.

Spread:-

The spread of the disease appeared to be due to close contact chiefly. The ^{causal} ~~casual~~ organism being conveyed from patient's ~~from~~ nose, throat and lungs. Fomites and drinking utensils may also play a part. "Carriers" may also play a part, and certainly the same organisms were found in apparently healthy throats and noses as were found in throats, noses, sputum and other specimens of patients. The casual organism appears to find lodgment in nasopharynx.

Clinical /

Clinical Features:-

The epidemic as seen by the writer was more an epidemic of pneumonia and complications than straightforward cases of Influenza. The pneumonic cases might be included under the section dealing with complications, but, owing to the large number of such cases, the writer deals with these as a type of the disease, not as a complication, especially as several such cases appeared to be pneumonic from the start. Clinical Features will thus be divided into two:-

- (1) Influenza cases and (2) Pneumonia cases.

Influenza Cases :-

The symptoms appeared in this group of cases to be much the same as those met with in the simple cases of Influenza seen every year. The onset is usually sudden, but in a few cases slight ~~Mal-~~ **aise** was complained of. The person attacked may be able to carry on for a short time and get to his home ; others are more or less knocked out and lie down wherever they happen to be. Once the patient gets to bed, he feels tired, but is unable to sleep. The temperature rises to 102° or 103° and remains about this level for two or three days. The patient complains of general pains in body and limbs, not so much of the /

the joints as in soft parts, severe headache, usually frontal and pain behind the eyes. The patient looks obviously ill, lying huddled up in bed with flushed face and frequently injected conjunctivae. The tongue is usually coated with a yellowish-brown fur. The throat, which is frequently complained of, exhibits frequently congestion of fauces. In most cases a slight degree of Bronchitis is observed with severe irritating harsh cough. After a varying number of days fever, usually 3 or 4, the temperature drops by lysis usually, but occasionally by crisis, the patient begins to feel better and convalescence commences. In some cases convalescence was slow, and this was chiefly noticed in those cases who did not take to bed at the commencement of illness, but "carried on" until forced to give in. The same was the result if the patient was allowed up too soon.

Pneumonia Cases :-

Pneumonia was observed occurring at three different periods of the illness:-

(1) Cases admitted presenting clinical picture of lobar pneumonia. As will be mentioned later, very few of these cases were straightforward lobar pneumonia cases.

(2) /

(2) Cases where pneumonic symptoms and signs appeared after two or three days illness with what appeared to be ordinary Influenza:-

This was the commonest type.

(3) Cases developing pneumonia after temperature had fallen, during convalescence.

These cases of pneumonia presented many symptoms and physical signs. This will be noticed when the various signs and symptoms are dealt with.

These cases admitted with pneumonic signs gave the history usually of a sudden onset and usually with a rigor, that is, in those cases in which pneumonia occurred at commencement of illness.

But very frequently, in cases in which pneumonia developed on top of Influenza, there was no rigor, the temperature did not rise much higher and frequently patient did not complain of his chest at all. Others complained of a vague pain on one side or other.

The appearance of the patient was striking. At first the majority of patients are flushed, and they may remain so till fever abates, but, in cases which did not do well, as they became worse, a peculiar colouration was observed. It was not the usual /

usual cyanotic hue but the face, in some cases only the lips and ears, presented a peculiar violet lavender hue. After a little experience, this was looked upon as a grave sign. Few recovered who presented this appearance. The writer was unable to do any examination of the blood in connection with this, owing to lack of apparatus and time, but some time after read in the Lancet of January 4th, 1919, an account of work done by Drs Abrahams Hallons and French. They seemed to think that the condition might be due to methaem-oglobinaemia, but spectroscopy did not support the theory, nor did they find any defect in the oxygen carrying capacity of the blood. It appears to be what Prof. Haldane terms "Anoxaemia" similar to what is seen in "gassed" cases and due partly to analagous causes.

The patient's eyes and eyelids also deserve mention. In serious cases the patient's eyelids droop and present the appearance of one who has a drug or toxin in the system. The eyes looked dazed, and sometimes the conjunctivae appeared dull.

The smell of the patient, especially in serious cases struck one. As in some other diseases, for example typhoid fever, the patients have a peculiar smell. It was not the smell of stale perspiration

nor from a foul mouth with sordes and coated tongue.

The breathing in these patients was curious.

They breathed rapidly up to 30 or 40 per minute, sometimes up to 60 per minute, but there was remarkably little dyspnoea or orthopnoea. The breathing was short and shallow, and not noisy except in cases in terminal stage. They did not complain of difficulty in breathing, and if propped up, usually asked to be allowed to lie down again.

The Physical Signs in these pneumonia cases were very puzzling. As stated before, many cases presented pictures of a straightforward lobar pneumonia and the usual physical signs were expected on examination of the chest, but it was not so. In some cases practically nothing definite could be made out, and one was satisfied that the next day would probably show the signs expected, but one was again disappointed. Some cases ^{seen} met with where patient appeared to be a case of lobar pneumonia and who recovered, but never exhibited more than a few ~~stronchi~~ or a few ^{crepitations} ~~crepitations~~ at base or bases, but in whom no dullness or bronchial breathing could be elicited.

In other cases one met with lesions varying from very small and hard to find, to a whole lobe or even a whole lung affected, where there was dullness on

percussion, and bronchial breathing and crackling rales were audible. The majority of cases presented signs of a broncho-pneumonia, rather than those of a lobar pneumonia. There did not appear to be any special locality for the lesions, but the middle and lower lobes were the commonest site of disease. In two cases, under the writer's observation, only the upper lobes were affected - both cleared up and no sign of tuberculosis could be made out.

It was a fairly common occurrence for the disease to clear up at one site, and a fresh part of same or other lung to become involved.

As regards effusions ⁱⁿ ~~on~~ to the plural cavity, this will be dealt with under "Complications".

It will be seen that the physical signs varied greatly and one could not depend on what one found either for diagnosis or prognosis. It was found after a little experience with these pneumonia cases that frequently a patient with only a few Rhonchi died, while a patient whose chest was full of physical signs recovered.

On examining the heart area one was at first surprised to find that there was no dilatation. This was almost invariably the case. One expected, from the patient's colour to find dilatation. This

This absence of dilatation will also explain the absence of orthopnoea.

