PNEUMONIA AS IT AFFECTS YOUNG ADULTS

The Predisposing Factors

By

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INTRODUCTION

The period of Young Adult life is usually associated with good health. Descriptions of Pneumonia at this age are sufficiently uncommon to justify its further investigation.

During the two years as Officer in Medical Charge of the wards in the Station Hospital, R.A.F. Recruits Reception Centre, the opportunity arose to observe a considerable number of Young Adult patients with pneumonia. The predisposing factors, the clinical features and the sequelae are studied.

I should like to express my indebtedness to the Director-General Medical Services, Royal Air Force, for permission to publish; to Wing-Commander S.B.S. Smith who extended to me the facilities for the study of the personnel treated and to Professor Alstead, Dr. T. Anderson and Dr. Hebbert for their ready advice.

Dr. Geoffrey Watkinson, one-time Squadron-Leader R.A.F.V.R. and Medical Specialist, first stimulated my desire to investigate. For this and his constant encouragement I shall always be grateful.

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PREFACE

The cases of pneumonia admitted to a Royal Air Force Station Hospital in two years, April 1946 to March 1948, are studied. There was radiological confirmation of the pneumonia in every case.

This hospital was attached to the Recruits Reception Centre for the Royal Air Force. The Reception Centre was part of a R.A.F. Station which also contained two Recruits Training Wings. The recruits were all National Service Entrants and were drawn from all parts of Great Britain. They were therefore representative of the Young Adults in this country.

Except for the small proportion who joined the training wings, these recruits only remained at this reception centre for about five days. After being equipped, the majority were posted to other centres for training.

While at the R.A.F. Station all recruits were eligible for admission to the hospital. The hospital also served the large number of permanent staff and the surrounding service stations. The patients seen in this series were therefore drawn from an ever changing population.

The Station was situated in the Midlands of England, about twenty miles from Manchester. It was a hutted camp on the outskirts of a small industrial town. The huts each housed about forty people and, in the winter months, were heated by coke-stoves. Being the recruiting centre, the diet was slightly more liberal than that in general use in the services./

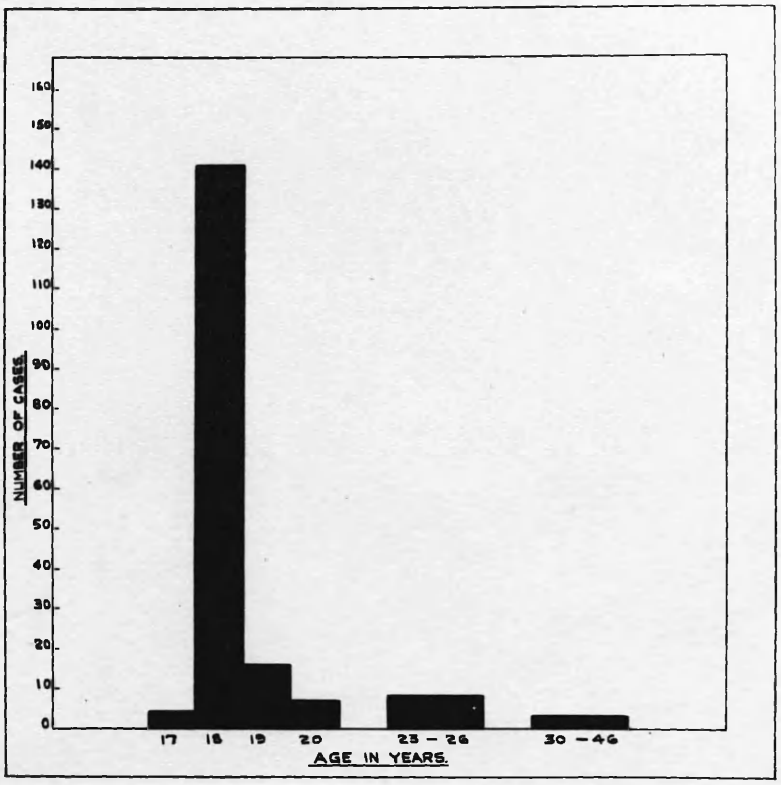
services. The clothing worn, the amount of exercise taken daily and the hours of sleep were uniform for all the recruits.

A Mass-radiography unit was affiliated to the hospital and all the recruits were X rayed shortly after arrival. Any cases requiring investigation or medical care were admitted to the hospital on request by this radiography unit.

The majority of admissions to the hospital came directly from two Medical Inspection Rooms on the Station. Each had a daily sick parade of about 60 to 80 persons.

Recruits on arrival were routinely vaccinated. Inoculation with T.A.B.C. was discontinued, as a routine, a few months after this investigation began.

The age incidence of the one hundred and seventy nine patients admitted as pneumonia falls in a single decade. One hundred and seventy six of the patients were between seventeen and twenty-six years of age. One hundred and forty-one of them were eighteen years old.


NUMBER OF CASES.
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
17
18
19
20
23 - 26
30 - 46
AGE IN YEARS.

Almost all of the patients were seen on admission within half an hour. Past and present histories were systematically inquired into. A general medical examination was performed and clinical records compiled.

All except nine of the 179 cases were investigated and treated personally. As the facilities for pathology investigation were necessarily limited, the contribution is largely clinical.

There was almost complete uniformity in the age of the patient, the physique, the living conditions and the medical care.

Historical Note.

(MAJOR, 1948)

Descriptions of diseases of the lung and pleura have been recorded since the days of Hippocrates. In the fourth century B.C. he described rales and pleural friction which he had detected by "immediate auscultation".

Though Aretaeus may have reasoned inaccurately, his original deductions require little correction to-day. "Provided the lung alone is inflamed there will be freedom from pain; but if the membranes by which it is connected with the chest be inflamed, pain also is present". Something may be obvious enough yet it is only appreciated initially by the inquiring mind. "They wish to get up into an erect posture, as being the easiest of all postures for respiration".

The discoveries of Auenbrugger and Laennec allowed precision/

precision and accuracy in the diagnosis of chest diseases. We are indebted to Auenbrugger for his description of percussion. Laennec did much more than introduce the stethoscope. He listened carefully and was able to correlate what he heard with the state of the lung beneath. His description of physical signs in pneumonia still form the basis of modern writings on this subject.

"Life is short, and the art long; the occasion fleeting; experience fallacious, and judgement difficult". (Hippocrates).

PART I. Classification of the pneumonias.

The classification of pneumonia in use a century ago underwent little modification until recently. Even in an established disease like lobar pneumonia, there has been a change in feature in recent years. The classical syndrome of lobar pneumonia with its crisis about the end of the first week has been transformed and is now rarely seen. The introduction of the sulphonamide and penicillin drugs has caused this artificial though practical change. It will be necessary to describe the features of lobar pneumonia and bronchopneumonia as they occur at present. The term "new pneumonias" will be introduced and defined.

The classification may be anatomical or etiological. Until recent years the pneumonias were divided into two broad groups, the lobar pneumonias and the bronchopneumonias. The freer use of radiography in the milder respiratory diseases has led to the description of a large number of "new pneumonias" and the segregation of the pneumonias into these two clearly defined/

defined groups, is no longer possible.

It would seem more logical to use an etiological basis for classification. The routine bacteriological investigation of a large number of cases is however, seldom practical.

World War II and the advent of mass radiography, have given the opportunity to study large numbers of people with respiratory disease. Many different types of pneumonia are now described. The difficulties of bacteriological investigation of a large number of cases, and often the inability to demonstrate the causal factor at all, undoubtedly explains why so many varied classifications of these pneumonias are in use to-day. Though progress is being made, until the true etiological factors can be easily demonstrated in each case, no final agreement in classification will be reached.

At present as simple a classification as possible must be the aim. In order to analyse the pneumonias as they occur in the Young Adult, the meaning of each type, and the terms applied to them at the present time, must be individually described to avoid confusion.

(a) Clinicians differentiated <u>lobar</u> and other pneumonias on clinical and pathological grounds before the discovery of the pneumococcus by Pasteur in 1880. The discovery that a virulent pneumococcus caused lobar pneumonia upheld this differentiation. Typically it occurs in the adolescent or adult. Health is of a high standard here and the resistance is good. It is only the more virulent invaders which will be able to overcome the body defences. A diffuse pneumococcal pneumonia/

pneumonia, such as a bronchopneumonia, is unlikely. It is therefore locally that the onslaught will be successful and a lobar pneumonia result. In a small percentage of cases other organisms will attain this degree of virulence and cause a lobar pneumonia akin to that caused by the pneumococcus. Here the patient is usually already weakened by some other debilitating disease.

In lobar pneumonia the incubation period is short, twenty-four to forty-eight hours, and the onset is abrupt. The temperature rises sharply to a 103°F or more and the patient is dyspnoeic. Normally the resistance is high and there is a leucocytosis of about 20,000 cells per c.m.m. or more. At first the sputum is viscid and scanty. Pleuritic pain is a common feature. On physical examination diminished movement, impairment of percussion, reduction in air entry and crepitations are found in the early stages. Later the signs of consolidation will be evident. This may take some time and will vary according to its relation to the periphery of the lung. When sulphonamides are administered the response is dramatic and the natural crisis is anticipated by several days. Penicillin is probably equally effective but is reserved for cases with overwhelming infection or showing sulphonamide resistance, the sulphonamides being the easier to administer. Complications are now much rarer, peripheral circulatory failure, empyema and toxic nephritis are among the commonest.

(b) Bronchopneumonias maybe due to many different bacteria. It has already been noted that it is uncommon in the young adult when/

when it is of pneumococcal origin. The pneumococcal broncho-pneumonias are seen most commonly in weakly children and more rarely in the aged. Though the lesion here is a broncho-pneumonia the type of onset and the course of the disease are similar to that of a lobar pneumonia.

The majority of the bronchopneumonias are, however, mixed infections. One organism being present in greater numbers or being of greater virulence, predominates. Among the commonest are these normally present in the upper respiratory tract, especially the streptococcus and the staphylococcus. Broncho-pneumonia occurs at all ages, but more commonly at the extremes of life. Generally it is correlated to poor social conditions, debility or secondary to an infectious disease. Clinically bronchopneumonia does not present a syndrome with many typical features, there being many variable factors. It will vary according to the predominant organism, the predisposing causes, the constitution of the patient and the age of the patient. In general there are some features which are commonly present. The infection is usually bilateral and the onset gradual. The temperature is remittent in type, terminating by lysis. Dyspnoea is marked and often accompanies cyanosis. In the early stages, at least, the physical signs are indefinite and diffuse. Most commonly there are patchy areas of added sounds and, at a later stage, of consolidation. Treatment by sulphonamide or penicillin varies according to the sensitivity of the organism but the response is usually not dramatic, the infection being a mixed one, and there being a/

a widespread lesion in the lung. Immediate complications are rare but absorption collapse may occur and this may result in subsequent bronchiectasis.

(c) It is only since the introduction of chemotherapy and the antibiotics that the bacterial pneumonias have ceased to cause a high mortality. So much so, that though formerly other types of pneumonia had been recognised they were, in comparison, mild diseases, and attracted little attention. Pneumonias, later known to be viral in origin were described during measles by Bartel in 1861, in smallpox by Keysselitz and Mayer in 1909, and during the pandemic of influenza in 1918. Research into these pneumonias presented many technical difficulties. However, in America especially many epidemics of pneumonias of known virus origin have been described. Most of the diseases of viral origin are now known on occasions to have associated pulmonary lesions and in some viral diseases, e.g. psittacosis and "Q" fever, the lungs are primarily affected. These pneumonias are highly contagious. There is an incubation period of about two or three weeks. Malaise is often present during this time. The acute phase is ushered in by pyrexia, headache, generalised aches and pains. Cough is marked and usually is unproductive. The physical signs are indefinite and the X ray of the chest shows patchy areas of consolidation, usually in the lower lobes and near the hilum. The leucocyte count is normal or slightly diminished, unless secondary pyogenic infection supervenes. According to the intensity of the infection so there may be a persistent pyrexia, for days or weeks, and it terminates/

terminates by lysis. A secondary invasion of the lung is common. The primary viral pneumonias show little response to chemotherapy.

(d) In these three types which have now been described the causal organisms are known. Apart from them, there is a group of "new" pneumonias about which an increasing amount of literature is being published, yet the cause is in most cases still in doubt, "New" probably only in the sense that they are becoming more frequently detected, for several reasons. The attenuation of the bacterial pneumonias by the use of sulphonamides and penicillin has allowed greater attention to be given to the milder varieties of pneumonia. The more frequent use of radiology in the milder respiratory diseases and the evolution of mass radiography have played their part. World War II provided the facilities for rapid and extensive study of these cases.

Attention was primarily drawn to these "new" pneumonias when, in relatively mild respiratory diseases, it was shown that in the course of such diseases a variety of opacities might occur in the lung fields; these opacities were transitory. The clinical picture did not correspond to the recognised forms of pneumonia. There was especially a paucity of symptoms and physical signs. So many terms have been applied to these transient pneumonias that there is much confusion and it would be better first to discuss their possible etiology.

These transient "shadows" may be due to several different conditions.

(i)/

(i) When they occur in association with catarrhal infections of the respiratory tract. "Pseudo-lobar bronchopneumonia", "bronchopneumonia of limited extent", or "acute pneumonitis" are among the terms which have been applied to this type. Associated with the mild respiratory infection there is radiological evidence in keeping with a localised inflammatory process in the lung. The course of such an illness is benign.

(ii) Other cases with similar transient lung shadows have been described apart from these discovered during epidemic or endemic catarrhal infections. Many of such cases have been detected by mass radiography and often in people doing their normal work unaware of their illness, the condition being almost symptomless. There may be a history of a recent cough, anorexia or loss of weight. The temperature is normal or only slightly raised. The signs are at variance with the X ray evidence, being less than expected. Impairment of percussion, altered breath sounds and localised crepitations are the commoner findings. Within a week or two of the onset of the symptoms, the signs and radiographic appearances completely disappear.

(iii) Loeffler (1932) described opacities in X ray films of lung fields which he attributed to a pneumonia-like reaction occurring in allergic individuals. The opacities were transient and often recurred. The cases described all had a well marked eosinophilia. This is a helpful differentiating factor. Such cases, however, must only account for a very small proportion of these seen, the cases with transient lung shadows having

in/

in general a normal eosinophil count.

(iv) Another rare cause of transient lung shadow might be the " Assman, or re-infection focus". This early exudative lesion of pulmonary tuberculosis is usually infraclavicular, less commonly appearing in other parts of the lung.

Epituberculosis, or absorption collapse, occurring in primary tuberculosis gives a lung "shadow" which resolves over months.

Extensive investigation has failed to show any evidence that the tubercle bacillus is present in these many transient pneumonias which resolve within one or two weeks, leaving no evidence of fibrosis.

(v) On acute pneumonia with delayed resolution being detected at a later stage or following inadequate chemotherapy, might account for a small number of cases.

(vi) A small number might be early cases of bronchiectasis. Here it is well known that periodically there may be affection of the adjacent lung tissue, and transient areas of pneumonitis develop. (Gill 1938, Scadding 1948). Unless more than one of these episodes are witnessed in the same patient the true underlying bronchiectasis in the absence of more definite symptoms is likely to be missed.

Groups (i) and (ii) account for the majority of transient pneumonias, the "new pneumonias". Other known causes of transient shadows radiologically, (iii), (iv),(v) and (vi) are excluded by careful examination of the patient. They account for only a few of the cases seen in the present series/

series, in particular, the cases of pneumonia secondary to bronchiectasis.

The remainder of the "new pneumonias" seen, these benign transient pneumonias, will be classified as "atypical" pneumonias. The entity will be discussed in detail later. "Atypical" pneumonia is the term selected for no other reason than that it is short and allows easier comparison later with similar pneumonias so described by other authors, especially in America.

Cases will also be described of a pneumonia, in Young Adults at least, which cannot be classified as true lobar pneumonia, bronchopneumonia, true viral pneumonia or as a benign transient pneumonia ("atypical" pneumonia). Here the onset is sudden and the response to treatment rapid, as in a true lobar pneumonia. There is usually a leucocytosis, yet the radiological findings are not these of a true lobar pneumonia. There are homogeneous opacities in the lower lobes, usually near the hilum, commonly associated with increased broncho-vascular markings. These radiological findings being similar to these seen in the aspiration type of benign transient pneumonia. Here, however, the clinical picture is that of an acute pneumococcal lobar pneumonia. The areas affected tend to coalesce and when sufficiently extensive it is almost indistinguishable from lobar pneumonia.

Probably, though a virulent organism is present, e.g. a pneumococcus, the degree of resistance is high in this type. When the resistance is lowered sufficiently to permit invasion, this acute more localised pneumonia results. Also in the present series/

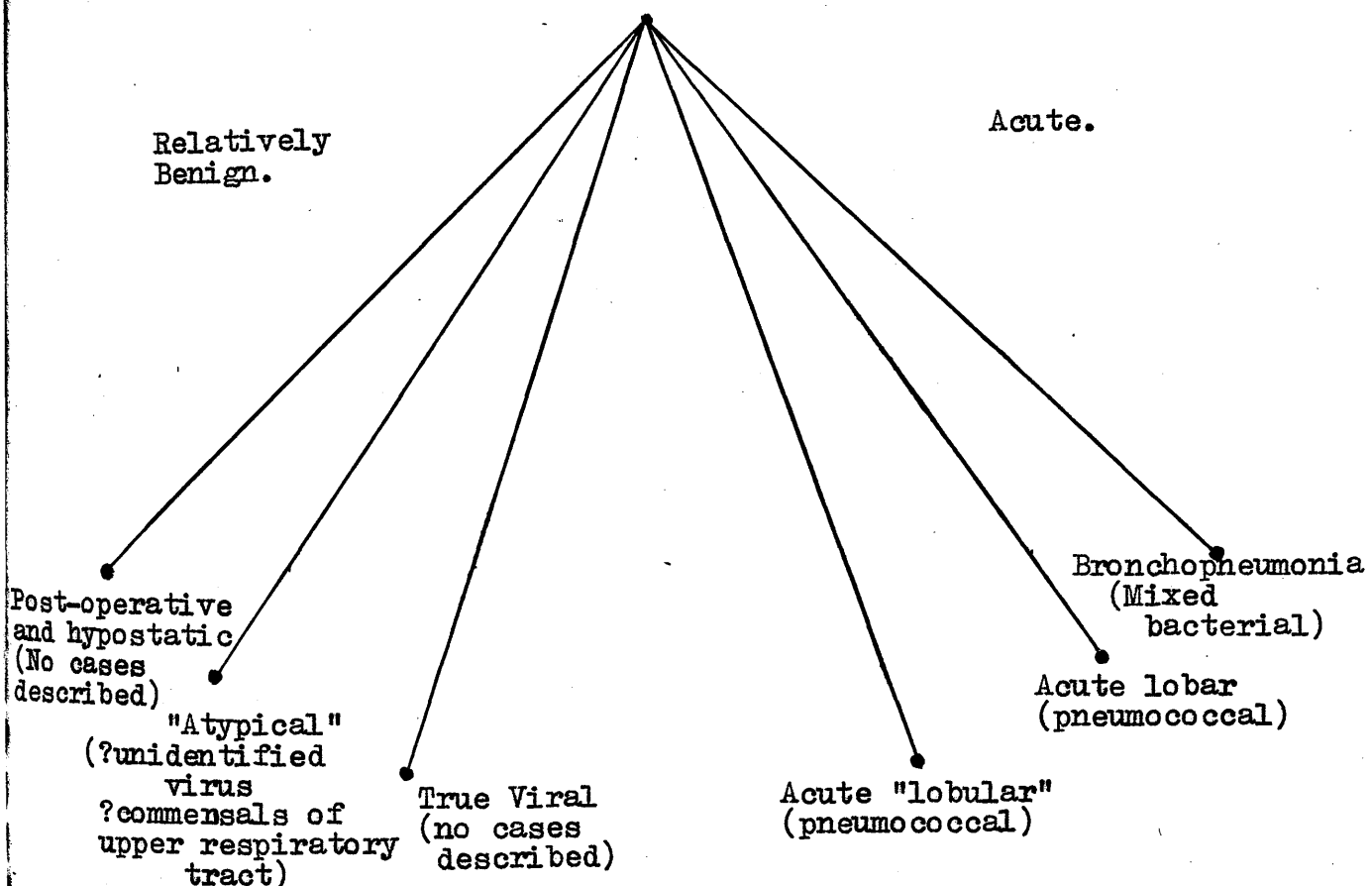
series, circumstances were such that cases were being seen and treated at a very early stage. Had the detection not been so early and the resistance in the Young Adult lower, then a true lobar pneumonia, or even a bronchopneumonia, might have resulted in these cases

(e) This type of pneumonia will be classified as an "acute lobular pneumonia" and probably is synonoymous with the "abortive lobar pneumonia" described by others (Maxwell 1938).