The Pulse kept good usually except in terminal ^{stage} ~~page~~. It is of course accelerated in proportion to the pyrexia. One was surprised to find a fairly strong and regular pulse in a patient who looked as if he had not long to live - a much better pulse than one would have expected under the circumstances.

The Sputum also varied greatly. Some cases which displayed only bronchitic symptoms had practically no sputum, others expectorated copiously. Some expectorated frothy sputum, other sputum consisting mainly of pus. Again in pneumonic cases with much the same signs, one expectorated little, other copiously. Frequently cases were met with, whose sputum mugs had to be changed twice during 24 hours. In many of the pneumonic cases, the sputum appeared to be slightly "rusty", but not quite the same as that met with in cases of lobar pneumonia. It was not so tenacious. In other cases the sputum was of a pinky red colour - in others, the sputum was merely streaked with blood. In practically all sputa/a large proportion of pus, but the sputa did not appear to have any very definite or objectionable odour.

It could not be observed that those who expector-

ated freely did better than those who did ^{not} or vice versa.

COMPLICATIONS.

Under this heading are mentioned many conditions which were met with during the epidemic. Some were observed in straight forward Influenza cases, but mostly in penumonic cases.

They will be dealt with under separate systems:-

(1) Respiratory System :-

Bronchitis and Pneumonia are not considered complications as they formed one of the most prominent symptoms of the epidemic. They have been dealt with earlier.

Pleurisy and Empyema :- In some cases a simple dry pleurisy was observed but not in many did it remain a simple dry pleurisy but proceeded to the formation of fluid, this fluid usually being turbid containing pus cells and organisms. These usually cleared up. Two cases required operative treatment after no improvement from aspiration. Cases which were aspirated appeared to clear up more quickly than cases met with in the ordinary run of illnesses. The bacteriology will be dealt with under a separate section, but it may be of interest to quote the following:-

While one Medical Officer was performing a post mortem

on a case in which there had been an empyema, he made a small prick into a finger through his glove, while working in the chest. Within 12 hours, in spite of vigorous treatment immediately after the cut, he had to be admitted to Hospital with the whole of his arm affected and signs of general septic absorption. The finger was opened and whole arm kept in anti-septic bath with the desired effect, but this serves to demonstrate the virulency of the organisms at work.

Returning to the subject of fluid exudation, several cases were seen where there were small pockets of pus, shut off by adhesions.

In most cases, the amount of fluid exuded was not great, but in one case there was a large and very rapidly formed exudate, which caused collapse of the lung.

Haemoptysis :- Only one case of what may be classified as Haemoptysis came under the notice of the writer. The patient had had an attack of pneumonic variety, and about the fourth day of his illness he commenced to cough up large quantities of fresh blood which continued for some days, gradually getting less and less. It was thought that perhaps some old tubercular lesion had been involved, but examination of the chest excluded this. His chest was perfectly clear when he left hospital. The bleeding probably

came from a small arteriole being opened by the acute infective process or from an infarct, which was observed in cases examined at post-mortem in cases of pneumonic-influenza.

Trachea, bronchi & bronchioles.

It has been mentioned that a varying amount of blood was seen in the sputa. This would be accounted for by the general congestion of trachea, which was a prominent feature of the illness, larger bronchi and bronchioles and of lung lesion.

In all cases which were examined at post mortems, there were symptoms of a generalised and intense congestion of this tract. The infection appeared to pass downwards to the lungs.

(2) Circulatory System:-

Pericarditis :- In one case pericarditis was detected and at post mortem turbid fluid was found in pericardium.

Endocarditis :- No case was observed or came within the knowledge of the writer.

Bradycardia:- This was noticed in some cases during convalescence, - the pulse rate dropping in one case to forty-two beats per minute - in other cases between fifty and sixty per minute was fairly common.

Dilatation of the Heart:- The most striking feature about the circulatory system was the fact that in only an odd case was any dilatation observed. In cases which presented the peculiar coloration, which made one think of cyanosis and dilatation of the right side of the heart, no dilatation could be made out. This was also shown at post mortems. This explains the absence of orthopnoea, for the chief cause of orthopnoea is dilatation of the right side of the heart.

(3) Alimentary System:-

Vomiting was observed in a few cases, but was not usual. A certain amount of abdominal discomfort was complained off in several cases, and in some definite attacks of colic were observed. In one or two cases symptoms closely resembling appendicitis were met with, the pain being in the appendicular area, but no ~~origin~~^{signs} of appendicitis could be made out on close examination of this area.

Colitis :- In two cases there was passage of mucus and blood in the stools in patients who had not previously had colitis or dysentery. No pathological organism was isolated.

Haematemesis:- In no case did the writer meet with a case of genuine haematemesis. One or two

cases vomited blood, but this was from blood which had been swallowed from an epistaxis, which, as will be mentioned later, was not uncommon.

Melaena :- The same may be said about Melaena as for ^{haematemesis} ~~haemoptysis~~ - blood was found on testing - colitis blood has been already mentioned.

The writer had no female cases under his charge, so can make no observations as regards increase of bleeding at menstrual periods, but there appeared in this disease to be a tendency to bleeding.

(4) Nervous System:- In many cases affections of the nervous system were observed.

Neuralgias:- were common, chiefly of head and face, but in a few cases, including one medical officer, severe neuralgia of the spermatic chord was complained of. The pain shot down the chord and the testicle. There was no evidence of any orchitis in any cases. Herpetic pains were also complained of, and in the case of the medical officer who complained of the neuralgia of the chord severe pain was complained of. He had a profuse typical herpetic eruption on several places, the upper lip, lobe of right ear, back of his neck, and on left side of chest. He had a great deal of shooting pains which persisted for a considerable period after the disappearance of

the rash.

One of the most striking features of the disease was the effect it had on the patients as regards their sleep and delirium. In purely Influenzal cases there were many who, although they felt tired, could not get to sleep, or if they did, suffered from dreadful nightmares. Delirium was not observed in simple Influenzal cases, but was ^{of} common occurrence in pneumonia cases. The type of delirium varied. Some exhibited quiet muttering delirium, but caused no trouble, whilst some became excited, noisy, and in a few cases maniacal. Special guards were used whose sole duty was to replace bed-clothes which had been thrown off or to put patients back to bed. Some went quietly, others fought and bit their guards. Some patients appeared to be very cunning, waiting till the guard's back was turned and leaping out of bed.

Subsultus Tendinum was observed in bad cases some of whom recovered, also twitching of a hand, forearm or of one side of the body. There appeared to be a great toxæmia which irritated the nervous system, part of the general severe toxæmia which presented itself in this disease. To this also were probably due the symptoms presented by one case, which gave a picture of meningitis, with severe occipital headache

and stiff retracted neck. It was not a meningitis, there being no Kernig's sign and examination by lumbar puncture proved negative. It passed off after a few days.

As far as could be made out, the delirium and nervous phenomena did not appear to be any more marked in these patients who had a history of alcoholism than in those who had been teetotal.

It must not be thought that all severe cases presented delirium, for this was not so. It was remarkable how many patients with rapid respiration, failing heart and violet coloration remained clear-headed to the last and realised that they were dying.

(5) Ear, Nose & Throat :-

OtitisMedia :- A certain degree of deafness has been fairly common, both Influenzal and pneumonic cases ; the degree varied. In 5 cases pain in the ear and otorrhoea were observed ; in 2 of these cases it was a recurrence of former otorrhoea. This again supports the view that the infection spreads from the nasopharynx. One patient remained deaf for nearly two months, gradually getting his hearing back. There was no discharge in this case. Some cases of simple deafness cleared up quickly on being "politized".

In one case, who previous to attack of Influenza had had no ear trouble, about 5 weeks after his attack had to undergo operative treatment on account of sup-
puration appearing in middle ear.

Epistaxis: This might be classified amongst the symptoms. It was fairly common occurring early in the illness. It appeared to be due to a small arteriole having been eroded by infective process.

It has been pointed out by other writers that pus was frequently found in ^{Sphenoidal} ~~Sphenoidal~~ and ethmoidal air sinuses. The writer did not observe this or get any report on this matter

Tonsillitis and Pharyngitis:- It was a common complaint early in the disease to have a patient complain about a sore throat. On examination the condition varied from slight engorgement to a very septic throat. What looked like membranes were observed, but on bacteriological examination no diphtheretic organisms were seen, but in several cases the Bacillus fusiformis and spirilla of "Vincent's" angina" were found. There was of course accompanying adenitis.

Laryngitis:- Varying degrees were met with, but all cleared up with the exception of one case, in which a fair degree of hoarseness persisted after nearly two months.

(6) Tegumentary System :-

As already mentioned Herpes was the most frequent eruption - chiefly on lips, nose and ears - a case with more and different sites has already been mentioned.

Many complained of intense itching either of part or of the whole of the body. This occurred during convalescence. The patients compared it with the well-known ^{hot weather} complaint "Prickly Heat", but the period of the year for this had passed.

No Skin Rashes were observed except a few cases of urticaria, probably due to the exhibition of Sodium Salicylate and Aspirin.

During the acute stages of the disease, especially in pneumonic cases, the skin was noticed to be frequently dry and burning, whilst in others to be bathed in perspiration, frequently with resulting sudamina. The skin in these cases presented slight "flaking".

(7) Urinary System:-

Nephritis:- The writer had not time enough to do a systematic examination of all the urines - a few were examined, but this was dropped when stress of work became greater. No definite case of nephritis was seen by the writer. One or two cases presented slight albuminuria, but this only lasted a

day or two. The urines examined appeared to be ordinary febrile urine, with in some cases, especially pneumonic, diminution of chlorides, but the number of specimens examined were so few, that the writer can make no definite observation as regards the urine, but can state that no case presented any signs of nephritis.

The same may be stated regarding haematuria, but no case passed urine which, naked eye, shewed any signs of containing blood and no trace was found in those examined in which there was a slight albuminuria.

(8) Eyes :- On the whole the eyes were exempt from complications. In two cases there was a definite conjunctivitis with formation of pus. Under treatment these cleared up and no permanent defects remained.

(9) Lymphatic System:-

In many cases cervical adenitis was observed in these cases which exhibited throat symptoms. In no case was suppuration observed.

In one case there was a suppurative parotitis. This patient had an attack of pneumonic type, but his temperature had dropped to normal and appeared to be doing well, when his temperature commenced to rise again, and he complained of pain on the left side of his face, chiefly in front of the ear and angle of the

jaw. The swelling gradually got larger, and he complained of difficulty in opening the mouth. At first no fluctuation could be elicited, just a hard red indurated swelling over parotid area. On fourth day, fluctuation appeared, and an incision was made, and pus evacuated. Pus was freely evacuated through drainage, but patient, who at commencement appeared normal, shewed signs of intense toxic absorption, becoming drowsy and delirious. He gradually became worse and died. At post-mortem, it was seen that his lung condition had cleared up, and that at the time of his death the only active condition was the suppurative parotitis. A chart of this case is at end of book.

As already mentioned, no case of orchitis was met with, although pain in chord and testicles was complained of. This must have been due to neuralgia.

(10) Besides the complications mentioned, diseases from which a patient had suffered were apt to recur, - malaria, dysentery and colitis were the commonest recurrences. Tuberculosis of the lung might follow, but up to the time of the writer being invalided out of India, no case had occurred.

From this long list of complications, it will be seen that they were frequent and varied. It can

be deducted that an acute infective process was at work which produced a marked degree of toxaemia.

Diagnosis:-

After the illness had been present for a short time, no difficulty was found in classifying the disease from which patients were suffering, but at first it was difficult, especially in India, owing to the number of fevers, both classified and unclassified, that one meets in the tropics. Many of these fevers have commencing symptoms like Influenza had, and, in spite of being on the lookout for Influenza, it was impossible to be certain of our diagnosis with the first few cases which appeared.

Malaria, sand fly fever, ^{relapsing fever} pneumonic plague, dengue, three day fever and seven day fever were the diseases which involved the differential diagnosis, and, as these frequently occur in atypical forms, it can be judged how hard diagnosis became. It can only be done after certain examinations have been made such as blood films, sputum examination and such like.