No case of post-operative aspiration pneumonia is described. Hypostatic pneumonias are inapplicable. No true viral pneumonia is included.

The pneumonias seen are described as either acute lobar pneumonia, bronchopneumonia, acute lobular pneumonia or "atypical" pneumonia.

Clinical and anatomical classification of pneumonia



PART II.

THE PRESENT INVESTIGATION.

(a) The one hundred and seventy-nine patients treated, past history and clinical findings in tabulated form.

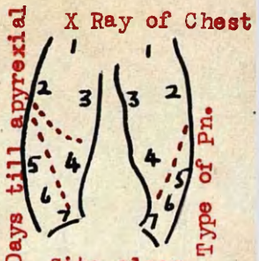
KEY TO TABLE

Past personal history of chest disease		=	age of incident.
Sputum (M, M.P., B.S.)		=	Mucoid, mucopurulent blood-stained.
W.b.c. on admission		=	thousand
X-ray of sinuses	Cl.	=	clear
	M.T.	=	mucosal thickening
	O.	=	opaque
	FL.	=	fluid
	Ost.	=	osteoma
Sulphonamide		=	grams
Penicillin		=	mega units
Days till apyrexial	R(x)	=	relapse (no. of days)
Site		=	see chart, top right.
Clear		=	days
Ac. L.		=	Acute lobar
Ac. Lob		=	Acute lobular
ATYP.		=	Atypical
B'pn		=	Bronchopneumonia
Bronch'		=	Bronchiectasis

As on admission No. of Case	Name.	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P,B.S)	Pain in Chest	Shortness of Breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Crepe. Rhonchi	Pleural Friction	None	Diagnosis Mass Xray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X Ray of Chest Site clear	Type of Pn.
1.	A.	26	Jly.'6	-	-	19	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	L.7	26	ATYP.
2.	B.	18	Ju. '6	-	-	-	+	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	80	-	+	MP	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	No AFB	-	-	-	L7&6	28	ATYP.
3.	B.	18	Ju. '6	-	-	17	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	84	1	+	MP BS	-	-	-	-	-	-	-	-	+	-	-	+	+	-	-	-	NO RMT AFB L	-	-	-	R&L 7&6	-	Bronch'
4.	B.	18	Jly.'6	-	-	-	-	-	-	-	-	-	2	+	+	-	-	-	+	-	-	103	2	112	2	+	M	-	-	-	+	+	-	-	-	-	-	-	-	+	-	-	18,	-	-	28	-	3	R,4	19	Ac.L.
5.	B.	18	Aug.'6	-	-	-	-	-	-	-	-	-	3	-	+	-	-	+	-	-	-	103.5	1	120	1	+	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	Pn.	-	30	-	2	L.7&6	-	Ac.L.
6.	B.	19	Oct.'6	-	-	-	-	-	-	-	-	-	8	+	-	-	+	-	-	-	-	100.5	1	80	1	+	-	+	-	+	+	+	-	-	-	+	-	-	+	-	-	-	16,	-	-	32	-	4	L.7	-	Ac.Lob.
7.	C.	17	Ju. '6	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	70	-	-	M	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-	No AFB	-	-	-	-	R7,L7	-	ATYP.
8.	C.	19	Jy. '6	-	18	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	100.5	4	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	+	-	-	-	11,	-	-	-	-	8	R7	17	ATYP.
9.	C.	19	Aug.'6	-	-	-	-	-	-	-	-	-	?	-	+	-	-	-	-	-	-	104	1	104	2	+	M	+	-	-	-	-	-	-	+	+	-	+	-	-	-	-	Staph.	-	35	-	3 (R)	R5,6,7, L7,6 (Sterile (Rt) poly. effusion)	-	Ac.L.
10.	C.	18	Dec.'6	+	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	104	1	110	1	+	-	-	-	-	+	-	+	-	+	-	-	+	-	-	-	14,	-	-	-	-	2	R 6,7	-	Ac.Lob.
11.	E.	18	Dec.'6	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	103	7	80	-	+	MP	+	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	130	-	7	L7,6	-	Ac.L.
12.	H.	19	Aug.'6	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	N	-	60	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	L6,7	-	ATYP.
13.	H.	20	Jly.'6	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	+	7,	No AFB	LO	-	-	-	R6,7 L2	-	ATYP,
14.	H.	18	Sp. '6	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	No AFB	-	-	-	-	L6,7	-	Bronch'
15.	J.	18	Nov.'6	-	-	-	+	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	+	-	-	39	-	2	R&L 5,6,7,	-	B'pn.
16.	L.	18	Nov.'6	-	-	-	-	-	-	-	-	-	5	+	-	-	-	-	-	-	-	102	2	100	-	+	MP	+	-	-	-	-	-	-	+	+	-	-	+	-	-	-	16,	-	-	31	-	2	R5&7	9	Ac.L.
17.	M.	18	Ap. '6	+	4	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	88	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	20,	-	Ro.	-	-	-	L6,7 (?Bronch.)		Ac.L.
18.	Mc.C.	26	Jly.'6	-	-	-	-	-	-	-	-	-	?	-	+	-	-	-	-	-	-	N Relapse (104)	-	84	-	+	-	-	-	-	-	-	-	-	+	-	+	+	-	-	+	-	No AFB	-	30	-	(4)	R6,7	17	Ac.L.
19.	O.	18	Jly.'6	-	-	-	-	-	-	-	-	-	?	-	+	+	-	+	-	-	-	99.8	-	96	3	+	M	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	1	R6,7	18	ATYP.
20.	P.	18	Nv. '6	-	-	-	+	-	-	-	+	-	3	-	-	-	-	-	-	-	-	102	1	122	3	+	MP	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	Cl.	-	-	1	L6,7	-	ATYP.

As on admission

No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum(M,M.P,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps.	Rhonchi	Pleural Friction	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	Site clear	Type of Pn.
21.	P.	18	Dec.'6	+	Inf	-	+	-	-	-	-	-	?	-	-	-	-	-	-	-	-	103.5	5	11.	4	+	MP	-	+	-	-	-	-	+	+	-	-	-	+	-	-	-	+	-	-	33	-	5	L.6,7	-	Ac.Lob.
22.	S.	18	Ju. '6	-	-	-	-	-	-	-	-	-	1	-	+	-	-	+	-	-	-	104.8	3	120	3	-	-	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-	22, Pn.	-	35	-	3	L.5,6,7,11		Ac.L.
23.	S.	18	Jly.'6	+	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	98	-	84	-	+	M	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	No AFB	L& RO	-	-	-	R&L	-	ATYP.
24.	S.	17	Jly.'6	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	102.4	1	96	-	+	M	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-	+	-	-	?30	-	4	L6,7 2&3	-	Ac.L.
25.	T.	18	Nov.'6	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	99	2	80	-	+	MP	-	-	-	-	-	-	+	-	-	-	-	+	-	-	+	11,	No AFB	-	-	-	3	L5,6,7,	-	ATYP
26.	W.	18	Ju .'6	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	No AFB	-	-	-	-	L6,7	22	ATYP
27.	W.	17	Aug.'6	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	100	1	100	1	-	-	-	-	-	+	+	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	1	L5,6,7	-	ATYP
28.	W.	18	Sep.'6	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	103	1	130	1	+	-	-	-	-	+	-	-	+	-	-	-	-	+	+	-	-	-	+	Pn.	-	?30	-	5	R7,6	19	Ac.Lob
29.	W.	18	Nov.'6	-	-	-	+	-	-	-	-	-	8	-	-	+	-	-	+	-	-	101	1	84	-	-	-	-	+	-	-	-	+	-	+	-	+	-	+	+	-	-	-	+	-	-	38	-	2	R5,6,7	-	Ac.L.
30.	A.	18	Jan.'7	-	-	-	-	-	+	-	-	8	+	-	-	-	-	-	-	-	-	103	1	120	7	+	-	-	-	-	-	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	55	-	12	R5,6,7	-	Ac.L.
31.	A	20	Feb.'7	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	?	-	-	-	+	-	+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	53	-	4	R6,7	16	Ac.Lob
32.	B.	18	Dec.'6	-	16	-	-	-	TB	-	-	-	22	+	-	-	+	-	-	-	-	105	1	104	6	+	MP	+	-	+	-	-	-	-	-	+	-	-	+	-	-	-	-	14	No AFB	-	40	L25	7	R6,7	-	Bronchh'
33.	B.	20	Jan.'7	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	99.2	1	76	-	+	M	-	-	-	-	-	-	+	+	+	-	-	+	-	-	-	+	-	-	-	36	-	2	L6,7	-	Bronch'
34.	B.	18	Jan.'7	-	-	-	-	-	-	-	-	-	3	+	-	-	-	-	-	-	-	104.5	1	116	5	+	-	-	-	-	-	+	-	-	+	-	-	-	+	-	-	-	+	+	-	-	35	-	7	R5,6,7,	-	Ac.L
35.	B.	18	Jan.'7	-	-	-	+	-	-	-	-	-	3	-	-	-	-	-	-	-	-	105	1	104	5	+	-	+	-	-	-	+	-	-	-	+	-	-	+	-	-	-	-	-	-	-	?35	-	6	R5,6,7 R(2)	15	Ac.L
36.	B.	19	Feb.'7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	101	2	100	3	-	-	-	-	-	-	-	-	+	-	-	-	+	+	-	-	+	-	-	-	-	-	4	R6,7	-	ATYP.
37.	B.	18	Feb.'7	-	Inf	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	103	1	100	2	+	M	-	-	-	+	+	-	-	-	+	+	-	+	-	-	-	-	-	-	-	50	-	2	L6,7 R(4)	17	Ac.Lob
38.	B.	18	Feb.'7	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	N	-	N	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-	-	-	-	-	53	-	-	L6,7	10	ATYP.
39.	B.	30	Feb.'7	-	-	-	-	-	-	-	-	-	4	-	+	+	+	-	-	-	-	101.6	1	92	1	+	-	+	-	-	-	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-	52	-	1	R,7	10	Ac.Lob
40.	B.	18	Feb.'7	-	-	-	16	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	68	-	+	M	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	L7	-	ATYP



As on admission No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H.Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum(M,M.P.,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps. Rhonchi	Pleural friction	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of chest Site clear / Type of Pn.
41.	B.	18	Feb.'7	-	16	-	+	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	68	-	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	-	-	+	-	-	-	-	-	R6,7	- ATYP
42.	B.	20	May'7	-	-	19	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	99	1	60	-	+	-	-	-	-	+	-	-	+	-	-	-	+	-	-	-	-	+	-	-	58	-	1	L6,7	15 Ac.Lob
43.	B.	18	May'7	-	-	-	-	-	-	-	-	-	?	-	-	+	-	-	-	-	-	102	1	88	1	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	4	R6,7	37 ATYP
44.	B.	19	Ju '7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	+	-	-	102	1	76	-	-	-	+	-	-	+	-	-	+	-	-	-	+	-	-	-	-	+	-	-	52	-	7	R5,6,7	42 Ac.Lob.
45.	B.	18	Ju '7	+	-	-	-	-	TB	-	-	-	8	-	-	-	-	-	-	-	-	102.5	2	88	3	+	M	+	-	-	-	+	-	+	-	-	-	+	-	-	-	-	+	-	MT R&L	64	-	4	R&L 7	45 B'pn.
46.	B.	18	My '7	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	N	-	80	1	-	-	+	-	-	-	-	-	+	-	+	-	-	+	-	-	-	+	10,	-	-	-	-	R7	15 ATYP
47.	B.	18	Ap.'7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	80	-	+	MP	-	-	-	+	-	-	+	-	+	-	-	+	+	-	-	+	6,	-	-	-	-	L7	12 ATYP
48.	C.	18	Ap.'7	-	-	-	-	-	-	-	-	-	?	+	-	-	-	-	-	-	-	N	-	80	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-	-	+	23	No AFB	-	66	-	-	R&L6,7	64 B'pn.
49.	C.	18	Ap.'7	-	-	-	-	-	-	-	-	-	4	-	-	-	-	+	-	-	-	102	3	96	14	+	-	-	-	-	+	-	-	-	+	-	-	+	-	-	-	-	+	Pn Staph	Ent NoTr	60	1.77	18 R(6)	R6,7	87 B'pn.
50.	C.	18	My '7	-	-	-	-	-	TB	-	-	-	?	-	-	-	-	-	-	-	-	99	2	86	3	+	-	+	-	-	-	-	-	+	-	-	-	+	-	-	-	+	+	Pn No AFB	-	62	-	2	L4 R7	29 Ac.Lob.
51.	C.	18	Aug.'7	-	-	-	-	-	-	-	+	+	5	+	-	-	-	-	-	-	-	-	-	-	-	+	MP	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	3	R7,6	9 ATYP.
52.	D.	24	Jan.'7	-	-	-	22 HAEM	-	-	-	-	-	8	-	-	-	-	-	-	-	-	103.5	2	120	3	+	-	-	-	-	-	-	-	+	+	+	+	+	+	-	-	-	-	Pn.	-	40	-	4	R5,6,7	- Ac.L.
53.	D.	18	Jan.'7	-	8	-	-	-	-	-	-	-	8	-	-	-	+	-	-	-	-	99.8	2	80	-	+	M	+	-	-	-	-	-	+	+	-	-	-	+	+	-	-	-	-	-	-	-	2	R&L6,7	- ATYP.
54.	D.	19	Feb.'7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	103	1	98	3	+	BS	+	-	-	-	-	-	+	+	-	-	+	+	+	-	-	-	-	-	40	-	4	R,4	37 Ac.L.
55.	D.	18	Ju.'6	-	-	-	-	-	-	-	-	-	?	+	-	+	-	-	-	-	-	99	1	104	5	+	-	+	-	-	+	-	-	+	+	+	-	+	+	-	-	-	-	-	No AFB	-	25	-	1 R(14)	L5,6,7,	33 Ac.L.
56.	E.	18	Ju'7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	99.5	1	100	1	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	17,	-	-	-	1	L6,7	30 ATYP.
57.	F.	18	Fb.'7	-	-	-	-	-	-	-	-	-	8	-	-	+	-	-	-	-	-	104	1	120	28	+	-	-	-	+	-	-	-	-	+	-	+	-	+	-	-	-	+	+	No AFB PEN SEN	-	77	3.9 2.7	28	R&L5,6,7	64 B'pn.
58.	F.	18	Jy.'7	+	11	-	-	-	-	-	-	-	22	-	-	-	-	-	-	-	-	N	-	76	-	+	MP	-	-	-	-	-	-	+	-	+	-	-	+	+	-	-	+	No AFB	Cl	-	-	-	R6,7	18 ATYP