As mentioned earlier, the first few cases were diagnosed malaria, but three negative blood examinations put the diagnosis out of count, likewise relapsing fever. About 3 months before there was a slight out-

break of relapsing fever in the unit in which Influenza was first observed. This blood examination of course took three days, meanwhile other cases had appeared with pneumonic symptoms, and cases of sudden death occurred, which recalled the epidemic of pneumonic plague which was raging when the writer first came to the station. Some cases appeared to resemble this disease. After the epidemic referred to, it was the practice in the Brigade area of which the writer was appointed Specialist in the Prevention of Disease and in charge of Brigade Area Laboratory, that samples of sputa of all pneumonia or pneumonia-like cases should be sent to the Laboratory for examination. Thus samples of sputa of these pneumonia like cases were sent to the Laboratory and both then and later after thorough microscopical and cultural examination had been made B. Pestis was never found. This ruled the diagnosis of pneumonic plague out of count.

By the time these blood examinations and sputum examinations had been done, many days had elapsed, and it was fairly obvious what the disease was with which one was dealing, - that at last the much dreaded pandemic was in our midst.

Until the disease was well established, it was impossible to say whether the first cases were cases

of Influenza or of one of the fevers which are so common in India, and, as far as the writer can see, the same difficulty would again be met with, if after a time a second epidemic arrived unless some rapid and certain test could be applied at the commencement. As far as the writer's observations and researches went, no Laboratory method was found that could be depended on or which gave any definite proof that the disease was Influenza and not another. It was only after some other diseases had been excluded, which meant delay of a few days, that one was justified in saying - "This must be a case of Influenza".

The work done in Laboratory during the pandemic will be dealt with under a separate section.

MORBID ANATOMY.

As mentioned earlier, the writer had not sufficient time as he would have liked for making post-mortems, most of his time being taken up with the care of the large number of patients in Hospital. The findings of the post-mortems conducted may be mentioned.

In this disease, the lungs, drew one's attention first - a varying degree of congestion and inflammation, often very intense, was observed in the trachea and bronchi. The bronchial glands shewed congestion and

enlargement. As regards the lungs themselves. In the few cases done, although they appeared to have signs of lobar pneumonia, neither red nor grey hepatization were met with, but the lungs presented more a bronch-pneumonic condition. The lungs shewed all degrees of congestion, but not always consolidation. What consolidation there was, was small and scattered. In all cases there was a certain amount of pus obtainable on section of diseased part of lung.

Acute pleurisy was found, but very little fluid was found except in case already referred to where a large rapidly formed empyema was formed. It was in this case that the medical officer cut his finger with results already recorded.

No enlargement of thyroid gland was observed.

Heart. Post-mortem examination bore out what was observed clinically - that there was no dilatation. In one case a little non-sterile fluid was found in pericardium.

Nothing to mention was observed in the examination of the spleen, liver, kidneys or intestinal tract, except what one might expect in cases in which there was much toxæmia.

The Sphenoidal and other accessory nasal sinuses were not examined, but other writers comment on

the frequency with which pus is met with in these situations.

TREATMENT.

The disease as regards symptoms has been divided into two groups. So also will the treatment be, - firstly for straightforward cases of Influenza, and secondly for the pneumonic septicaemic type.

Influenzal Cases:-

Many drugs have been vaunted as specific for the early treatment of Influenza, but it was the writer's experience that, in spite of early treatment and all precautions being taken against any factor which might cause the change of the mild type to the virulent, neither was the simple type cut short, nor was the simple type prevented from turning into the virulent type, and one was led to come to the conclusion that the virulent type could not be avoided.

For the ordinary mild type, the usual routine was observed of administering Calomel grs. III. and salts the following morning. Diaphoretic mixtures, aspirin and sodium salicylate were administered. These caused diaphoresis, and got rid of some of the toxin and relieved the headache and general pains, but they cannot be ascribed any power of either

cutting short the disease or in preventing the appearance of symptoms of the virulent type of the disease.

Many stated that quinine was valuable both for prophylaxis and also for treatment. The writer can state that it had no such power as regards the area in which he worked, for the great majority of the patients who came under his care were taking quinine prophylactically or continuing a course of quinine for an attack of malaria in the past. Practically all the men had been infected some time or other with malaria. Not only had these men taken quinine prior to an attack of Influenza, but in many cases continued taking it during the illness, and, in the writer's opinion, no effect as regards shortening the disease or making it take a milder form can be ascribed to the administration of quinine. It only prevented a relapse of malaria complicating the Influenza.

Cinnamon was also administered, but no great benefit was observed.

After some experience with the disease, Routine nasal douching and gargling was instituted. This appeared to lessen the number of complications dealt with. This will be again referred to under Prophylaxis.

During the attack ordinary fever diet was given and increased as the patient recovered. A general tonic was frequently required during convalescence, which was sometimes slow.

A word of warning must be issued as regards treating the mild cases too lightly. Many cases have been seen to relapse, with perhaps fatal results, or prolonged convalescence owing to lack of proper care during and after a mild attack. However mild a case may be, the patient should be immediately forbidden any work and put to bed, only to be allowed up after the temperature has been down to normal for at least four days, and after that only gradually allowed to return to his usual work.

Pneumonic Cases:-

If a case was first seen as a severe case the usual routine of a brisk purge was followed, and also throughout the illness it was seen that the bowels were kept well opened.

As regards stimulants, the writer's usual routine in ordinary lobar pneumonia cases is to give some cardiac stimulant from the first. This was done in these cases. Tincture of digitalis was given at first four hourly and changed as the pulse demanded. Brandy was reserved for the more serious cases. This

was also administered as the case appeared to require. In some cases injections of Digitalis and Strophanthin were given. In cases where blood pressure was poor, resorcin was had to injection of adrenalin or pituitrin. The results of all these stimulents were disappointing, and the patients did not appear to respond to their administration as one would have expected.

Inhalation of Oxygen was also disappointing in its results. Practically no relief or good effect was observed from either continuous or periodical administration. The writer put this down to some change in the oxygen carrying capacity, to which might possibly be due the peculiar coloration already referred to, but it has been stated by other writers that there is no change in the oxygen carrying capacity of the blood.

Venesection :- This was not resorted to by the writer. It did not appear to be justified as there was no dilatation and engorgement of the right side of the heart.

Saline Infusion:- As there appeared to be a great degree of toxaemia in many cases, it was thought that some improvement might be expected from infusion either subcutaneous, intravenous or per rectum. Little or no improvement could be claimed for this line of treatment. Some thinking there was an acidosis added

Sodium bicarbonate to the infusion, but, here again, no advantage appeared to be gained.

On the whole the results from the above mentioned lines of treatment were unsatisfactory and disappointing, and one cannot claim any advantage from any special line. The disease appeared to have to run its course, and, for any one line of treatment described, it cannot be claimed that it definitely saved a serious case.

No mention has been made of vaccine treatment. At the time there was no vaccine available, and the writer had neither time nor staff to go in for vaccine preparation on a large scale. The subject of a vaccine will be dealt with in section on Bacteriology.

Besides the general treatment, a short account of treatment of various complications will be given.

Respiratory System:- For helping expectoration in cases with bronchitis, a simple stimulating expectorant proved useful. Emetics were never resorted to for emptying the chest. Steam impregnated with a drug such as Eucalyptus or Tinct Benzoin Co did not appear to give much relief except a little in cases of laryngitis, but not so much as would be expected.

In cases of pleurisy, counter irritation was applied and strapping to chest gave relief. If fluid

was present in any quantity, after a primary puncture with needle and syringe, the fluid was aspirated, or if necessary operation performed in case of empyema.

One was, after a few cases, inclined to aspirate earlier in this disease than usual. Very rapid clearing up was the rule. In the only case of haemoptysis seen by the writer, the usual routine treatment was adopted.

(Nervous System:- Under this system, one had to combat sleeplessness and delirium. In the milder cases of sleeplessness, aspirin grs.X or Pulv. Ipecac. Co. proved very useful. In delirium and restlessness, bromides, bromide and chloral, paraldehyde, Tinct.Opii. and morphia injections were given, but only for the last could any good results be claimed. Rest was secured and no bad results observed. The other drugs used were more or less useless even in large and repeated doses. Hyocine was never given at all. Aspirin and Sodium Salicylate gave relief in neuralgias, but no relief for herpetic pains.

(Ear, Nose and Throat:- Any case coming under this heading was at once put on antiseptic gargling and nasal douching. Cases of otitis media had antiseptic syringing. In only one case did suppuration of mastoid antrum appear. This appeared well on in convalescence. Operative interference was necessary,

with good results.

Epistaxis, if prolonged, usually stopped with application of iced water. In one case plugging with adrenalin had to be done.

Tonsillitis usually cleared up under gargling. Strong "Mandles paint" proved of great use in several throat cases. As mentioned before, a little relief, but not ^{as} much as expected was given to cases of laryngitis with inhalation of steam impregnated with some drug.

The treatment of case of secondary parotitis has already been recorded.

Patients who, prior to attack of Influenza, had had an attack of malaria and were on the "Malaria Register", were given quinine to prevent relapses occurring. If dysentery appeared as a relapse, the usual emetine treatment was given. Practically all cases in this area were amoebic in character.

Owing to overcrowding of the Hospital, many patients were treated on the "covered in" verandahs of the Hospital. All did well and seemed to have a quicker convalescence when treated this way. Great care had to be taken as regards the patients getting chills.

Cleansing of mouth and nose which became part of routine treatment is very important and was followed

in all cases however slight.

Since the writer made his observations and collected material for this paper, a great deal of work has been done as regards injections both for prophylaxis and treatment. While the disease was raging in India, some stock vaccines were used and some new ones prepared, but at that time no good results had been obtained. The Army Medical Department issued a circular stating that the vaccine could not be depended on and recommended that it should not be used. Since then no doubt great strides have been made, and now injections are being advised and given, both for prophylaxis and treatment. These are mostly mixed vaccines containing the pneumococcus, B. Influenzae and streptococci in varying proportions.

Prognosis :-

In practically all cases of pure uncomplicated Influenza, the prognosis is good.

As regards the more serious cases, the writer found it extremely difficult to make definite observations or come to any conclusions as regards prognostic signs. Very few cases could be depended on. Nothing could be determined regarding temperature, pulse, blood pressure or respiration, except that those

cases in which the temperature suddenly dropped and who were bathed in a clammy cold perspiration did not do well, many ending fatally. It was not a crisis as one sees in lobar pneumonia. A very grave prognostic sign was the appearance of the peculiar lavender violet coloration already mentioned. Few, if any, recovered who exhibited it.

The more toxæmia there appeared to be, the more grave was the prognosis, but it was, on the whole, almost impossible to make an accurate prognosis, for some cases who appeared moribund recovered, and, on the other hand, many cases who were causing no anxiety, suddenly became seriously ill and died.

The uncertainty in the course of the disease and the many complications which were liable to appear, forced one to give a guarded prognosis in all, even the simplest cases.

Laboratory Work.

Before going on to the subject of Bacteriology a little will be mentioned about work done in connection with the blood and urine.

Not as much work as the writer would have liked was done in the Laboratory. At ordinary times the writer's work was all the Laboratory work and work which came under the heading of "Prevention of Di-

Disease" in the Brigade Area. No ordinary hospital work - As the Influenza increased one Medical Officer after another went down with an attack until the writer was left alone to do all work in the Hospital as well. The result was that the Laboratory work had to be left and the writer's whole time was taken up with the patients in Hospital. The native who worked as Laboratory attendant, who made all media etc., was laid off for several weeks with an attack of pneumonic type. When the epidemic began to die down and more time was available for Laboratory work, the writer himself went down with a relapse of Malaria and Dysentery.

However, some work was done, and this will be mentioned. As regards the blood, not a great deal was done. No differential blood counts were done, and the writer can only state that from experience of examination of many blood slides before the epidemic started, there appeared to be a moderate degree of leucopenia in the majority of cases. Only one blood culture gave any growth, and this gave an organism, which is discussed later, a diplo-streptococcus.

Urine examination was also rather scanty, and after a short time was not done unless a case exhibited symptoms which warranted an examination of the urine.

Of the urines done, at times a slight temporary albumenuria was observed. No casts of any variety were seen. There was a diminution of chlorides in pneumonic cases generally. Of the few specimens taken, no growth on cultures was obtained.