As on admission No. of case Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P.,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps. Rhonchi	Pleural friction	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of chest Site clear	Type of Pn.
59. G.	18	Fb.'7	-	-	-	-	-	-	-	-	-	4	-	+	-	-	-	-	-	-	102.8	1	120	5	+	-	-	-	-	+	-	+	-	-	-	-	+	-	-	-	-	-	-	59	-	4	R5,6,7	14 Ac.L.
60. G.	18	Mr.'7	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	102.2	3	104	3	+	-	-	-	-	+	-	+	+	-	-	-	+	-	-	-	-	Pn. No AFB	-	54	-	5 R(6)	R3,5,6,7	- Ac.L.
61. G.	18	Ju.'7	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	105.5	1	120	3	+	-	+	-	-	+	+	-	-	-	+	+	-	+	-	-	-	-	61	-	2	R4,5,6,7	- Ac.L.
62. H.	19	Ja.'7	+	-	-	+	-	-	-	-	-	6	-	-	-	-	-	-	-	-	N	-	96	1	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-	-	Non. H. Strept.	-	-	-	L6,	7 ATYP.
63. H.	18	Fb.'7	-	-	-	-	-	-	-	-	-	5	-	-	-	+	-	-	-	-	103	5	-	-	+	BS	-	-	-	-	+	-	+	-	+	-	-	+	-	-	-	6, No AFB	-	35	-	7	R&L6,7	- Bronch.
64. H.	18	Mr.'7 My.(R)	-	Inf (EMPYEMA)	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	100.4	1	90	3	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+	14, No AFB	R&L O	-	-	2 R(3)	L6,7	- Bronch.
65. H.	26	My.'7	-	-	-	-	-	-	-	-	-	8	-	-	+	-	-	-	-	-	N	-	60	-	+	BS	-	-	-	-	-	-	-	-	-	-	+	-	-	-	6, No AFB Staph	-	-	-	-	R6,7	- ATYP.
66. H.	19	Mr.'7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	72	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	9,	-	-	-	-	R6,7	Bronch.
67. H.	18	Jy.'7	+	-	-	+	-	-	-	+	-	?	-	-	-	-	-	-	-	-	N	-	80	-	+	-	+	-	-	-	-	+	-	-	-	+	+	-	-	-	8,	-	R&L	O	-	-	98 R6,7	Bronch.
68. J.	18	Ju.'7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	72	-	+	M	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	14,	-	-	-	-	L6,7	- ATYP.
69. J.	31	Fb.'7	-	-	Inf.	-	-	-	-	-	-	?	-	-	+	-	-	+	-	-	103	1	112	6	+	-	+	-	-	+	-	-	-	+	-	+	+	-	-	-	-	No AFB	-	56	-	6	R5,6,7	43 Ac.L.
70. J.	18	Ju.'7	-	6/52 Aco	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	102.4	2	114	6	+	-	-	-	-	-	-	+	+	+	+	+	+	-	-	-	+	PEN SEN	-	10	L.12	3	R2,3 R&L5,6,7 (NEPHRITIS)	- Ac.L.
71. J.	18	Ju.'7	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	101	1	120	1	+	M	+	-	-	-	-	-	-	+	-	-	+	-	-	-	-	No AFB	LMT	-	-	1	R6,7	- ATYP
72. L.	18	Mr.'7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	103	4	84	6	-	-	-	-	-	-	-	+	-	+	-	-	+	-	-	-	-	No AFB	-	61	? Am.	7 R(4)	R&L 5,6,7	37 Bpn (proven Scarlet Fever after 24 days)
73. L.	18	My.'7	+	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	102	1	120	3	-	-	+	-	-	-	-	-	-	+	-	+	-	-	+	+	-	-	-	+	-	L.O.	63	-	2	L5,6,7	- Ac.L.
74. Mc.Q.	18	Ap.'7	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	99	6	86	1	+	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	+	Staph No AFB	R&L O	64	-	5 R(1)	L6,7	67 ATYP.
75. M.	19	My.'7	+	-	-	-	-	-	-	-	-	2	-	-	-	-	-	+	-	-	101	1	90	1	+	M	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	16, Pn	R&L MT.	-	-	2	L6,7	42 Ac.Lob

As on admission	No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P.,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps. Rhonchi	Pleural friction.	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of Chest: Site clear	X ray of Chest: Type of Pn.
	76.	P.	18	Ja. '7	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	102.4	1	104	5	+	-	+	-	-	-	+	-	-	+	+	-	+	+	-	-	-	+	-	-	40	-	2	L5,6,7	-	Ac.L.
	77.	P.	18	Ja. '7	+	12	12 17	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	102.8	1	132	6	+	-	+	-	-	-	-	-	+	+	-	+	-	-	-	-	-	-	40	-	4	L6,7	-	Ac.Lob.
	78.	P.	18	Ja. '7	-	-	-	+	-	-	-	-	-	3	-	-	-	-	-	-	-	-	104	1	110	4	+	M	+	-	+	-	-	-	-	+	+	+	+	-	-	-	-	+	Staph	-	?AMT	1.5	2	R5,6,7	10	Ac.L.
	79.	P.	18	Fb. '7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	N	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	L5,6,7	-	ATYP.
	80.	P.	18	Fb. '7	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	101.5	9	98	14	+	-	-	-	-	-	+	+	-	-	-	-	-	+	+	-	-	-	+	-	-	52	-	11	R7 L5,6,7	-	B.pn.
	81.	P.	19	Ap. '7	-	-	-	-	-	-	-	-	-	2	-	+	-	+	-	-	-	-	103.5	2	74	-	+	-	-	-	-	+	+	-	-	-	+	-	-	-	-	-	-	-	Pn.	-	88	-	10	L6,7	12	Ac.Lob
	82.	R.	18	Fb. '7	-	-	-	-	-	-	-	-	-	2	-	+	-	-	-	+	-	-	103	2	98	10	+	-	-	-	-	-	+	+	-	-	-	+	-	-	+	-	-	-	17,	-	-	-	? AMT	6	L5,6,7	17	Ac.Lob
	83.	R.	18	Fb. '7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	102.8	1	92	3	+	-	+	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	33	-	3 R(4)	L5,6,7	18	AC.L
	84.	R.	18	Mr. '7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	100	1	84	1	+	M	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-	-	-	-	3	R7	-	ATYP.
	85.	R.	18	Mr. '7	-	-	-	+	-	-	-	-	-	4	-	-	-	-	-	-	-	-	103.5	2	94	5	+	M	-	-	-	-	-	+	-	+	-	-	-	+	-	-	-	-	-	-	45	-	5	R7	12	Ac.Lob.
	86.	R.	18	Ju. '7	-	-	-	-	-	-	-	-	-	?	+	-	-	-	-	+	-	-	104.5	4	120	4	-	-	-	-	-	+	-	+ CSF -VE	-	+	-	-	+	-	+	-	-	14+	-	-	56 (3)	-	4	R5,6,7	19	Ac.L.
	87.	S.	18	Ja. '7	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	102	1	100	3	-	-	+	-	-	-	-	-	+	-	+	+	+	-	-	-	-	-	-	-	40	-	3	L5,6,7	13	Ac.L.
	88.	S.	18	Ja. '7	-	-	-	-	-	-	-	-	-	3	-	-	-	+	-	-	-	-	103.8	2	120	7	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	+	-	+	-	-	43	-	4	R6,7	-	Ac.Lob.
	89.	S.	18	Fb. '7	-	17	-	-	-	-	-	-	-	4	-	-	+	-	-	-	-	-	102	1	100	3	+	-	+	-	-	-	+	-	+	-	+	+	-	+	-	-	-	-	-	-	46	? AMT	3 R	R7 (L5,6,7)-		Bronch.
	90.	S.	18	Fb. '7	-	-	9	-	-	-	-	-	-	3	+	-	-	-	-	-	-	-	103	2	100	3	+	M	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	40	-	3	R5,6,7	12	Ac.L.
	91.	S.	18	Ap. '7	-	12	-	-	-	-	-	-	-	1	-	-	-	-	+	-	-	-	104	1	100	1	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	Cl.	21	-	2	L5,6,7	69	Ac.Lob
	92.	S.	18	My. '7	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	102.8	1	100	3	-	-	-	-	-	+	+	-	+	-	+	+	-	+	-	-	-	16,	-	-	78	-	3	R6,7	-	Ac.Lob
	93.	S.	24	My. '7	-	16	-	18	-	-	-	-	-	?	+	+	-	+	-	-	-	-	102	1	100	1	+	M	+	-	-	-	-	-	+	-	-	-	+	-	-	-	6,	-	-	-	-	2	R7	13	ATYP
	94.	T.	18	Fb. '7	-	-	-	-	-	-	-	-	-	3	-	+	-	-	-	-	+	-	105	1	104	5	+	-	-	-	-	-	+	+	-	+	-	+	+	-	+	-	-	-	-	-	-	40	-	6	R5,6,7	-	Ac.L.

As on admission. No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P,P.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps. Rhonchi	Pleural friction	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of chest Site clear.	Type of pn.
95.	T.	20	Mr.'7	-	-	-	+	-	-	-	-	-	4	-	+	-	+	-	-	-	-	103.4	1	98	8	+	-	+	-	-	+	+	-	-	-	-	-	-	-	+	-	-	+	-	-	77	2.05	7	R5,6,7 R(7,3) L5,6,7	30 Ac. L
96.	W.	18	Fb.'7	-	-	-	-	-	+	-	-	-	?	-	-	-	-	-	-	-	-	99	1	94	3	+	M	-	-	-	-	-	-	+	-	+	-	+	+	+	-	-	11,	-	-	-	-	1	R&L6,7	- ATYP
97.	W.	18	Fb.'7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	103	1	128	4	+	-	+	-	-	-	-	-	-	+	+	-	+	-	-	-	-	-	-	42	-	3	L6,7	18 Ac.Lob
98.	W.	18	Feb.'7	-	-	-	-	-	-	-	-	-	5	+	-	-	-	-	-	-	-	104	5	102	6	-	-	-	-	-	-	+	-	+	-	+	-	+	+	-	-	-	-	-	56	-	9	R6,7	- Ac.Lob
99.	W.	18	My.'7	-	17	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	102.4	1	120	4	+	-	+	-	-	-	-	-	+	-	+	-	-	+	+	-	-	-	-	-	Cl.62	-	2	R6,7 L7	- Bronch'
100.	Y.	18	Ju.'7	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	103	1	100	16	+	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	0.8	17	R2,3, L6	45 Ac.L
101.	B.	18	Oc.'7	-	-	-	+	-	-	-	-	-	3	-	+	-	-	-	+	-	+	-	-	100	1	+	-	-	-	-	+	+	-	-	-	-	-	+	+	-	-	+	-	-	64	-	1	R6,7	9 Ac.Lob.
102.	B.	18	Oc.'7	-	-	-	-	-	-	-	-	-	11	-	+	-	-	-	-	-	-	-	-	120	1	+	-	+	-	-	-	-	-	-	+	+	-	+	-	-	-	+	9,	-	-	68	-	2	R&L6,7	10 B'pn
103.	B.	18	Dc.'7	-	-	-	-	-	-	-	-	-	29	-	-	+	-	-	-	-	-	98.8	-	-	-	+	MP	-	+	+	-	+	-	+	-	-	-	+	+	-	-	+	9	+ve AFB	-	-	-	-	L2,3	- Tubercle
104.	B.	18	Fb.'8	-	15	-	-	-	-	-	-	-	3	-	+	+	-	-	-	-	-	100.4	2	96	2	+	M	+	-	-	-	-	-	+	+	+	+	-	+	-	-	-	17,	-	RMT	68	-	2	L6,7	12 Ac.Lob
105.	B.	18	Nv.'7	-	-	-	+	-	-	-	-	-	2	+	-	+	+	+	-	-	-	102	2	100	2	+	MP	-	+	-	+	+	-	+	+	+	-	-	+	-	-	-	+	Staph Strept.	-	64	-	2	R6,7	16 Ac.Lob
106.	B.	18	Fb.'8	+	-	-	-	-	+	-	-	-	2	-	+	+	+	+	-	-	-	101	1	96	2	+	MP	+	-	-	+	-	-	+	-	+	-	-	+	+	-	-	-	+	-	Cl.58	-	2	L6,7	10 Ac.Lob
107.	C.	18	Aug.'7	-	-	-	+	-	-	-	+	-	?	+	-	-	+	+	-	-	-	101.6	1	-	-	+	-	+	-	-	-	+	-	+	-	-	-	-	-	+	-	-	8,	No AFB	Cl.46	-	1	R,7	- Ac.Lob
108.	C.	18	Fb.'8	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	100.5	5	96	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	R&L MT	68	-	17	R7& L7	- ?Bronch
109.	C.	18	Dc.'7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	+	-	-	-	103.5	-	120	-	+	M	+	-	+	+	-	-	-	+	+	-	+	+	-	-	-	20, +	Pn.	-	70	1.19	3	L5,6,7	7 Ac.Lob
110.	C.	18	Aug.'7	-	-	-	-	-	-	-	+	+	4	+	+	-	-	-	-	-	-	-	-	-	-	+	MP	-	-	-	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	3	R7	42 ATYP
111.	C.	18	Ja.'8	+	-	-	-	-	-	+	-	-	2	-	+	-	-	-	-	-	-	102	1	104	2	+	M	+	-	-	-	-	-	+	+	+	+	+	+	-	-	-	+	-	Cl.	36	0.5	2	R6,7 (Crystaluria)	44 Ac.L.
112.	C.	18	Ja.'8	-	-	-	+	-	-	-	-	-	5	-	-	+	-	-	-	-	-	101.5	3	96	4	+	MP	+	-	-	+	-	-	+	-	+	+	-	+	-	-	-	24, +	-	FL. R.	68	-	3	R,7	- Ac.Lob
113.	C.	19	Dc.'7	-	-	-	-	-	-	-	-	-	2	-	-	+	-	-	-	-	-	104	1	148	2	+	BS	+	-	+	+	-	-	-	+	+	-	+	+	-	-	-	27,	Pn.	RO LMT	68	-	2	L5,6,7 R7	- Ac.L.
114.	C.	18	Dc.'7	+	-	-	-	-	-	-	-	-	2	+	-	-	-	-	-	-	-	102	2	100	2	+	-	-	-	-	+	-	-	-	-	+	+	-	+	-	-	-	-	19, +	-	R&L MT	68	-	2	R5,6,7	8 Ac.L

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As on admission	No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps. Rhonchi	Pleural friction	None	Diagnosis Mass X ray	WBC. on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of chest Site clear	Type of Pn.
	115.	C.	18	Sp. '7	-	-	-	-	-	-	-	-	-	2	-	-	+	-	-	+	-	-	103	2	96	5	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	10,	-	R&L MT	-	-	2	R&L 7	8	ATYP
	116.	C.	18	Ja. '8	-	Inf	-	-	-	-	-	+	-	1	+	+	-	-	-	+	-	-	.5 104	1	118	3	+	-	-	-	-	+	+	-	+	-	-	-	+	-	+	-	-	26,	-	R&L MT	52	-	2	R5	7	Ac.Lob
	117.	D.	18	Dc. '7	+	-	-	-	-	-	-	-	-	6	-	+	-	-	-	-	-	-	102	2	100	2	+	M	+	-	-	-	+	-	-	+	-	-	+	-	-	-	-	14,	Pn No AFB	Cl.	70	-	3 R.	L6,7	32	Ac.Lob
	118.	D.	18	Ja. '8	-	-	-	-	-	TB	-	-	-	3	-	-	-	-	-	-	-	-	.5 102	1	104	6	+	MP	+	-	-	-	-	-	+	+	+	+	-	+	-	-	-	-	21,	-	R&L MT	64	-	2	L5,6,7	-	Ac.Lob
	119.	E.	18	Sp. '7	-	-	-	-	-	TB	-	-	-	2	-	+	-	-	-	+	-	-	2 99.	3	76	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	+	-	7,	-	Cl.	-	-	1	R7	9	ATYP
	120.	F.	18	Aug. '7	+	-	-	-	-	?TB	-	-	-	2	-	-	+	-	-	-	-	-	100	1	76	-	+	-	-	-	-	+	+	-	+	-	-	-	+	-	-	-	-	12,	-	Ost. RF	-	-	2	L6,7	16	ATYP
	121.	F.	18	Ja. '8	-	-	-	-	-	-	-	-	-	4	-	+	+	-	+	-	-	-	102	1	102	2	+	M	-	-	-	+	-	-	+	-	-	-	+	-	-	-	-	12,	-	R&L MT	68	-	2	R,7	6	Ac.Lob
	122.	F.	18	Ja. '8	+	-	-	-	-	-	-	-	-	?	+	+	-	-	+	-	-	-	5 99.	2	90	5	+	MP	-	-	-	+	+	-	+	-	-	-	+	+	-	-	-	21,	-	Cl. R	58	0.63	3	R&L6,7	-	B'pn.
	123.	F.	18	Sp. '7	-	-	-	-	-	-	-	-	-	5	-	+	-	-	+	-	-	-	104	1	140	1	+	-	-	-	+	+	+	-	-	+	+	+	-	-	+	-	-	-	17,	-	MT	59	0.96	1	R&L5,6,7	5	B'pn
	124.	F.	23	Ju. '7	+	Inf	-	-	-	-	-	-	-	?	-	-	+	-	-	-	-	-	.8 100	2	68	-	+	M	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	9,	+ve AFB	-	66	0.96	-	L2&3		Tubercle
	125.	F.	18	Jy. '7	+	17	17	-	-	-	-	-	-	?	+	-	+	-	-	-	-	-	99	1	84	1	+	M	-	-	-	-	+	-	+	-	-	-	+	+	-	-	-	9,	-	R&L O	-	-	1	R,7	14	ATYP
	126.	G.	18	Sp. '7	-	-	-	-	-	-	-	-	-	4	+	+	-	-	-	+	-	-	.6 102	1	100	1	-	-	-	-	-	+	-	-	+	-	-	-	+	+	-	-	-	13,	-	R&L MT	62	-	2	(R)L6,7	7	Ac.Lob
	127.	G.	18	Dc. '7	+	-	-	-	-	-	-	-	-	2	+	-	-	-	-	-	-	-	-	-	-	-	+	MP	+	-	-	-	-	+	+	+	-	-	+	+	-	-	-	14	Fried Strept	R&L MT	70	-	4	R&L	5,6,7	23 B'pn.
	128.	G.	18	Ju. '7	+	-	-	-	-	-	-	-	-	2	-	-	-	-	-	+	-	-	.8 101	2	92	3	+	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	11,	Staph.	R MT	52	-	2	L5,6,7	9	Ac.L.
	129.	G.	18	Ju. '8	-	-	12	-	-	-	-	-	-	2	+	+	-	-	-	-	-	-	.8 101	1	66	-	+	-	+	-	-	+	-	-	+	-	-	-	-	-	-	+	-	17,	-	R MT	52	1.08	1 R (11)	R7 L6,7	25	B'pn.
	130.	H.	18	Fb. '8	-	-	-	-	-	-	-	-	-	5	-	+	+	-	+	-	-	-	.5 101	2	72	-	+	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	-	16,	-	R&L MT	70	-	4	R7	9	Ac.Lob.