As regards the General Bacteriology of the epidemic, the most striking feature was the almost universal presence in all material examined of what appeared to be a "diplo-streptococcus". As mentioned before, the writer examined all the sputa slides amongst others both before, during and after the epidemic. This diplo-streptococcus was observed in a few films at the start, very markedly throughout the epidemic, and was becoming less common when the writer fell ill. It was practically absent when he took up his duties again. This was, of course, not the only organism present, but its presence and preponderance attracted the writer's notice. This organism was also found in swabs taken from the nose and throat of patients and healthy people. The writer's own throat and nose were markedly positive. The remarks made about the appearance and disappearance of the organism applies here too.

The other organisms most frequently found along with the diplo-streptococcus were pneumonococci,

streptococci, B. Influenzal and micrococcus tetragenus.

The diplo-streptococcus was found in all types of the disease. Besides being found in nose, throat and sputum, it was also isolated from pus of middle ear discharge, from lungs at post-mortem and ~~empy-~~^{empy-}emas. It was found in the pus from the finger of the M.O. who cut his finger when working on an empyema, as before mentioned. It was found in pus from secondary parotitis and in one instance was obtained on blood culture. It was usually associated with some of the other organisms already mentioned.

As regards staining and cultural characters of the diplo-streptococcus.

Staining:- It stained well with Methylene blue. It is Gram positive, but on occasions all did not retain the stain some appearing as Gram negative. Staining with Muir's method, no capsule was exhibited. On occasions, from cultures, a chain formation was exhibited.

Culture:- It grew well on most media, but best on blood agar forming small discrete colonies. There was production of acid in glucose and clotting of milk. No change was observed in lactose, saccharose, mannite or ~~dulcitate~~^{dulcitate}. There was no production of gas in any media.

Guinea pigs were inoculated from culture ; there was, however, neither local suppuration nor constitutional change.

Another point of interest in this disease was the frequency with which, in bad throats, the Spirilla of Vincent's angina and B. Fusiformis was obtained from Swabs from such throats. In these cases there was what appeared to be a very inflamed throat with a membrane. This was not a true membrane. It usually sloughed off leaving a shallow ulcerated surface behind. No B. Diphtheriae was found.

PROPHYLAXIS :-

The disease in question is obviously of an intensely infective character. The organism responsible, as far as can be made out, is lodged in the naso-pharynx and sputum, and finds lodgement in the nose and throat of uninfected people. Thus infection is spread by sneezing and coughing.

As regards prevention. The limitation of the spread of an epidemic of the nature of the disease discussed, depends a great deal on the individual and thus the education of the public should go far to preventing such an epidemic occurring again. They should be told that the best way of avoiding the

disease is in keeping fit and have the advantages of fresh air, good food and proper clothing explained to them. It does not always avoid an attack, but gives them better chances of recovery if attacked.

The earliest symptoms should be enumerated, so that if they themselves are attacked or see others, they can isolate themselves and advise others to do so too. They should be advised not to try and carry on if attacked, but to go home, if possible, occupy a separate bed and call in a doctor. The dangers of neglecting the early symptoms or of going back to work too soon after an attack should be pointed out to them.

They should be told to hold a handkerchief in front of mouth or nose when coughing and sneezing, and after use to burn or boil it. In a patient, paper may be used for sputum and burnt.

They should be warned against the dangers of going into overcrowded halls, tramcars, railway carriages and such like.

Regarding those who are in contact with a patient suffering from Influenza, special precautions should be taken. The wearing of face masks may lessen the possibility of becoming infected. It should always be worn in the room occupied by the patient. A good mask can be made of four or six layers of fine

muslin. It should be made so as to cover the mouth and nose completely.

The advantages to be derived from gargling of the throat and nasal douching should also be explained. Many gargles have been advised, amongst these being potassium permanganate, hydrarg, perchloride, zinc sulphate and Tincture of Iodine ($\frac{3i}{\text{pint}}$ to the pint.) Common salt solution (20 oz. to a pint) has also been advocated. Not only should gargling be done, but also nasal douching. If a nasal douche is not available, it can be sniffed up from the palm of the hand. In some places "spray rooms" have been much used. In these jets of steam are projected into the room through a special nozzle. The nozzle plays over another nozzle which is attached to a bottle containing zinc sulphate solution (1 %). The room is thus filled with steam impregnated with zinc sulphate. People should remain in this atmosphere for 10-15 minutes. The beneficial results of gargling and nasal douching was observed by the writer in the area in which he worked, not only for prophylaxis but also possibly lessening the occurrence of complications.

In many places organised relief was arranged, and people should be told where they can get help from. They should also be told where they can get innocu-

innoculation for the disease, if this is looked upon as a reliable prophylaxis. At present no reliable vaccine is to hand, but no doubt one will be available in the near future.

The above general education could be carried out at schools, factories, and such like, and a great deal of valuable help could be obtained from the Press and public notices.

As regards the closing of schools, theatres and such like, - there are two main theories - one that it is in such places, where many are collected, that infection is spread, and so that all such places should be closed. The other theory is that they should not all be closed, but it should be judiciously done. If all places of amusement are closed, a certain amount of depression is caused, which may be a predisposing factor in the occurrence of the disease, also if weather were bad, those who frequent such places would wander about the street perhaps getting soaked and chilled. Again, as regards schools ; if all were closed, many children would be sent from a clean well ventilated school to a dirty, ill-ventilated and perhaps infected home. It is a matter for each locality to settle, but it should be remembered that the morale of the public must be kept up, at the same

time limiting the number of unnecessary gatherings.

Notification of all cases of Influenza does not seem called for. It would cause a great deal of extra work and expense, bringing no great benefit, for, like measles, most of the damage is done before the patient is seen. All cases of the pneumonia type should be notified. In a country like India, notification would of course only affect the Civil and Military population of the stations. Notification of all cases might be of great benefit if applied to all ports, when all patients could be removed to hospital and contacts watched. This might prevent the disease breaking out in an unaffected area.

As regards isolation and quarantine, all cases of Influenza should be isolated as far as circumstances permit. Home treatment has to be carried out. Cases of Influenzal Pneumonia should be strictly isolated and if possible removed to a hospital. Quarantine should be observed in schools, jails, asylums, and such like. This resulted in the non-appearance or delay in appearance of the disease in several institutions during the recent epidemic.

Disinfection should be carried out as for other infectious diseases, especially in cases of pneumonia type.

As mentioned before, some relief organisation should be formed. When an epidemic comes, this organisation can be called on for doctors, nurses, drugs and medical comforts. A great deal can be done by such an organisation. Besides the above, the public health organisation would no doubt place their staff which is used as regards vaccination and such like, to deal with the epidemic.

SUMMARY.

1. The epidemic belongs to the group of infective-catarrrhal diseases. It is intensely infective.
2. Incubation appears to be of short duration - usually 48_72 hours.
3. The casual organism has not yet been proved.

Many epidemics resembling Influenza clinically have occurred in which B. Influenza has not been demonstrated. In the epidemic of 1918, the B. Influenza was not always demonstrable, in fact, was very frequently not found. However, it must be remember that, in this connection, it is very easily overgrown by other organisms in culture. It appears to the writer that the diplo-streptococcus described

before played a very important role in the disease. It appeared in enormous numbers at the commencement of the epidemic, was found and isolated from almost all material examined in the Laboratory, including once by culture from the blood, and disappeared as the disease disappeared. It appears that this organism is either responsible for the peculiar course the disease took and its many complications or that the virulence of B. Influenza was exalted by it.

4. The infection appears to take place in upper Respiratory passages involving accessory nasal sinuses. From these and other septic foci the septicaemia or toxæmia develops.
5. The disease spreads to the lungs down the air passages, as the marked tracheitis demonstrates.
6. There is in many cases a marked degree of toxæmia or septicaemia exhibited, which cases cause a high mortality rate. The relative frequency cannot be accurately stated, but it appeared to be about 80% at the commencement and falling to 40 or 50% at end of epidemic.
7. The usual symptoms of septicaemic cases were lung symptoms varying from a slight bronchitis to an extensive pneumonia, polypnoea but no ^{orthopnoea} ~~etyhpnocæ~~.

and a peculiar lavender heliotrope lividity. Generally there were various symptoms referable to a disturbance of the nervous system.

8. Complications were varied, and frequent in the more severe cases.
9. Examination of the blood shewed a leucopenia. Other writers have demonstrated that there is no change in the oxygen carrying capacity of the blood.
10. Diagnosis must be looked upon as uncertain in first few cases, and is only arrived at by a process of exclusion of other diseases which it simulates.
11. Prognosis has always to be guarded owing to the uncertain course of what appears to be a simple case may take.
12. Treatment both prophylactic and curative is unsatisfactory. No drug or method of treatment can be looked on as reliable either for preventing infection taking place, for treating a case of the disease, or for preventing severe complications supervening on a simple case. If ~~is~~ a suitable vaccine is prepared, no doubt the outlook in this respect would be better. Gargling and nasal douching appeared to lessen the

development of complications.

Mortality:-

The writer can only give correct figures for those cases treated in Hospital in Gullundur. There were 214 cases admitted and out of these 21 died. This was a lower mortality rate than in other stations or amongst the natives or native Battalions amongst whom the writer also worked. Such a low Mortality Rate as shewn in above figures does not perhaps illustrate how many severe cases there were, but it may be realised better if it is stated that on one day, out of a large number of cases on the "Seriously Ill list", no fewer than 61 were on the "Dangerously Ill list."

APPENDIX.

In the following pages will be found a few charts illustrating certain features of the disease and its complications:-

NAME.		RESIDENCE.		AGE.	SEX.	OCCUPATION.																															
PTE D.		HOSHIARPUR		25																																	
DISEASE. INFLUENZAL PNEUMONIA.																																					
1918		DATES OF OBSERVATIONS.																																			
		27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16															
Cent.	Fahr.	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM														
106	106																																				
105	105																																				
104	104																																				
103	103																																				
102	102																																				
101	101																																				
100	100																																				
99	99																																				
NORMAL	98																																				
97	97																																				
96	96																																				
Pulse per minute.		80	90	90	80	72	84	88	100	90	72	76	76	68	64	60	66	72	64	64	76	78	78	76	94	92	76	80	88	110	90	90	104	112	90	84	
Respirations per minute.		28	22	26	28	28	40	32	28	26	32	32	28	24	24	28	20	24	20	20	24	24	28	20	24	24	32	36	32	40	32	24	32	32	28		
Urine	Q.S.																																				
	Spec.																																				
	Conc.																																				
REMARKS.		Admitted on 3 rd day of illness																																			