As on admission No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P.,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps. Rhonchi	Pleural friction	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of chest Site clear	Type of Pn.
131.	H.	18	Jy.'7	+	-	-	+	-	-	-	+	-	7	-	-	-	-	-	-	-	-	98.4	-	-	-	+	-	+	-	-	-	-	-	+	-	-	-	-	+	+	-	-	-	-	No AFB	R&L O LFO	72	1.5	(R)	R,7 R L,7	-	Bronch'
132.	H.	18	Dc.'7	-	-	-	17	-	-	-	-	-	2	+	-	-	-	-	-	-	-	101.5	1	84	3	+	-	-	-	+	+	-	-	-	-	-	-	-	+	+	-	-	-	24,	-	Cl.	66	-	2	L5,6,7	-	Ac.Lob.
133.	H.	18	Ja.'8	-	-	-	-	-	-	-	-	-	8	+	+	-	-	-	-	-	-	99.5	1	64	-	+	M	-	-	-	-	+	-	+	-	-	+	-	+	-	-	-	10,	-	Cl.	68	-	2	R,7	34	ATYP.
134.	H.	18	Dc.'7	-	-	-	-	-	-	-	-	-	2	-	+	-	-	+	-	-	-	100.5	2	72	-	+	M	+	-	+	+	-	-	-	+	+	+	-	+	+	-	-	-	7,	Pn.	-	62	-	2	L,5,6,7		Ac.L.
135.	H.	18	Oc.'7	-	Inf	-	+	-	-	-	-	-	8	-	-	-	-	-	-	-	-	101	1	110	1	+	M	+	-	-	-	-	-	+	-	+	+	-	+	+	-	-	-	16	-	Cl.	64	-	2	L6,7	16	Ac.L.
136.	J.	18	Ju.'7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	101	1	120	1	+	M	+	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	16	No AFB	L MT	-	-	1	R6,7	-	Ac.Lob.
137.	L.	18	Sp.'7	-	-	-	-	-	-	-	-	-	2	-	-	+	-	-	+	-	-	100	1	100	1	+	-	-	-	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	LO	-	-	1	R7	57	ATYP.
138.	L.	18	Sp.'7	-	-	-	-	+	-	-	-	-	3	+	-	-	-	-	-	-	-	100	3	80	-	-	-	-	-	+	-	-	-	-	+	-	-	-	+	-	-	-	7	-	R&L O	-	-	(R)	R7	10	ATYP.
139.	L.	18	Ag.'7	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	+	-	99.5	-	-	-	+	M	-	-	-	+	-	-	-	+	+	+	-	+	-	-	-	11,	-	-	-	-	2	L7	-	ATYP.
140.	M.	23	Jy.'7	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	+	+	-	100	1	88	7	+	M	+	-	-	+	-	-	-	-	-	-	-	-	-	+	-	11,	Gw sub AFB	-	52	1.5	4	R,7	?	Old Tubercle
141.	M.	19	Nv.'7	-	Inf	-	-	-	-	-	-	-	15	+	+	-	-	-	-	-	-	100.2	2	72	-	+	M	-	-	-	-	-	-	-	+	+	-	+	-	-	-	+	-	R&L O	64	-	3	L6,7	-	Ac.Lob.
142.	P.	18	Nv.'7	+	-	-	-	-	-	-	-	-	2	+	+	+	-	+	+	+	+	101.2	2	104	1	+	MP	-	+	-	+	-	-	+	-	+	+	-	+	-	-	-	-	-	LO RMT LFMT	66	-	2	R7 L6,7	-	B.pn.
143.	P.	18	Fb.'8	-	-	-	-	+	-	-	-	-	2	+	-	-	-	-	+	-	-	101.5	1	104	1	+	M	+	-	-	+	+	-	+	+	+	+	+	+	-	-	-	+	-	FL R	70	-	2	L6,7	7	Ac.Lob.
144.	R.	18	Sp. '7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	+	99.8	2	106	1	+	M	-	+	-	+	-	-	+	-	+	+	-	+	-	-	-	15,	Staph	R&L MT	66	-	2	L6,7	8	Ac.Lob.
145.	R.	18	Dc. '7	+	-	-	-	-	TB	-	-	-	3	-	+	-	-	+	-	-	-	101.1	1	96	1	+	M	+	-	-	-	-	-	+	-	+	+	-	+	+	-	-	-	5,	-	R&L LF MT	68	-	1	L6,7 R7	-	Ac.Lob.
146.	R.	18	Ag.' 7	-	-	-	-	-	-	-	-	-	?	-	-	-	-	-	-	-	-	100	1	100	1	+	M	+	-	-	+	-	-	-	-	-	-	-	+	-	-	-	7,	No AFB	L MT	-	-	1	L,5	55	ATYP
147.	R.	18	Ja.'8	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	99	1	82	-	+	-	-	-	-	-	-	-	-	-	+	-	-	+	+	-	-	-	+	Strept.	Poly L.	58	-	1	R&L6,7	21	B'pn.

As on admission No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest Pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps. Rhonchi	Pleural friction	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of chest: Site clear / Type of Pn.
148.	R.	18	Fb.'8	-	-	-	-	-	-	-	+	-	4	-	-	+	-	-	-	-	-	101	2	86	8	+	-	+	-	-	-	-	-	+	-	+	+	-	+	-	-	-	+	-	R&L MT	68	1.0	7	R,7 19 Ac.Lob
149.	S.	46	Dc.'7	+	-	-	-	+	-	-	-	-	2	+	-	-	-	+	-	-	-	104	2	108	5	+	MP	-	+	-	+	-	-	-	+	-	-	+	-	-	-	24, +	-	RL MT	64	-	2	R2,3 - Ac.L.
150.	S.	18	Jy.'7	-	Inf	-	Inf	-	-	-	-	-	14	-	-	-	-	-	-	-	-	99	3	80	2	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	20 +	-	Cl.	58	-	3	R&L3,7 27 B'pn.
151.	S.	18	Jy.'7	-	Inf	-	-	-	-	-	-	-	2	-	-	+	-	-	-	-	-	N	-	66.	-	+	M	+	-	-	+	-	-	+	-	+	+	-	+	-	-	-	14,	-	MT RL & EO	68	-	-	L6,7 10 Ac.Lob
152.	S.	18	Sp.'7	-	Inf	-	+	Inf	-	-	-	-	5	-	+	-	-	+	-	-	-	-	-	-	-	+	M	+	-	-	-	-	-	+	+	+	-	+	-	-	-	20, +	-	-	60	-	3	R&L 6,7 - B'pn
153.	S.	18	Ju.'7	+	Inf	-	+	-	-	-	+	-	5	-	-	+	+	+	-	-	-	101.5	1	68	-	+	MP	+	-	+	-	-	-	+	+	-	+	-	-	+	-	+	Pn Staph	R&L MT	74	-	2	R&L 6,7 45 Ac.L. (Polymorph (Effusion)
154.	S.	20	Fb.'8	-	Inf 19	19	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	99	1	84	-	+	M	+	-	-	-	-	-	+	-	+	+	-	+	-	-	-	+	-	R&L MT	64	-	1	R,7 7 Ac.Lob.
155.	S.	18	Dc.'7	-	Inf	-	-	-	-	-	-	-	4	-	+	-	-	-	-	-	-	102	3	110	3	+	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	16, +	-	Cl	74	-	3	R,7 - Ac.Lob.
156.	S.	18	Jy.'7	+	+	-	-	-	-	+	-	2	-	-	-	-	-	-	-	-	-	103.8	1	72	-	+	M	-	+	-	+	-	-	+	-	+	-	+	+	-	+	-	+	14,	Pn	-	68	1.0	-	L6,7 - Bronch'
157.	S.	18	Ja.'8	-	-	-	-	-	-	-	-	-	3	+	-	-	-	-	-	-	-	99.8	2	104	1	+	MP	+	-	-	-	-	-	+	-	-	-	+	-	-	-	17, +	-	No AFB R&L O	56	-	2	R,7 7 Ac.Lob.
158.	S.	20	Ag.'7	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	100	9	80	1	-	-	-	-	-	+	-	-	+	-	-	+	-	-	-	-	-	10,	-	-	-	-	11	L6,7 14 ATYP.
159.	T.	19	Dc.'7	+	-	-	+	-	-	-	-	-	1	-	-	-	-	-	-	-	-	102	3	84	3	-	-	+	-	+	-	-	-	-	-	-	+	+	-	-	-	-	Pn.	R&L MT	65	0.5	3	R6,7 10 Ac.Lob.
160.	T.	17	Jy.'7	-	-	-	-	-	-	-	-	-	7	+	-	-	-	-	-	-	-	99.5	1	80	1	+	M	+	+	-	-	-	-	+	-	+	-	-	+	+	-	-	12,	Pn.	Cl.	-	-	-	L6,7 34 ATYP.
161.	T.	18	Sp.'7	+	-	-	-	-	-	-	-	-	2	+	+	-	-	-	-	-	+	-	-	106	1	+	-	-	-	-	-	-	-	-	+	+	-	+	-	-	-	-	-	R&L O LFT	54	-	2	R,7 17 Ac.Lob.
162.	W.	18	Nv.'7	+	-	-	-	-	-	-	-	-	1	+	+	+	+	+	-	-	-	104	2	110	-	+	MP	+	+	+	+	-	-	+	+	+	+	-	+	+	-	-	14	Pn Staph	L MT	-	1.8	2	L5,6,7 19 Ac.Lob
163.	W.	18	Dc.'7	-	-	-	-	-	+	-	-	-	2	+	-	-	-	-	-	-	-	99	-	97	-	+	-	+	+	-	+	-	-	+	-	+	+	-	-	-	-	-	-	-	R MT	70	-	2	R&L 6,7 - B'pn.

As on admission No. of case	Name	Age	Month of onset	P.H. of N.ph.	P.H. Chest pn.	Pl.	Br.	Asth.	F.H. Chest Pn.	Pl.	Br.	Asth.	Day of Disease	Malaise	Shivering	Lassitude	Anorexia	Sweating	Fascial Pains	Joint Pains	Backache	T. on admission	Days T. sustained	P. on admission	Days P. sustained	Cough	Sputum (M,M.P,B.S.)	Pain in chest	Shortness of breath	Dyspnoea	Headache	Sore throat	Meningism	Coryza	Diminished Movement	Impaired P.N.	Diminished A.E.	Consolidation	General & (Localised) Creps.	Rhonchi	Pleural friction	None	Diagnosis Mass X ray	WBC on admission	Sputum culture	X ray of sinuses	Sulphonamide	Penicillin	Days till apyrexial	X ray of chest: Site clear	X ray of chest: Type of Pn.
164.	W.	23	Oct. '7	-	Inf	-	+	-	-	-	+	-	5	-	+	+	-	-	-	-	-	N	-	60	-	+	-	+	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	12, +	-	R&L MT ET	70	-	-	L6,7	-	ATYP.
165.	W.	19	Fb. '8	-	-	-	-	-	-	+	-	-	3	-	+	+	+	+	-	-	-	.5 100	8	108	10	+	MP	+	-	-	+	-	-	+	-	+	+	-	+	+	-	-	-	16 +	-	Cl.	70	0.92	8	L6,7	8	Ac.Lob.
166.	M.	18	Jan. '7	-	-	-	-	-	-	-	-	-	?	+	-	-	-	-	-	-	-	N	-	-	-	+	M	-	-	-	-	-	-	+	+	+	-	-	+	-	-	-	-	-	-	-	-	L6,7	36	ATYP.
167.	H.	18	Fb. '8	+	17	-	+	-	+	-	-	-	4	-	-	+	-	-	-	-	-	99	1	88	1	+	M	+	-	-	+	-	-	+	+	+	-	-	+	-	-	-	-	MTL FLR	72	-	1	1R&L	6&7	21 B'pn.
168.	W.	18	Fb. '8	-	-	-	-	-	-	-	-	-	5	-	+	-	-	-	-	-	-	101	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	MT R&L	58	-	7 (R)	R5,6,7 L6,7	-	B'pn.
169.	U.	18	Mr. '8	-	14	-	-	-	-	-	-	-	2	-	+	+	-	+	+	-	-	-	-	-	-	+	MP	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	-	R&L O	62	0.6	6	R&L 5,6,7		21 B'pn.
170.	N.	18	Fb. '8	-	-	-	-	-	-	-	-	-	3	+	-	+	+	-	-	-	-	N	-	80	3	+	MP	+	-	-	-	+	-	+	-	-	-	-	+	+	-	-	-	R&L	56	-	-	L5,6,7	14	Ac.L.
171.	S.	19	Mr. '8	-	-	-	-	-	-	-	-	-	1	+	-	-	-	-	-	-	-	101	2	100	3	+	-	+	-	-	+	-	-	+	+	+	-	+	-	-	-	-	8, -	-	R&L O	56	-	3	R6,7	-	Ac.Lob.
172.	M.	18	Mr. '8	-	-	-	-	-	-	-	-	-	1	+	-	-	-	+	+	-	-	102	-	126	3	+	MP	+	-	+	-	-	-	-	+	-	-	+	+	-	-	-	15, -	-	-	50	-	5	R&L 6,7	18	Ac.L.
173.	C.	18	Mr. '8	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	+	MP	+	-	-	-	-	-	-	+	+	+	-	+	-	-	-	-	24, Pn.	-	58	-	4	L5,6,7	19	A.L.
174.	H.	18	Mr. '8	-	-	-	-	-	-	-	-	-	4	+	+	+	-	-	-	-	-	101	-	100	-	+	MP	+	-	-	+	-	-	+	-	-	-	-	-	-	-	+	-	16, Pn.	R MT	50	-	10	R6,7	-	Ac.Lob.
175.	E.	18	Mr. '8	-	-	-	-	-	-	-	-	-	4	+	-	+	-	+	-	-	-	-	-	-	-	+	MP	+	+	+	-	-	-	-	+	+	+	-	+	-	-	-	-	12 -	R&L MT	50	-	2	L5,6,7 R6,7	23	B'pn.
176.	F.	18	Fb. '8	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	100	1	-	-	+	-	+	-	-	-	+	-	-	-	-	-	+	-	-	-	-	15, -	Cl.	54	-	1	R6,7	-	Ac.Lob.
177.	S.	18	Mr. '8	-	2	17	+	-	-	-	-	-	3	+	-	+	+	-	+	-	-	99	1	88	1	+	M	-	-	-	-	-	-	+	-	-	-	-	+	+	-	-	-	14, Pn.	MT R&L & F	56	-	1	R5,6,7 L6,7	26	Ac.L.
178.	H.	18	Mr. '8	-	-	-	-	-	-	-	-	-	5	+	-	+	-	-	-	-	-	99	4	-	-	+	MP	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	13 -	R O	56	-	4 (R)	L6,7 1	34	Ac.Lob.
179.	B.	18	Mr. '8	-	-	-	-	-	-	-	-	-	4	+	+	-	-	-	-	-	-	-	-	-	-	+	MP	+	-	-	-	-	+	-	-	-	-	+	+	-	-	-	14, -	-	58	0.92	5	R&L 6,7	20	B'pn.

CYSTIC DISEASE OF LUNG

(b) Clinical notes on representative cases.

(1) LOBAR PNEUMONIA

Case No. 22. AC2 S. Age 18 years.

This patient was admitted to hospital on 23/6/46 and gave a history of shivering, sweating and left sided pleuritic pain, for one day.

There was no relevant past history.

On admission the temperature was 104.8° F. and pulse 120/m. The pyrexia and tachycardia were sustained for three days.

Examination showed no evidence of an upper respiratory infection. There were signs of consolidation and persistent crepitations over the left lower lobe.

White cell count on admission showed a leucocytosis, 22,000/c.m.m. Blood sedimentation rate was 50 m.m. in the first hour. Sputum on culture grew many pneumococci.

Radiological examination confirmed that there was pneumonic consolidation of the left lower lobe, showing as a homogeneous opacity.

Sulphonamide was given on admission, full course of 35G being given in four hourly doses.

Response to treatment was satisfactory, there being rapid subjective and clinical improvement. Resolution of the pneumonia was complete, as confirmed by a second X ray taken eleven days later.

The patient was discharged from hospital after 18 days, to proceed on a period of sick leave prior to his return to full duties.

113. AC2. J.C. Age 19 years.

The patient was admitted on 2/12/47. There was a history of lassitude, backache and headache for two days. He also complained of a cough and had coughed up blood-stained sputum. Some dyspnoea was partly explained by a pleuritic pain. No relevant past history was obtained.

The temperature was 104°F and pulse 148/m. on admission. No upper respiratory infection was present. Examination of the chest showed signs of consolidation and persistent crepitations at the left base.

White blood count on admission was 27,000/c.m.m., Polymorphs 85%, Lymphocytes 11%, Monocytes 4%. Pneumococci were grown on culture of sputum.

Radiologically there was a homogeneous opacity at the left lower lobe, with increased broncho vascular markings and some mottled opacities in the right cardiophrenic angle.

In view of the severity of the infection sulphonamide was started by giving 1 G. intravenously and continued in four hourly doses of 2 G. orally, to a total of 68 G. The response to treatment was satisfactory and the patient was apyrexial within two days.

Radiological examination of the sinuses showed the right and left antrums to be opaque. The remaining sinuses were clear. An E.N.T. specialist advised no treatment.

After six days in bed the patient was allowed up gradually. A further X ray at the time showed marked improvement but some opacity still persisted at the left base. As the practice with such/

such ambulant patients was to send them on a month's sick leave and to readmit them to hospital on return for further examination, he was discharged from hospital after 16 days. Radiologically there was complete resolution and the patient felt quite fit at the end of the period of sick leave.

114. AC2. M.C. Age 18 years.

This patient was admitted to hospital on 7/12/47. He gave a two day history of malaise, headache and a non-productive cough. A history of fairly frequent head colds was obtained. There was no family history of chest diseases.

On admission the temperature was 102°F. and the pulse 100/m. These were sustained for two days.

Examination showed impairment of percussion, diminished air entry and persistent localised crepitations at the right base.

White blood count was 19,000/c.m.m. on the day after admission. Differential count showed polymorphs 78%, lymphocytes 21%. monocytes 1%. Culture of the sputum grew only commensals of the pharynx.

Response to sulphonamide was speedy, a course of 68 G. being given in 4 hourly doses. The white cell count was 9,200/ c.m.m. on the 4th day of treatment and there was complete radiological resolution after one week.

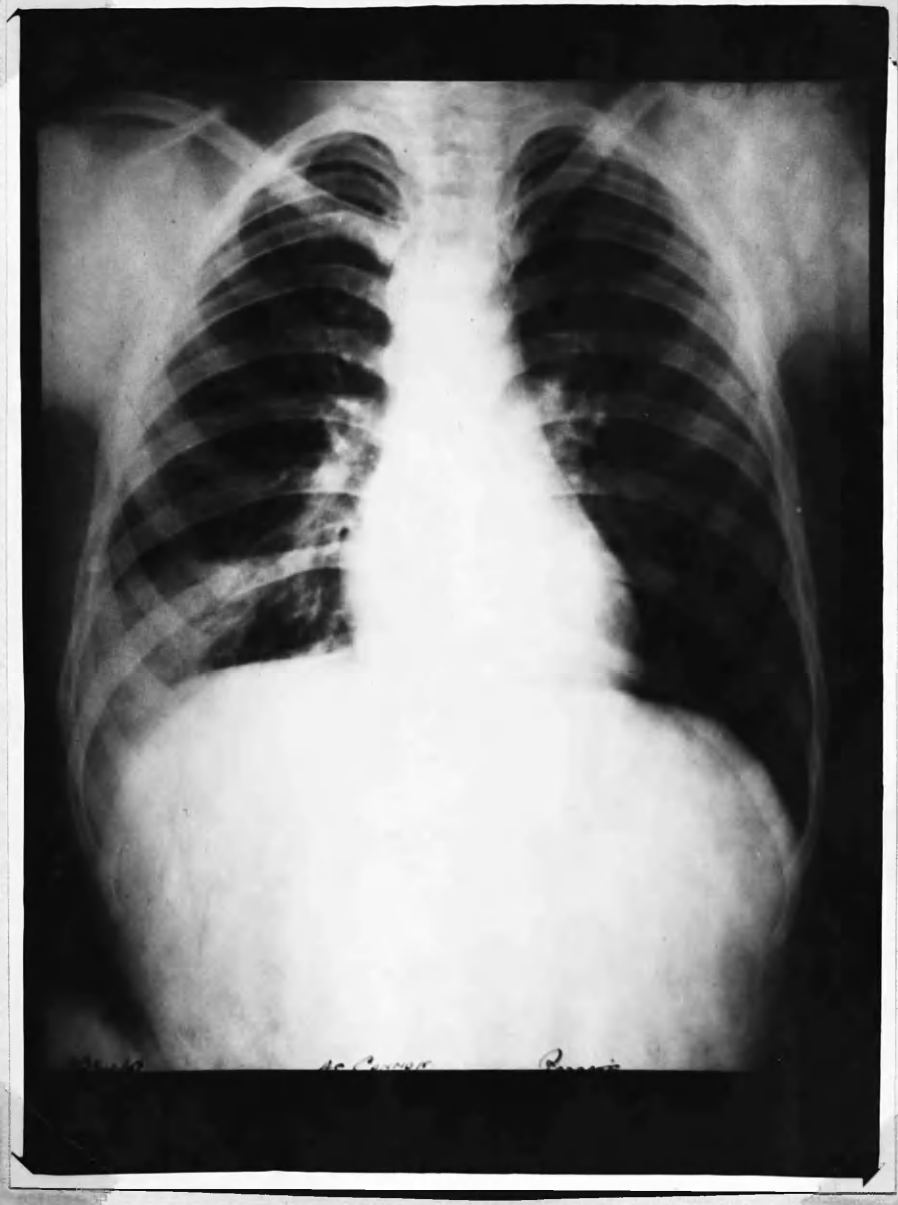
Radiological examination showed mucosal thickening in both antra, the remaining sinuses being clear.

Clinically, though pneumococci were not isolated in the single sputum specimen cultured, this case presents the features of an acute lobar pneumonia detected at an early stage. The/

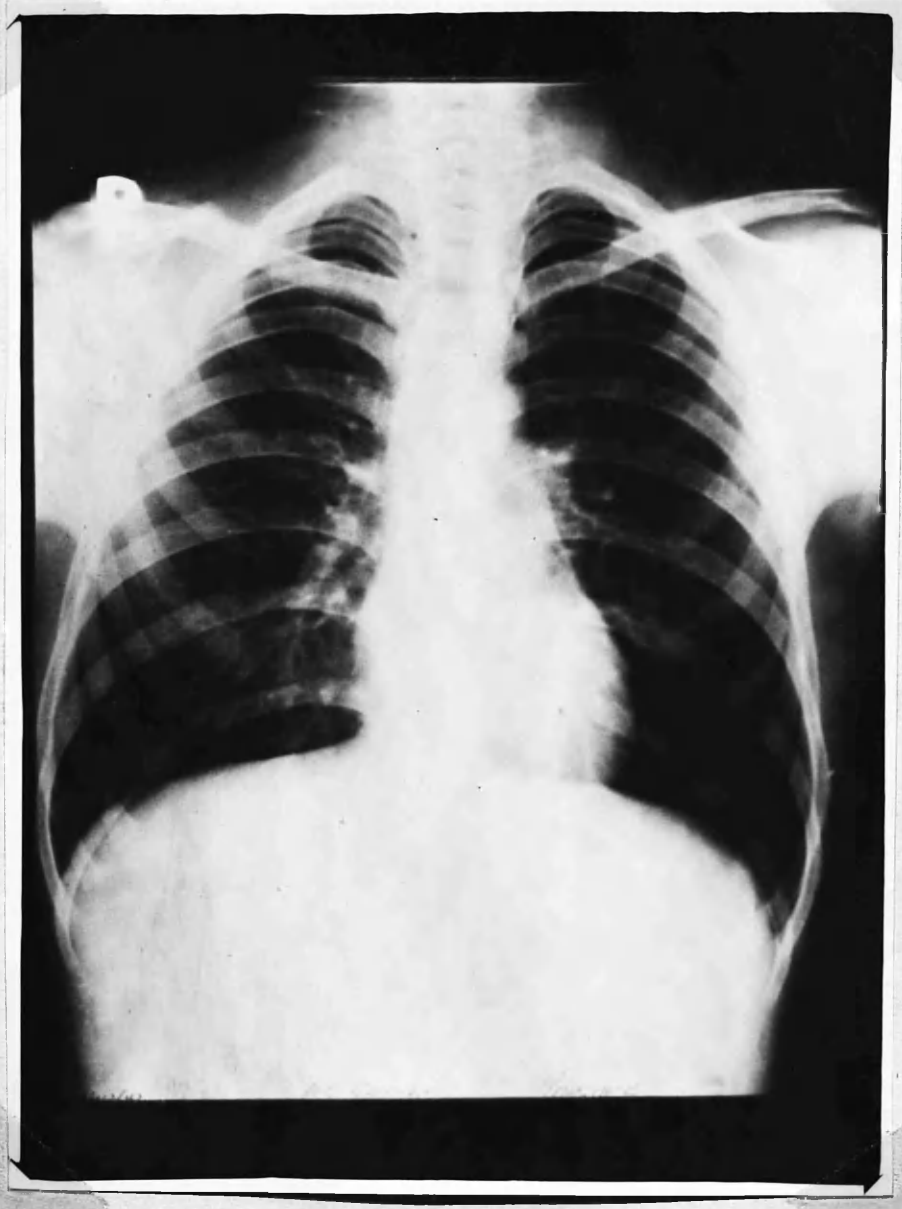
The onset was abrupt and accompanied by moderate pyrexia and leucocytosis. Sulphonamide administration resulted in rapid and complete resolution.

The X rays are reproduced to demonstrate the early stage at which many of the pneumonias were being seen. Although the opacity seen in Plate I is situated peripherally and occupies only part of the right lower lobe, it conforms to the homogeneous consolidation of lobar pneumonia. There is no evidence of partial collapse. It is not the mottled opacities associated with lobular pneumonia and bronchopneumonia. Plate II shows complete resolution has taken place.

CASE 114. PLATE 1.



CASE 114. PLATE II.



(2) LOBULAR PNEUMONIA

130. AC2 I.H. Age 18 years.

This patient, admitted on 12/2/48, gave a history for 5 days of headache, lassitude, shivering, sweating and a non-productive cough. A temperature of 101.5°F. was sustained for two days. There was no relevant past history.

Clinical examination showed localised crepitations and rhonchi at the right base. White blood count on admission was 16,400/c.m.m., polymorphs 80%, lymphocytes 15%, monocytes 4%, basophils 1%.

There was no obvious upper respiratory infection. However, radiological examination of the sinuses showed mucosal thickening of both antra, more marked on the right.

Mottled opacities were present in the right cardio-phrenic angle on radiological examination. Otherwise the lung fields were clear.

Sulphonamides were administered four hourly to a total dose of 70 G. The patient was apyrexial in four days and allowed up after 6 days. Further radiological examination after 9 days showed complete resolution. He was discharged from hospital on the fifteenth day feeling fit.

104. AC2 D.W.B. Age 18 years.

Lobular pneumonia, while presenting the features of an acute pneumococcal pneumonia, often has little, yet definite, local/

local signs in the chest, both clinically and radiologically.

This patient was admitted to hospital on 11/2/48. He gave a history of pneumonia 3 years ago but none of chronic cough and sputum since then. Coryza, shivering and lassitude had been present on admission for three days. He also complained of a cough with some mucoid sputum. There was left pleuritic pain.

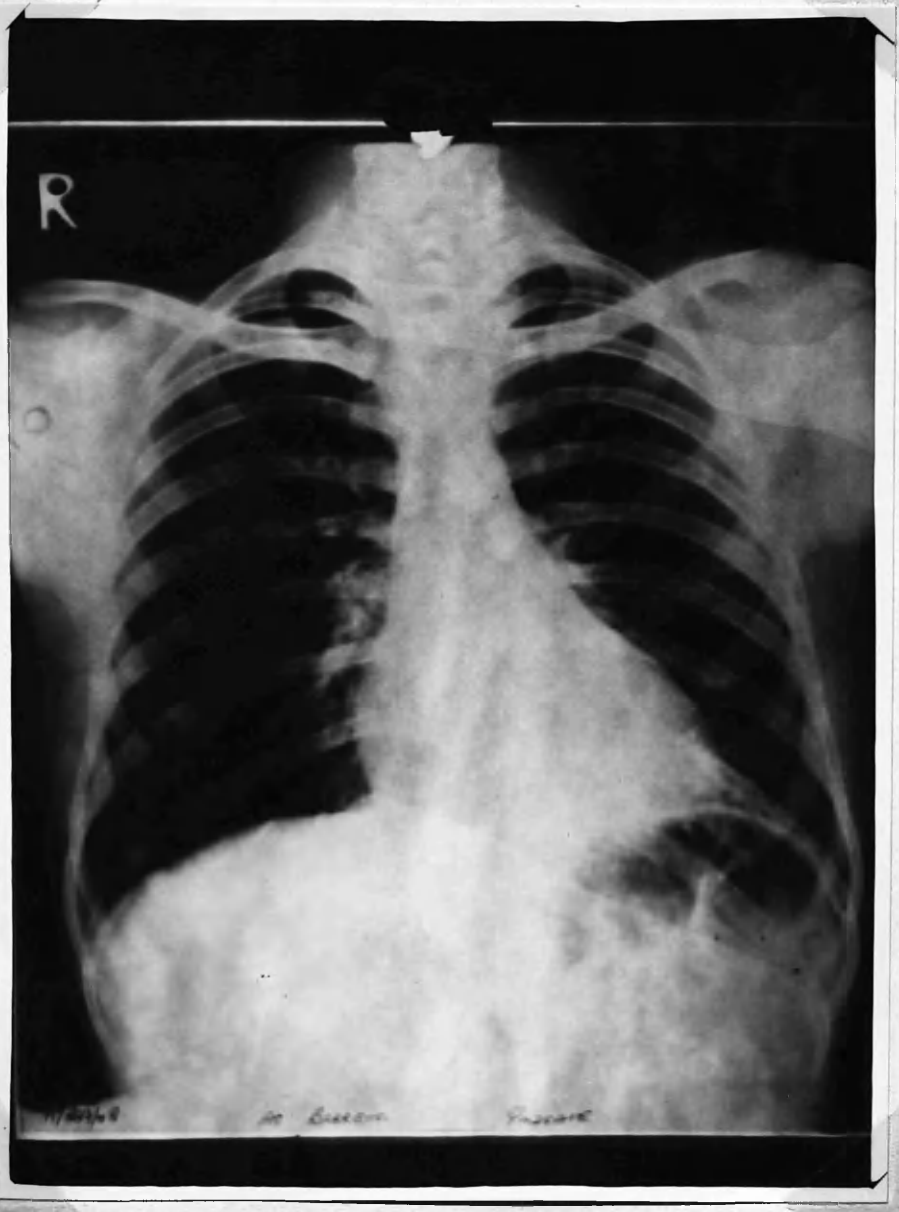
Temperature was 100.8°F. and pulse 96/m., being sustained for two days. At the left base there was diminished movement, impairment of percussion, diminished air entry, and persistent localised crepitations. White cell count was 17,800/c.m.m. polymorphs 84%, lymphocytes 9%, monocytes 4%, basophils 1% and eosinophils 3%.

Sulphonamide was given in four hourly doses to a total of 68G. The response was immediate and a white all count done five days after admission was 8,400/c.m.m. Resolution was rapid and complete.

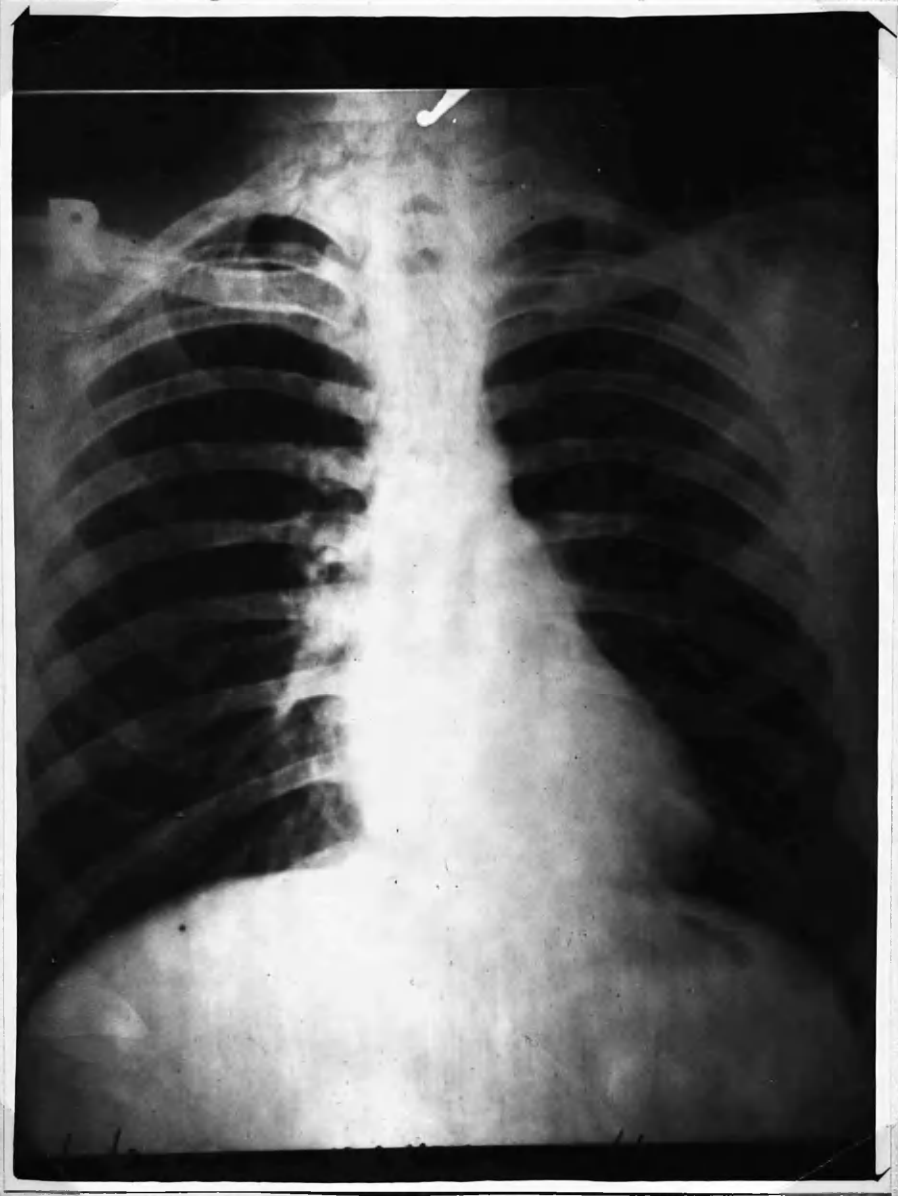
These features are consistent with a lobar pneumonia, being detected early, and showing rapid response to sulphonamide therapy. Yet it will be seen in PlateI that radiologically there is only minimal evidence of pneumonia. There are, however, definite localised areas of opacity in the left cardiophrenic angle corresponding in site to the signs detected clinically. Plate II, taken thirteen days later shows complete resolution, the cardophrenic angle now being quite translucent.

Radiological examination of the sinuses showed a homogenous opacity in the right antrum, consistent with mucosal oedema.

CASE 104. PLATE I



CASE 104. PLATE II.



165. AC2 G.W.W. Age 19 years.

On admission to hospital on 13/2/48 this patient gave no past history of chest disease nor of frequent head-colds. His father had pleurisy 4 or 5 years ago.

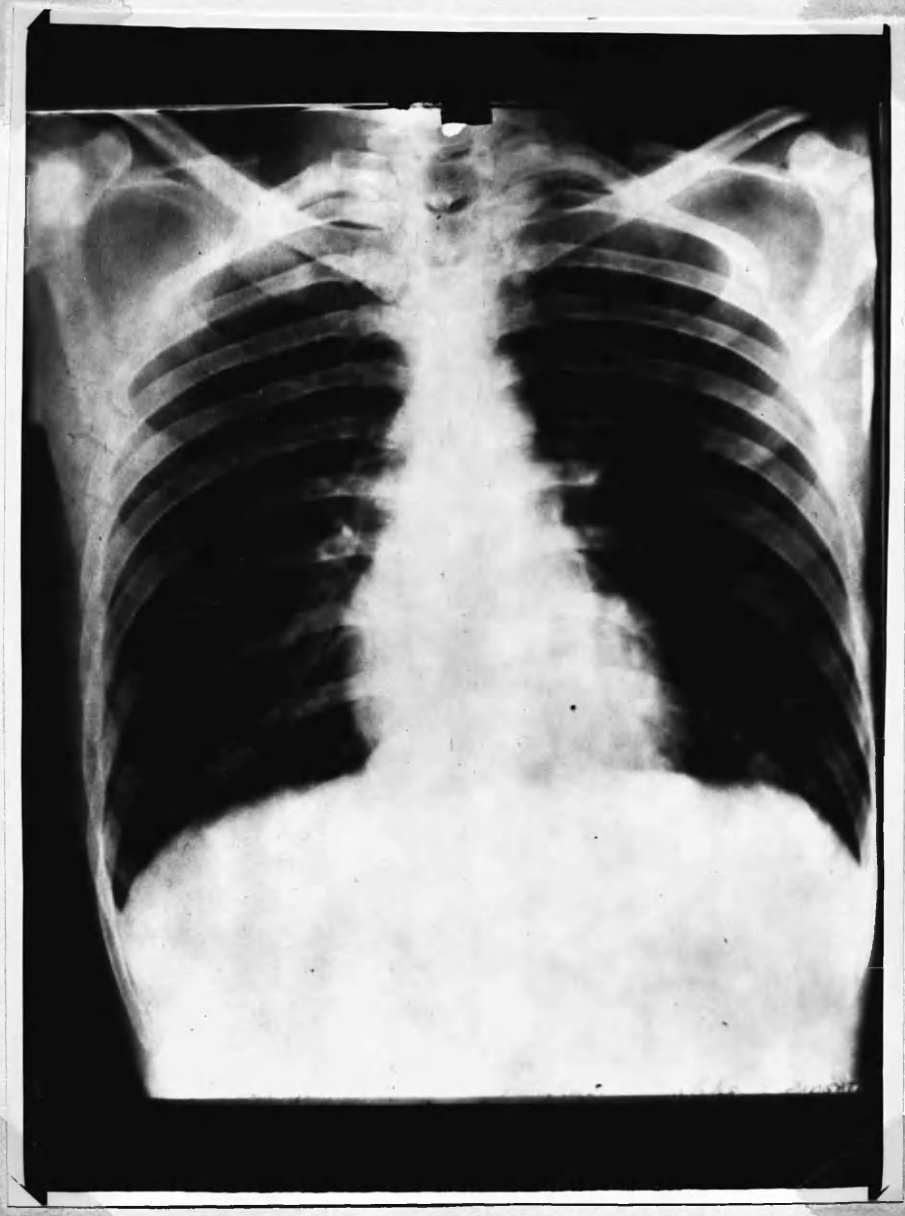
There was a three day history of head-cold, headache, shivering, sweating, lassitude and anorexia. A cough with mucopurulent sputum was present and also left pleuritic pain.