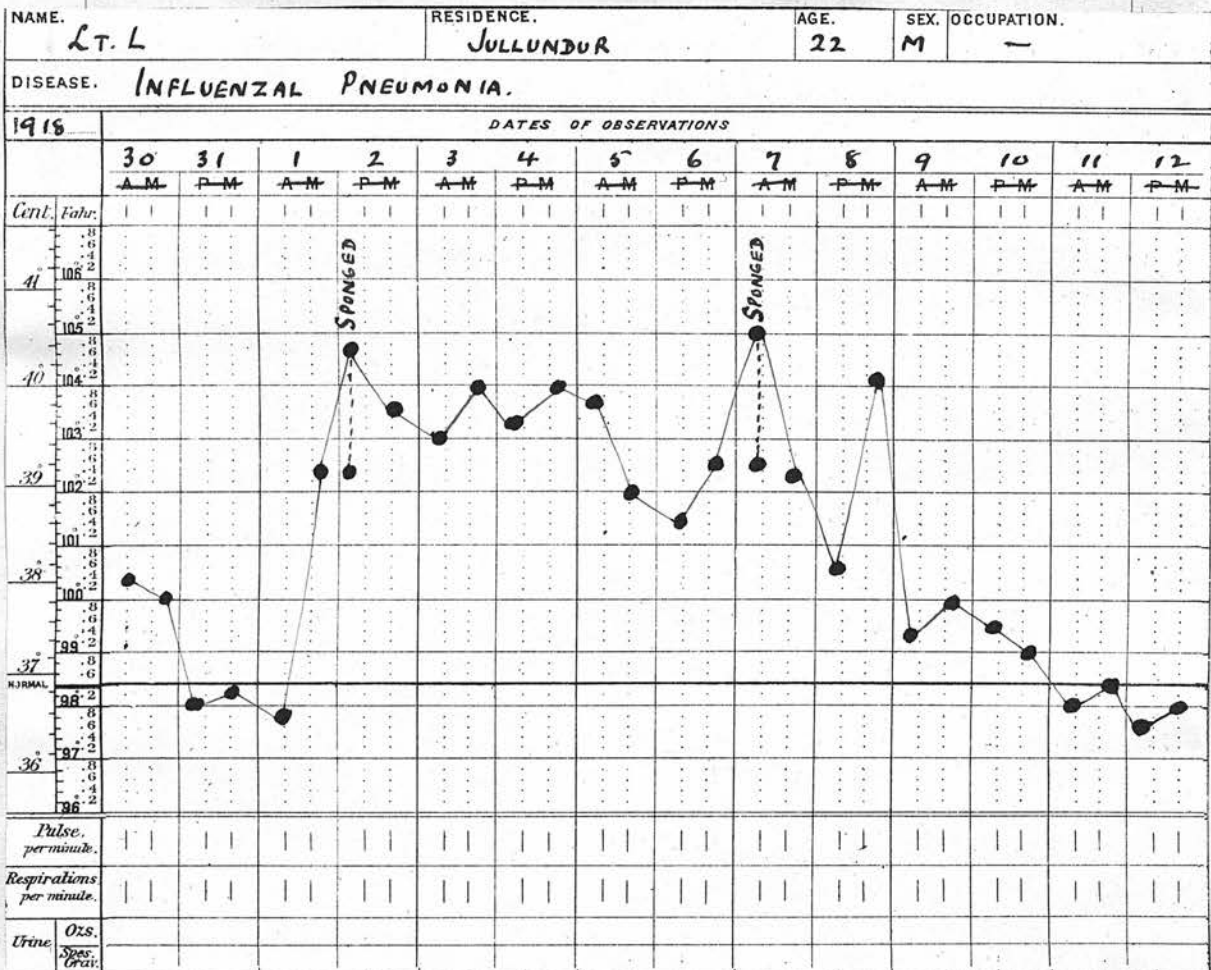
Illustrates a case of Influenzal pneumonia with involvement of left lung, - after crisis, the lung did not clear up completely. On 9th day after "crisis", pneumonia developed in right lung. Recovery.

NAME.	CPL T.		RESIDENCE.	HOSHIAPUR		AGE.	36	SEX.	M	OCCUPATION.	-											
DISEASE.	INFLUENZAL PNEUMONIA AND COLITIS.																					
1919.	DATES OF OBSERVATIONS.																					
	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	
Cent. Fahr.	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
106																						
105																						
104																						
103																						
102																						
101																						
100																						
99																						
98																						
97																						
96																						
Pulse per minute.																						
Respirations per minute.																						
Urine																						
Spec. Grav.																						
REMARKS.	Admitted on 2 nd day of illness.																					

This chart illustrates the same as last case. A second focus of pneumonia supervening on the first. It also shews a relapse of colitis. Recovery.

NAME.		RESIDENCE.		AGE.	SEX.	OCCUPATION.									
PTE C.		HOSHIARPUR		25	M	-									
DISEASE. INFLUENZAL PNEUMONIA.															
DATES OF OBSERVATIONS															
		24	25	26	27	28	29	30							
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Cent.	Fahr.														
41	105														
40	104														
39	102														
38	100														
37	98														
NORMAL	96														
36	97														
36	96														
Pulse.	per minute.	96	88	96	96	100	100	104	100	?					
Respirations	per minute.	28	28	32	24	28	30	32	36	60	?				
Urine	Qts.														
	Spec.														
	Exam.														
REMARKS.		Admitted on 4 th day of illness													

A case of pneumonia of left lung, with spread to right lung. Death. In the other cases illustrated there had been a "crisis" of first pneumonia before second pneumonia developed. Not so in this case.



Pneumonia developing in convalescence after an attack of Influenza. There was much involvement of Right lung, with later a slight involvement of left lung. Recovery.

NAME.		RESIDENCE.		AGE.	SEX.	OCCUPATION.																																					
PTE M.		HOSHIARPUR		20		-																																					
DISEASE. INFLUENZAL PNEUMONIA + EMPYEMA																																											
19 19		DATES OF OBSERVATIONS.																																									
		22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11																					
Cent.	Fahr.	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM																				
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
106	106	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
105	105	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
104	104	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
103	103	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
102	102	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
101	101	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
100	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
99	99	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NORMAL	NORMAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
98	98	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
97	97	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.8	.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
96	96	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pulse	per minute.	92	96	92	100	96	104	100	120	108	112	100	100	96	100	92	96	96	108	104	92	96	92	76	92	80	86	72	80	100	108	100	104	88	80	88	92	84	88	72	80	76	80
Respirations	per minute.	36	40	44	48	36	44	40	40	36	44	40	36	28	36	32	36	32	32	28	28	20	24	20	20	24	32	36	32	32	24	24	24	20	24	20	24	20	20	20	20	24	
Urine	Ozs. Spec. Grav.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

A case of Influenzal-Pneumonia followed by an empyema of left side. A large quantity of thin watery pus was aspirated, but condition did not clear up, so Rib was resected and drainage given with excellent results.

NAME.		RESIDENCE.		AGE.	SEX.	OCCUPATION.										
BOMB. G.		HOSHIARPUR		25	M	—										
DISEASE. INFLUENZAL PNEUMONIA - PAROTITIS																
DATES OF OBSERVATIONS																
		12	13	14	15	16	17	18	19	20	21	22	23	24	25	
		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.															
41	105															
40	104															
39	102															
38	100															
37	98															
NORMAL	96															
36	94															
Pulse.	per minute.	100	108/100	104/104	100/100	108/96	100/100	100/92	88/96	92/76	92/84	76/88	112/128	120/120		
Respirations	per minute.						24 28	24 24	24 20	24 20	24 24	32 36	36 30	36 32		
Urine	Qts.															
	Spec. Grav.															
REMARKS.																
Admitted on 2 nd day of illness																

A case of Influenzal-Pneumonia followed by a secondary parotitis. On 18th a parotitis was observed, but no fluctuation got till 20th, when operation was performed and pus evacuated. In spite of free drainage, patient died. At post-mortem no other septic focus found. Lung condition had cleared up.