The temperature was 100.5°F. and the pulse 108/m. At the left base there was impairment of percussion, diminished air entry, localised crepitations and rhonchi. White cell count on admission was 16,200/c.m.m. polymorphs 75%, lymphocytes 12%, monocytes 10% and eosinophils 3%. Sulphonamide drugs were given four hourly to a total of 70 G. In this case, as in the majority of cases when the patient was not apyrexial 48 hours from the onset of chemotherapy, penicillin was also given in 3 hourly injections, to a total, in this case, of 0.92 mega units.

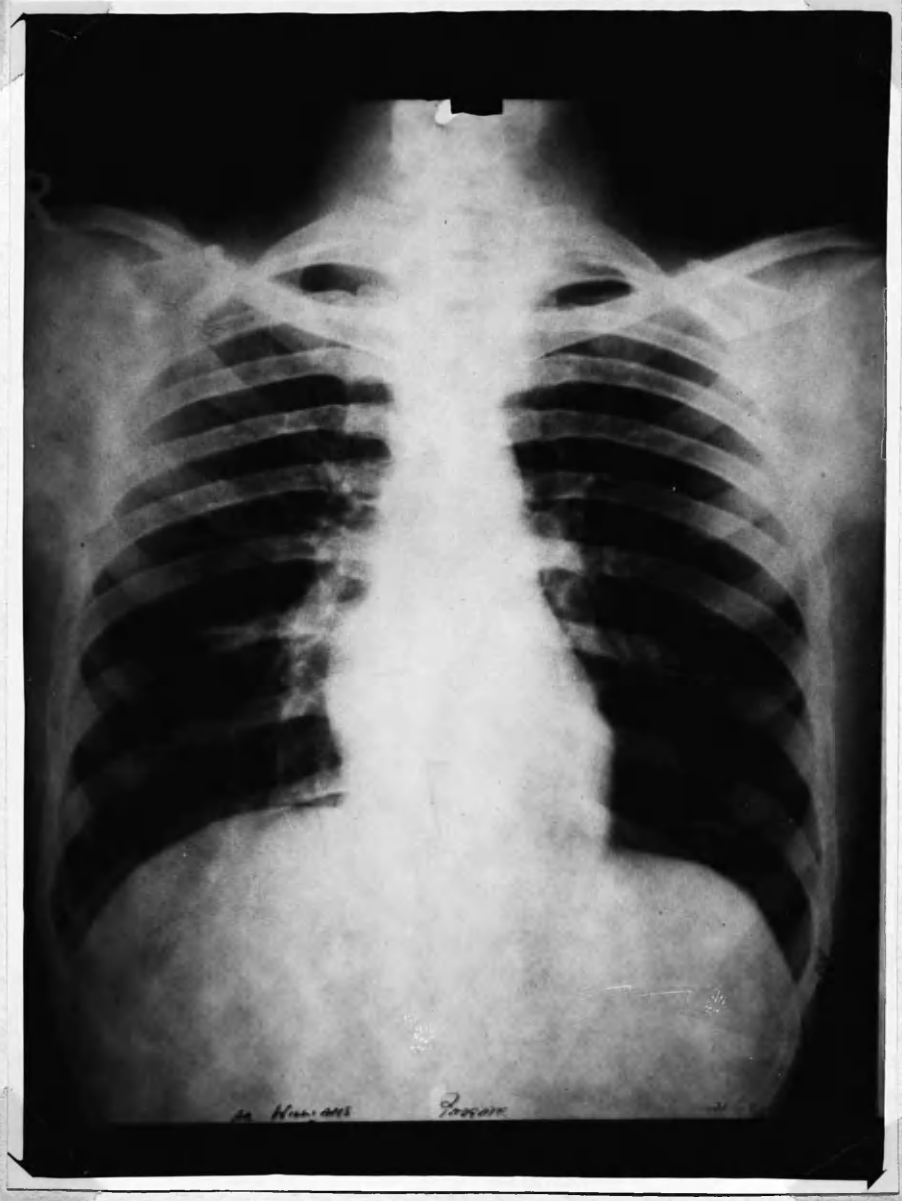
Here again there were minimal signs of pneumonia radiologically yet the onset and course was that of an acute pneumonia with concurrent upper respiratory infection. The signs radiologically, though meagre, are definite, localised opacities being seen in the left lower lobe above the crest of the diaphragm in Plate I. Though resolution is complete, there is evidence to support a preceding pneumonitis. Adhesion of the pleural surfaces locally has resulted in a "peaking" of the diaphragm, as seen in Plate II.

Radiological examination showed no evidence of sinus disease.

CASE 165. PLATE I.



CASE 165 PLATE II.



116. AC2. R.C. Age 18 years.

This illustrates some of the difficulties experienced in classifying the borderline cases. These which, while showing features of one type of pneumonia, also had features of another.

The patient, admitted on 29/1/48 , gave a past history of pneumonia in infancy. His father has chronic bronchitis.

For one day only there was a history of headache, sore throat, coryza, malaise, shivering, fascial pains and a non-productive cough.

The temperature was 104.5°F. and pulse 118/m. on admission. This degree of pyrexia was sustained for one day only and the tachycardia for 3 days.

The only signs detected in the chest were localised crepitations and pleural friction at the right lower lobe. The white cell count was 26,000/c.m.m. polymorphs 85%, lymphocytes 9%, monocytes 3%, eosinophils 1% and basophils 2%. Subsequent culture of a single specimen of sputum showed commensals of pharynx only.

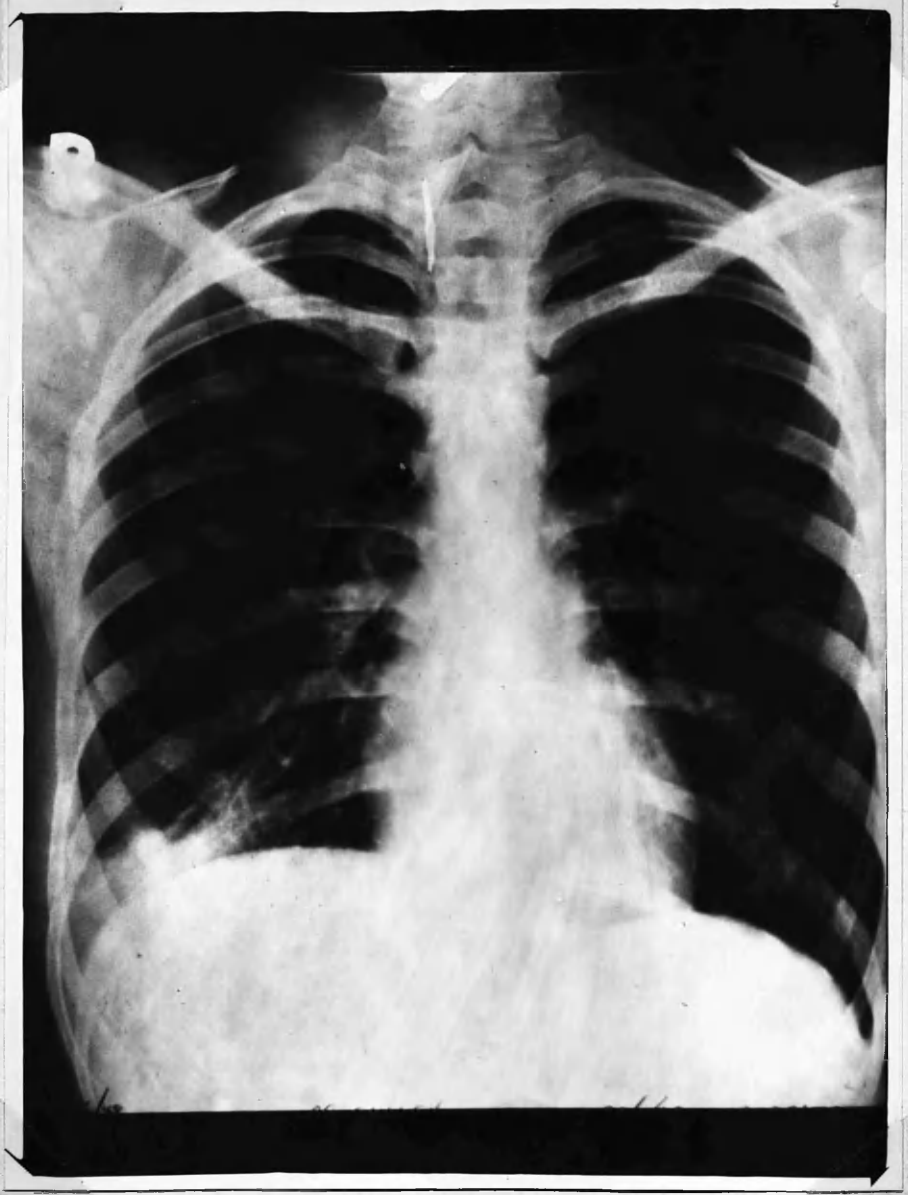
Administration of sulphonamides to a total of 52G, resulted in defervescence. White cell count repeated a week later was 9,000/c.m.m. The patient had been allowed up since the fifth day.

The radiological findings are again slight in comparison with the degree of illness on admission, Plate I. The onset is abrupt, the pyrexia moderate to severe, the leucocytosis above 20,000/c.m.m. and the response to sulphonamides immediate, yet the X ray plate supports the absence clinically of signs of true lobar/

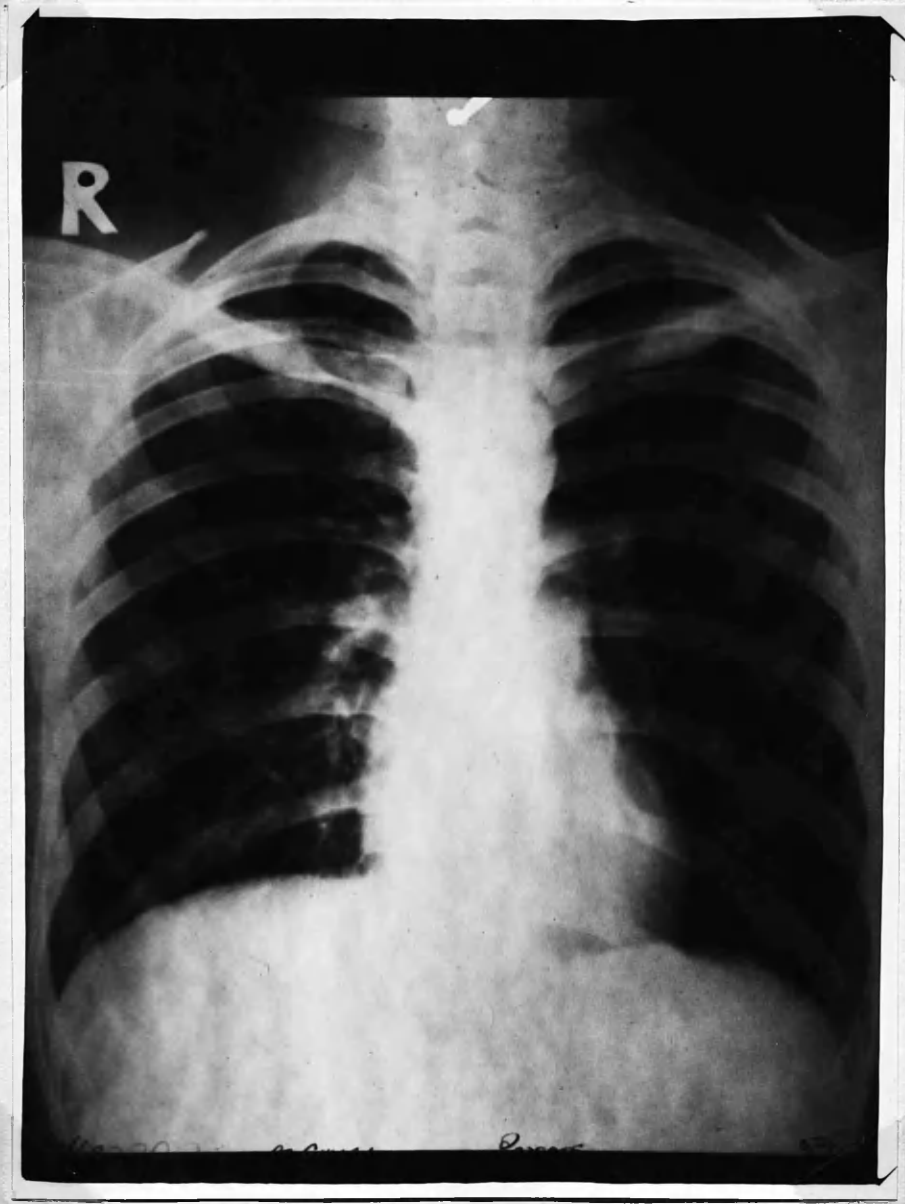
lobar pneumonia. The proximal mottled opacities in the right lower lobe, consistent with lobular pneumonia, become confluent peripherally resulting in a homogeneous opacity similar to that seen in lobar pneumonia. Plate II, taken a week later, shows complete resolution.

Sinus X rays show loss of translucency in both antra, especially the right, which suggests mucosal thickening.

CASE 116 PLATE I.



CASE 116 PLATE II.



(3) BRONCHOPNEUMONIA

123. AC2 B.F. Age 18 years.

The patient was admitted on 29/9/47. Apart from frontal headaches for 2-3 months, there was no relevant past personal or family history.

There was a five day history of shivering, sweating, non-productive cough, headache and coryza.

On admission the patient was extremely ill. He was delirious, cyanosed, dyspnoeic and had vomited. The temperature was 104°F. and pulse 140/m. White cell count was 17,600/c.m.m. polymorphs 81%, lymphocytes 16%, monocytes 3%. Clinically there was diminished movement bilaterally, impairment to percussion and numerous scattered crepitations throughout both lower lobes. Apex-impulse was slightly displaced to the left.

Radiologically there were numerous scattered fine opacities throughout both lower lobes, with evidence of partial collapse of the left lower lobe. There appeared to be mucosal thickening in the right antrum radiologically.

He was treated with sulphonamides, 56 G, and penicillin, 0.96 mega units. The response was unusually rapid for such a widespread, though early, bronchopneumonia, the temperature returning to normal within 24 hours. A second white cell count done three days after admission was 7,600/c.m.m. and the lung fields were quite clear radiologically, when a second X ray was taken in 4 days time. Unfortunately the sputum was not cultured. The hospital laboratory had to deal with many routine out-patient investigations and interesting though it would have been to know if/

if such a case was a true pneumococcal bronchopneumonia, the response was satisfactory and as a rule the routine investigation of such cases was limited.

57. AC2 F. Age 18 years.

The patient was admitted on 19/2/47. He was a poorly nourished youth who gave a history for about 8 days of lassitude, dyspnoea and a non-productive cough. The temperature on admission was 104°F. and the pulse 120/m. White blood count was 21,000/c.m.m. with a polymorph preponderance to 87%. Culture of the sputum showed no predominant organism. Acid-fast bacilli were not detected.

On examination a marked kyphosis was noted. There was diminished movement, diminished air-entry and numerous scattered crepitations in both lower lobes.

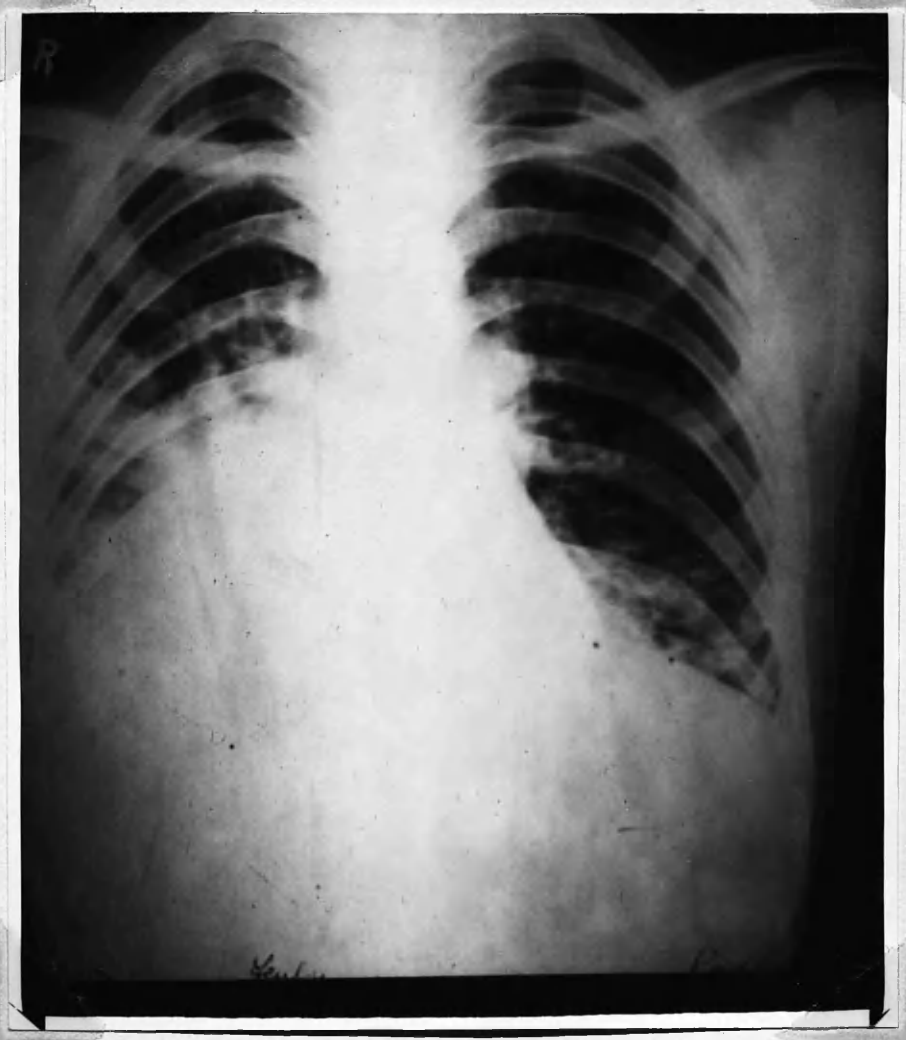
Radiologically, Plate I, there are confluent mottled opacities throughout both lower lobes and some in the right upper lobe.

An initial course of sulphonamides, total 77 G, and penicillin, total 3.9 mega units, were given, in doses of 2 G four hourly and 50,000 units three hourly respectively. However in spite of this intensive treatment the pyrexia and tachycardia did not subside and the patient remained seriously ill. Repeated culture of the sputum still isolated no predominant organism but those grown still were penicillin sensitive. In view of this, it was decided to try a then heroic dose of penicillin, 200,000 units four hourly to a total of 2.7 mega units. There was, thereafter, for the first time, a definite response both clinically/

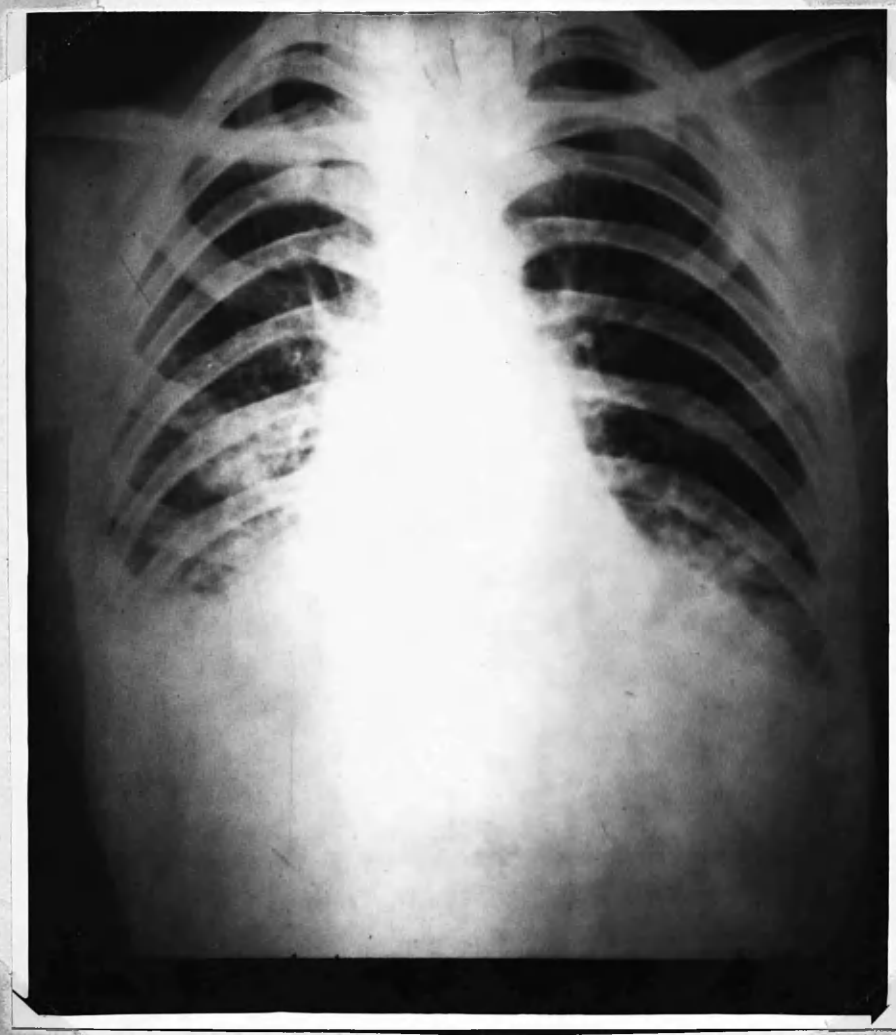
clinically and radiologically. Plate II taken 9 days later, shows evidence of considerable resolution. Plate III shows further improvement, the plate being taken prior to discharge from the hospital. The final X ray, Plate IV, taken after sick leave, shows only some residual straightening of the right diaphragm, the pneumonic process having resolved.

These two cases of bronchopneumonia illustrate the differences seen in this type. Both patients were acutely ill on admission, especially the first one, yet they had a very different course of illness. In general the cases of broncho-pneumonia resembled the second case more, an indefinite response, followed by a prolonged convalescence.

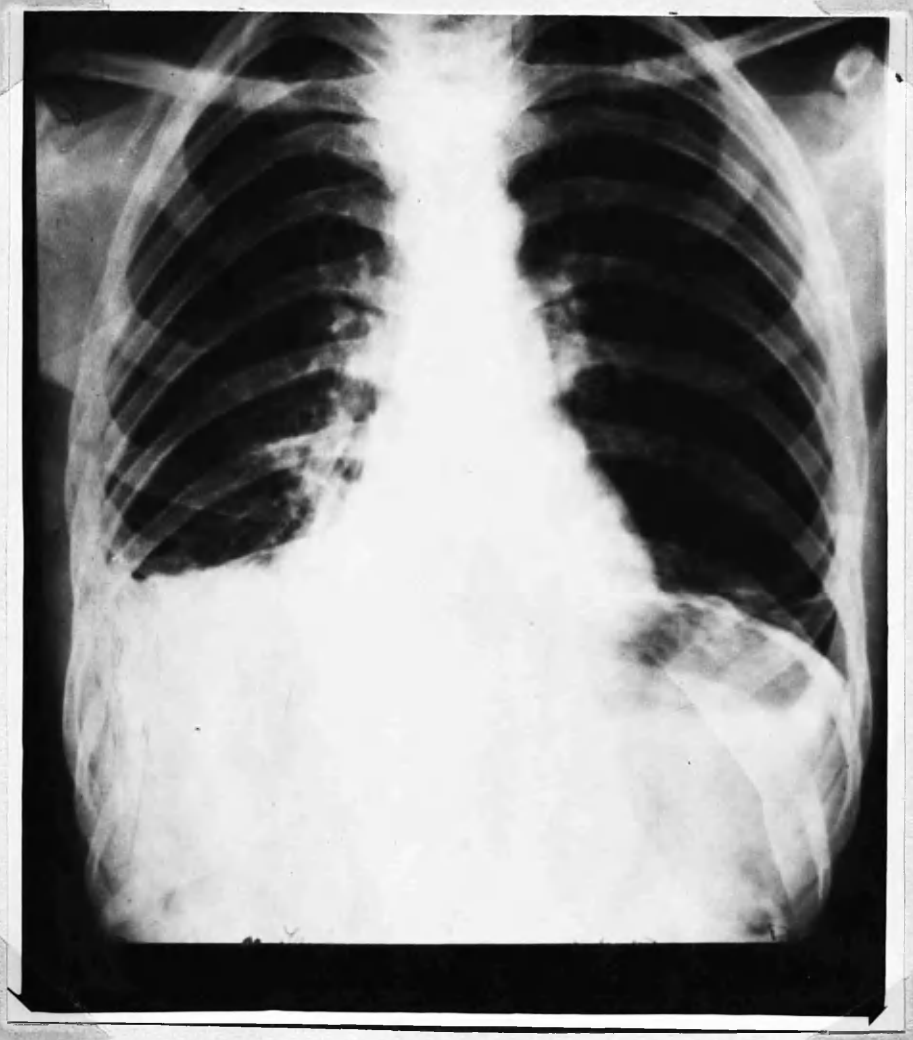
CASE 57 PLATE I



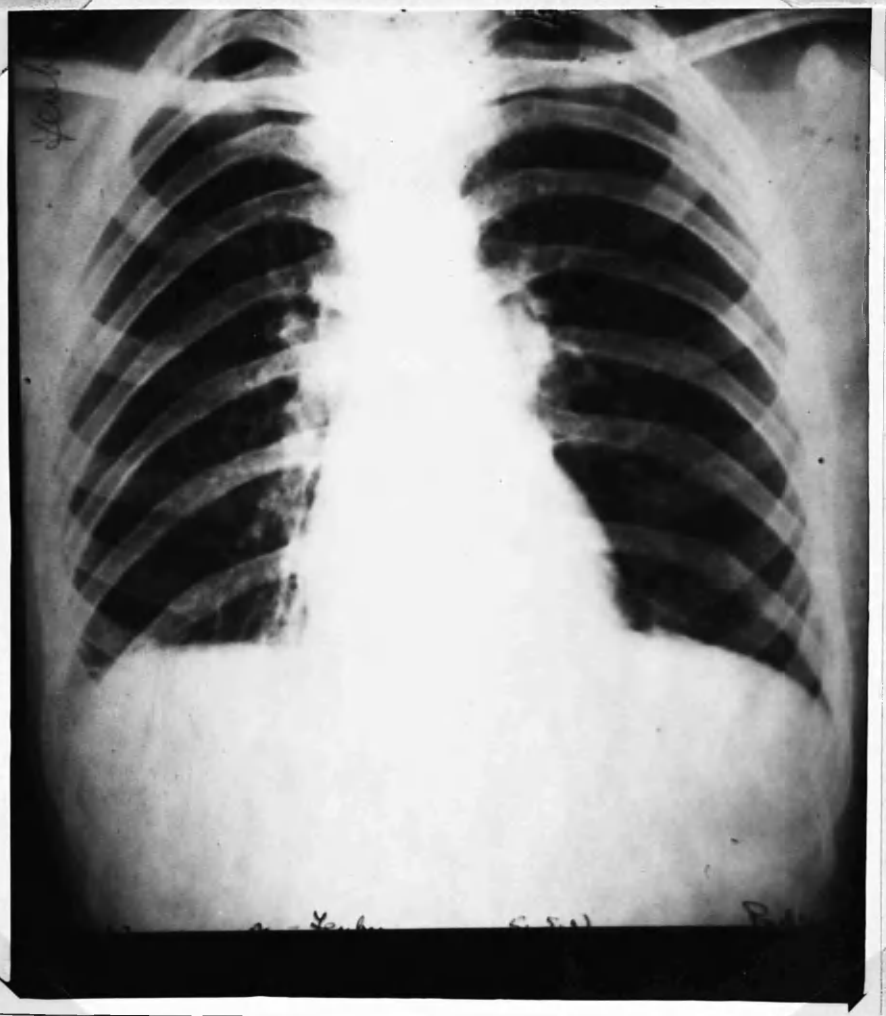
CASE 57 PLATE II.



CASE 57 PLATE III



CASE 57 PLATE IV



(4) "ATYPICAL" PNEUMONIA

13. AC2 H. Age 20.

This patient had no symptoms, the pulmonary lesion being detected accidentally by routine mass radiography. He was admitted to hospital on the 5/6/46.

On admission the temperature and pulse-rate were normal. Clinical examination showed only localised crepitations, rhonchi and pleural friction at the right base. White cell count was 7,500/c.m.m. polymorphs 71%. The blood sedimentation rate was 3 m.m. in the 1st hour. Sputum was negative for acid-fast bacilli.

There was no obvious coryza but radiologically the left antrum was slightly opaque. The E.N.T. specialist punctured the antrum to obtain only mucus.

Radiological examination on admission showed mottled opacities above the dome of the right diaphragm and a small area of mottling in the left upper lobe, otherwise the lung fields were clear. A second X ray taken 22 days later showed that the opacities above the diaphragm had persisted but the left upper lobe was no longer involved. A final X ray taken after sick leave showed this entirely benign pneumonia to have cleared completely, leaving no evidence of fibrosis.

The patient received no treatment, beyond bed rest.

65. F/O H. Age 26 years.

This patient was a Medical Officer. He gave no past history of chest disease. However, he had been in contact with two proven cases of "atypical" pneumonia prior to admission.

There was an eight day history of lassitude. No coryza was present. He was alarmed because, for the first time, he coughed up some blood-stained sputum.

The temperature was normal and pulse 60/min. He was well built and nourished. The only abnormal finding was persistent crepitations over the right lower lobe posteriorly. White cell count was 6,400/c.m.m. polymorphs 59%, lymphocytes 22%, monocytes 15%, eosinophils 4%. Sputum was negative for acid-fast bacilli and on culture only a few colonies of staphylococcus aureus were grown.

Radiologically there was a homogeneous opacity in the right lower zone. Otherwise the lung fields were clear. A second X ray taken a week later showed considerable improvement, though the resolution was incomplete.

At the end of a fortnight he was discharged from hospital to proceed on a month's sick leave. He returned thereafter to his own unit direct and had a final X ray taken there. This X ray showed there had been complete resolution by then. He received only symptomatic treatment.

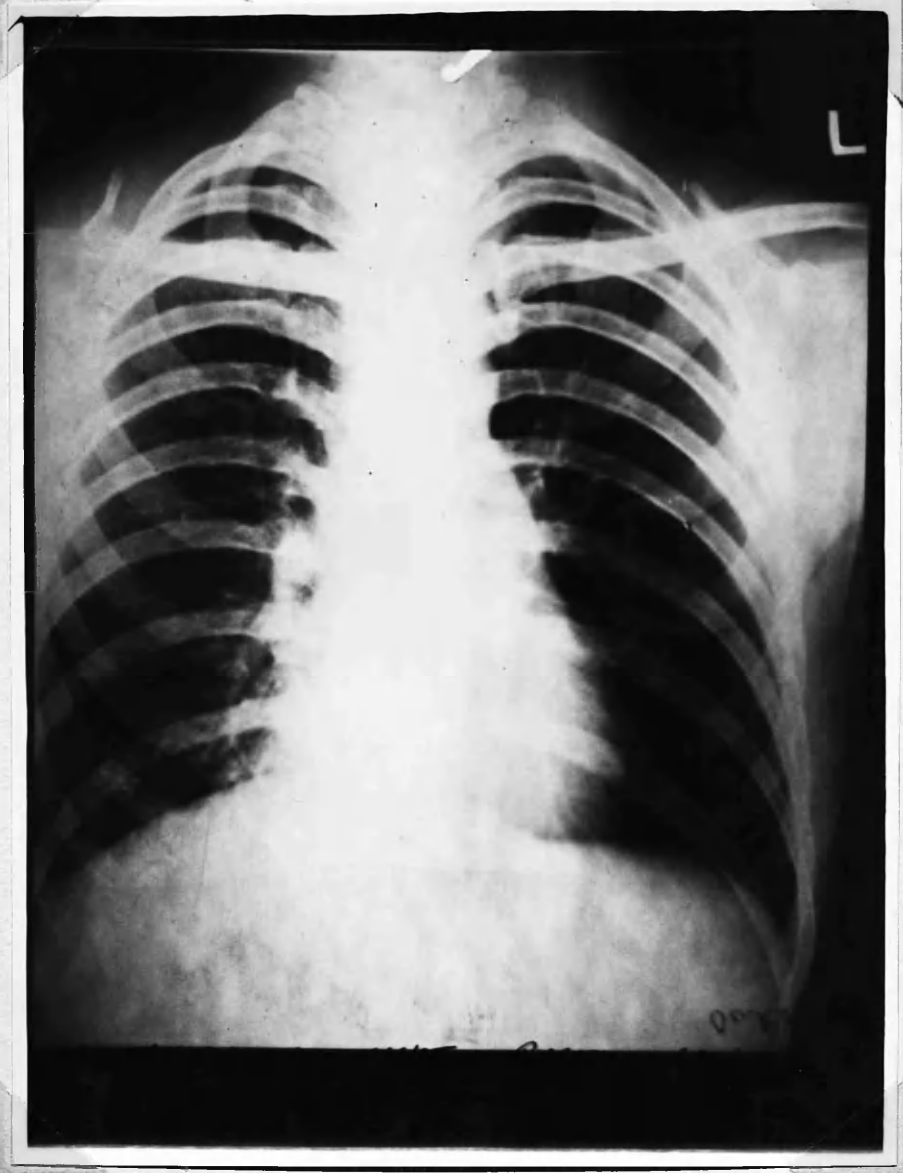
19. AC2 O. Age 18 years.

On 1/7/46 this patient was admitted to hospital giving a history of some recent shivering, sweating and lassitude. There was/

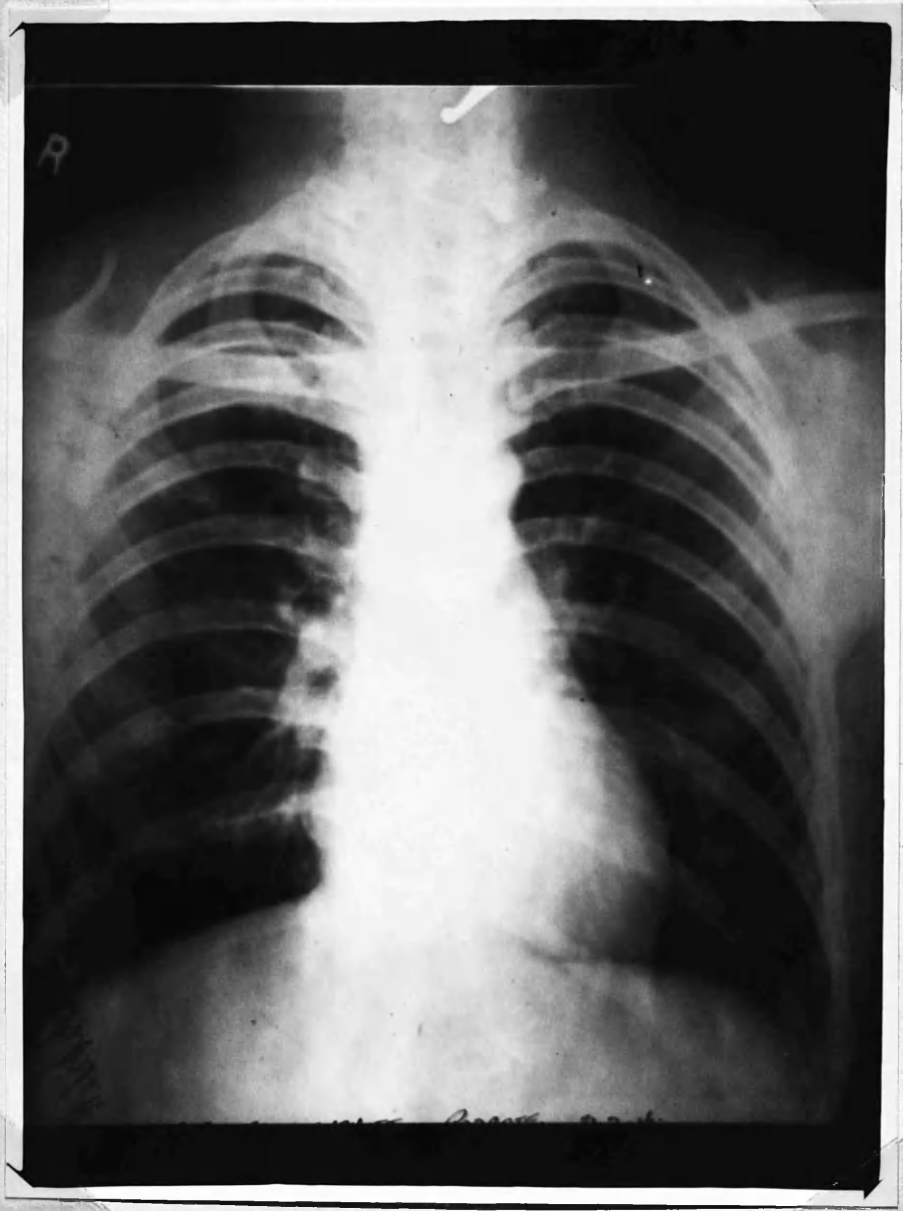
was cough and mucoid sputum. The temperature on admission was 99.8°F. and the pulse 96/m. Clinical examination showed only persistent crepitations at the right base. Radiologically, Plate I, there is some opacity in the right cardiophrenic angle, merging with the right cardiac border. The slight pyrexia settled within 24 hours from admission. A second X ray taken eleven days later showed improvement but some opacity still remained. The patient was discharged from hospital to proceed on a fortnight's sick leave. On return the X ray Plate II, showed complete resolution, the right cardiophrenic angle being translucent.

He received no treatment and was not entirely confined to bed during his stay in hospital.

CASE 19 PLATE I.



CASE 19 PLATE II.



Illustrative Sinus X rays.

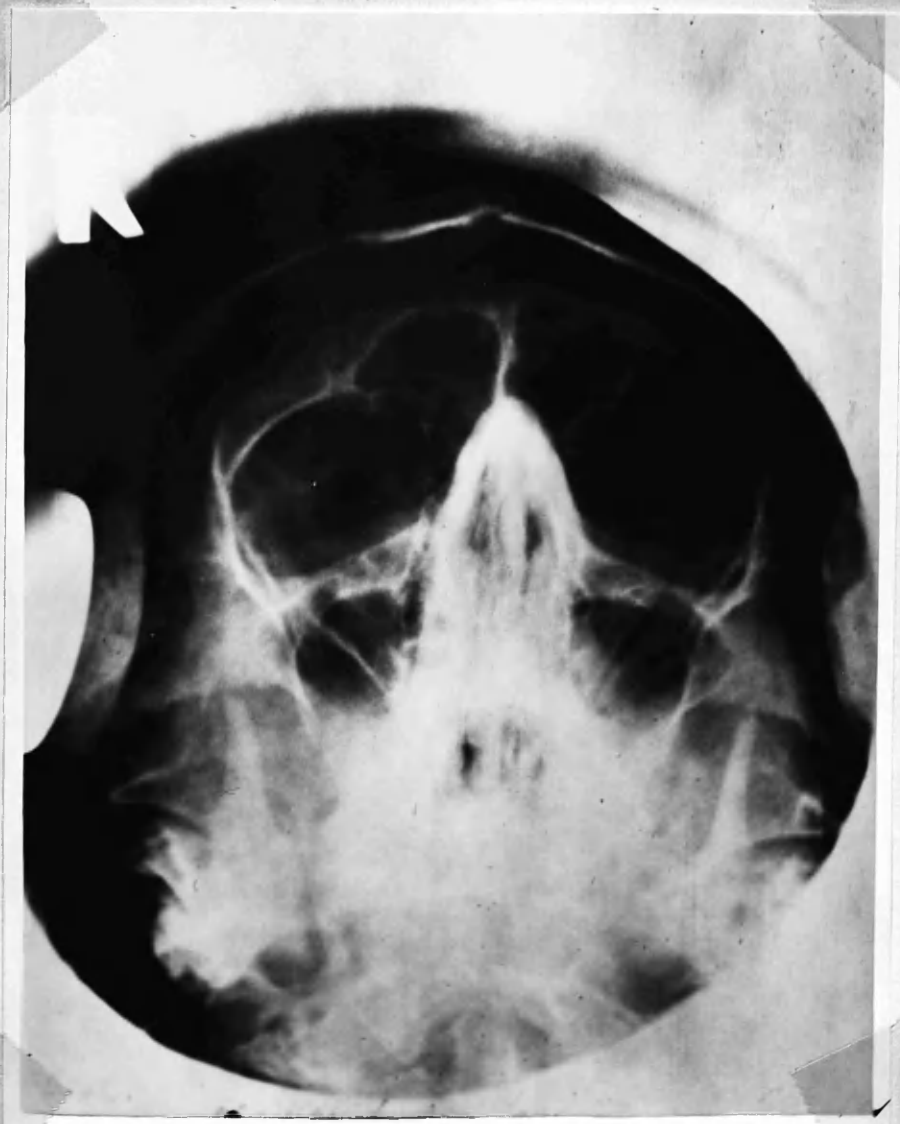
106. AC2 B. Age 18 years.

Acute lobular pneumonia.

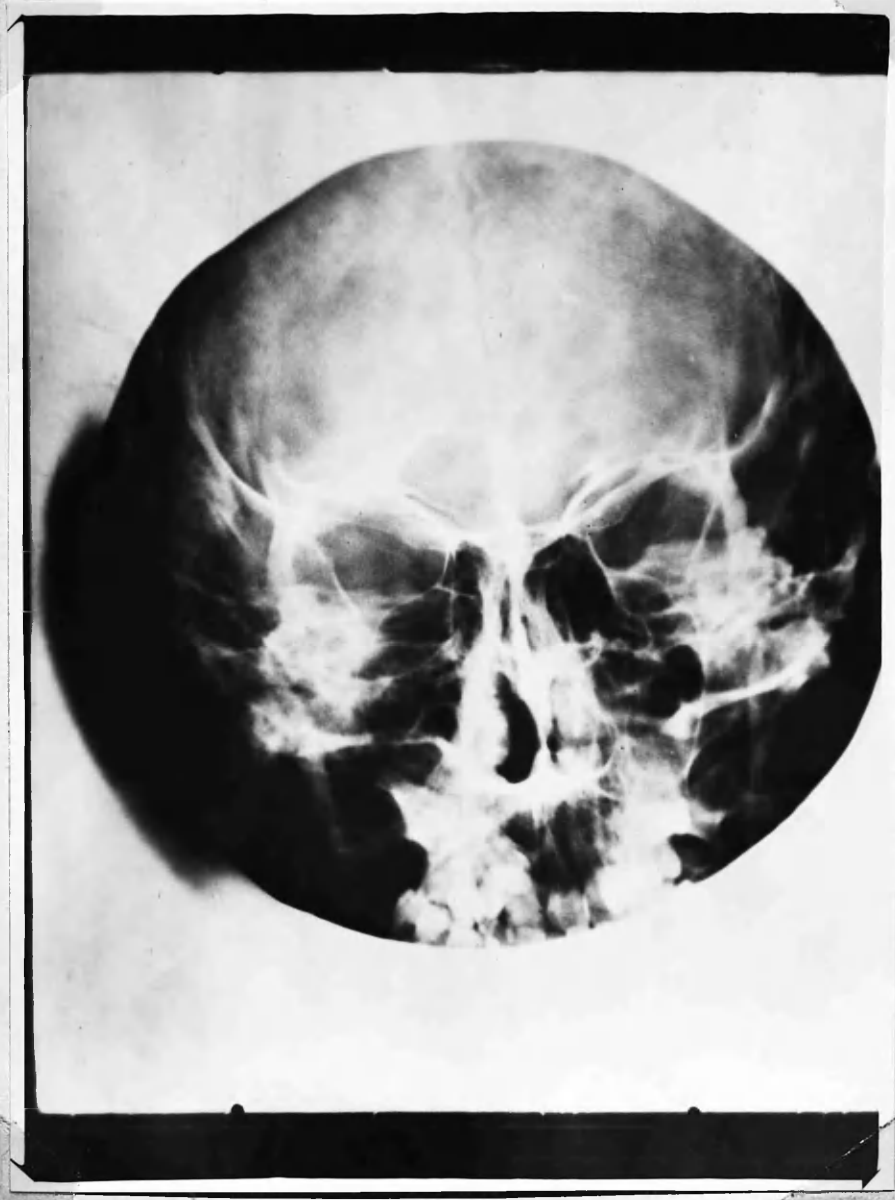
Coryza was present on admission.

Plates I and II show no radiological evidence of sinus disease, maxillary and frontal sinuses being quite clear.

PLATE I.



CASE 106 PLATE II.



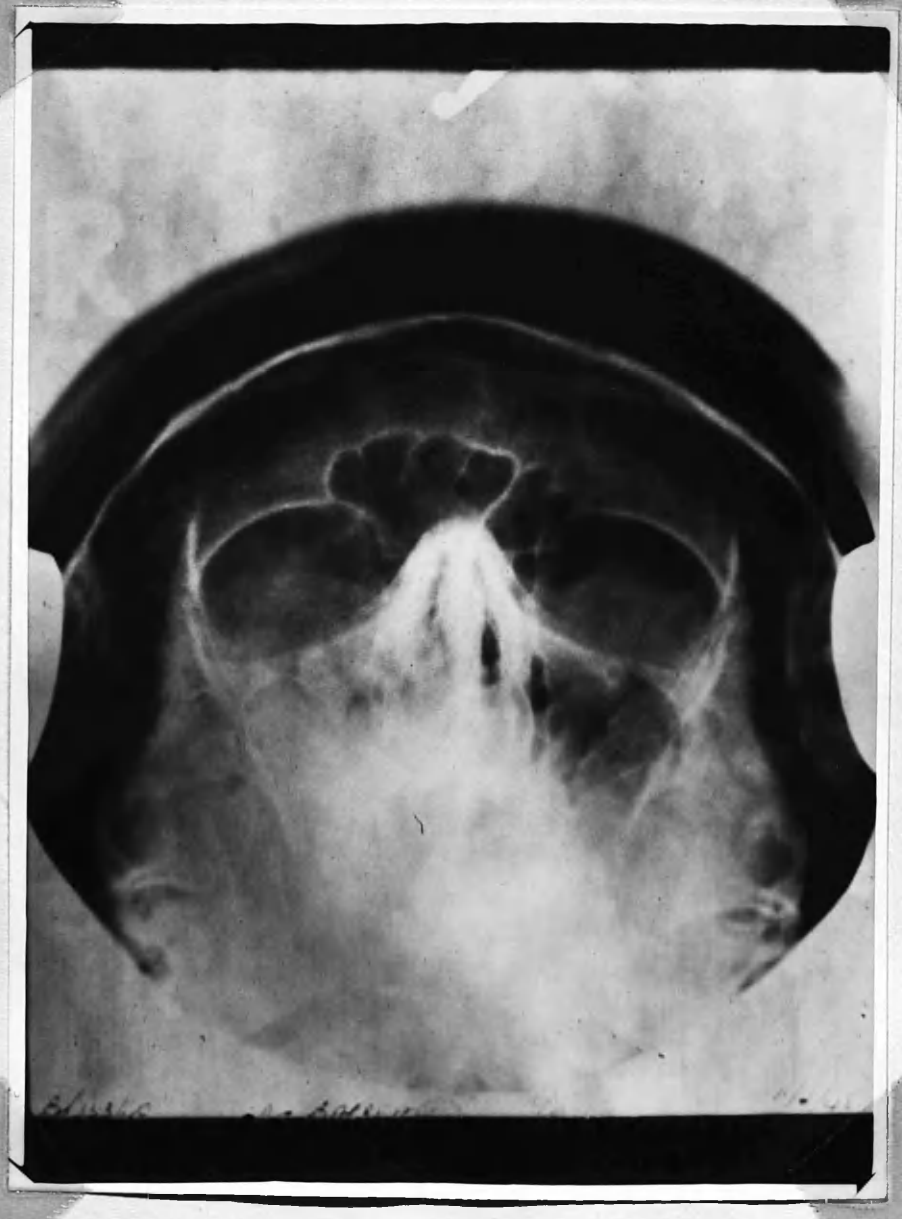
104. AC2 D.W.B. Age 18 years.

Acute lobular pneumonia.

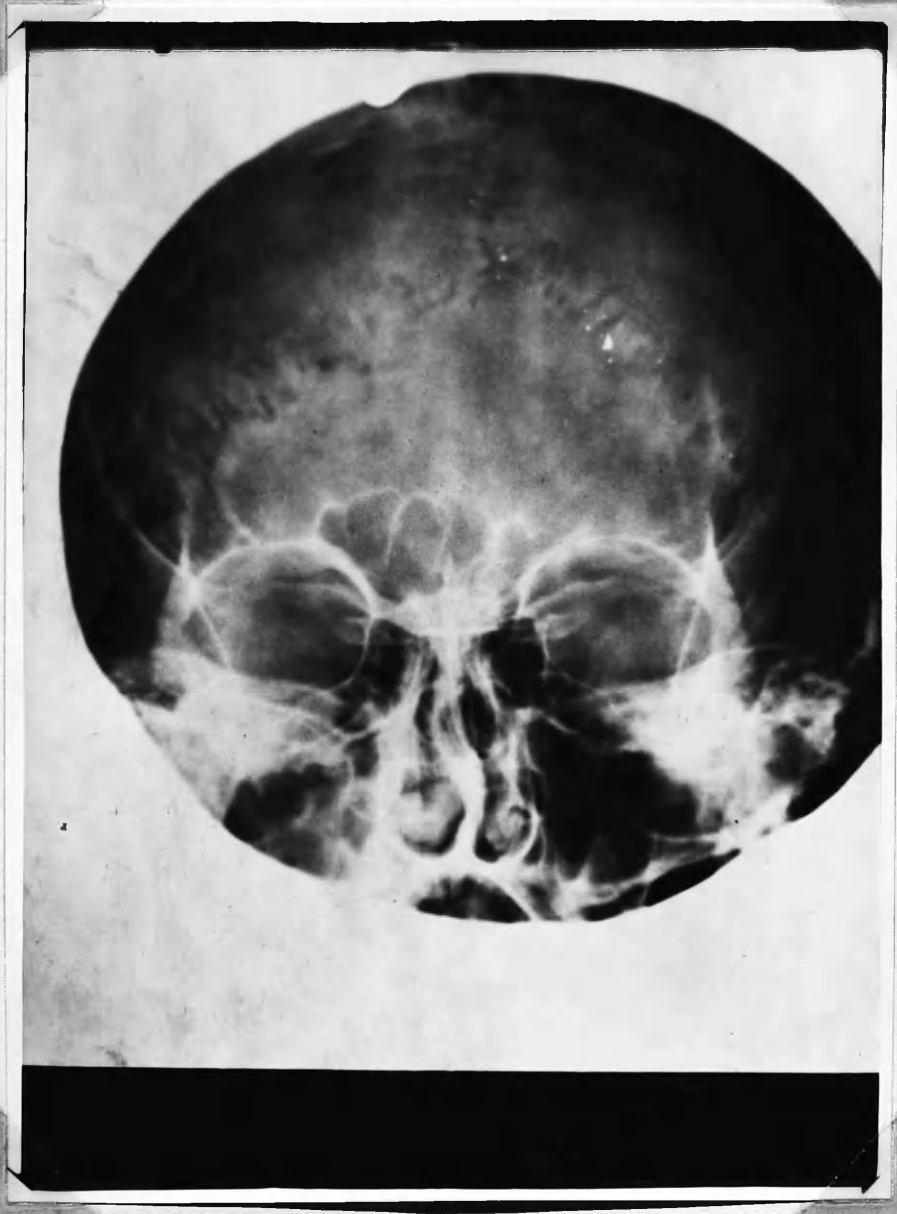
Coryza present on admission.

Plate I & II show a homogeneous opacity of the right antrum consistent with mucosal oedema. The remaining sinuses are clear.

PLATE I.



CASE 104 PLATE II.



(c) Analysis of material.

(1) The personnel.

A total of 179 patients were diagnosed on admission as suffering from a pneumonia. The majority of these patients were only moderately ill. A few were severely ill, requiring immediate administration of sulphonamide drugs intravenously.

All were male service patients and the majority were just recruited to the Royal Air Force. They formed a Young Adult group. The majority had always enjoyed good health and were accustomed to a rather sedentary life. Generally they were of good physique but on the average were slightly under weight, compared with the Young Adult accustomed to service habits. This was clearly shown by the universal gain in weight during their initial training. In no case did this slight under-nourishment approach malnutrition levels.

(2) The mode of life.

The majority had been accustomed to reasonably comfortable home conditions and now endured physical exertion and exposure to cold and damp foreign to them, there being frequent chilling.

The training was exacting, often fatiguing. There were regular nourishing meals, of ample quantity. Sleep was, for the most, of uniform duration. It was a communal life and in the barrack huts and classrooms there was close contact with neighbours.

A cold and damp environment usually prevailed. The Station was situated near Warrington, between Manchester and Liverpool, the weather being notoriously inclement in this area/

area. In winter there are occasional fogs, and for two months of one of the winters under review there was exceptional cold, January and February, 1947.

(3) Type of pneumococci prevalent in the area.

The pneumococcal type should be ascertained in any pneumococcal pneumonia if the epidemiology, severity of illness and response to treatment are to be assessed exactly. However in the young adult pneumococcal pneumonia as a whole, can be assessed clinically, with considerable accuracy (Hodges etal. 1946) and valid conclusions drawn.

It is noteworthy that the prevalent pneumococcal type in the Manchester area between 1939 and 1942 was the type I pneumococcus (quoted, Anderson 1945). This type tends to cause a milder illness (Anderson 1945) and yet an illness which conforms most closely with the classical description of pneumonia (Cecil, 1927).

Large numbers of pneumonias have been typed in America. Cecil etal (1927) in 1,092 cases under 40 years of age found 40% to be due to the type I pneumococcus and Blake (1931) found in patients under 39 years that 80% of the pneumonias were caused by this type.

However desirable it might have been, it was not practical to type the causal organism in the pneumococcal pneumonias included in the present series.

(4) Classification of the cases.

Acute lobar pneumonia	44 cases
Acute lobular pneumonia	51 cases
"Atypical pneumonia"	46 cases
Bronchopneumonia	22 cases
Bronchiectasis	13 cases
Tuberculosis	3 cases

Total number of cases of pneumonia ... 163

(5) The cases of pneumonia detected by mass radiography

Total number of cases.... 20 (12.2% of total 163 cases).

	Number of cases	Percent of each type of pneumonia
Lobar pneumonia	3	(6.8)
Lobular pneumonia	1	(1.9)
"Atypical" pneumonia	15	(32.6)
Bronchopneumonia	1	(4.5)

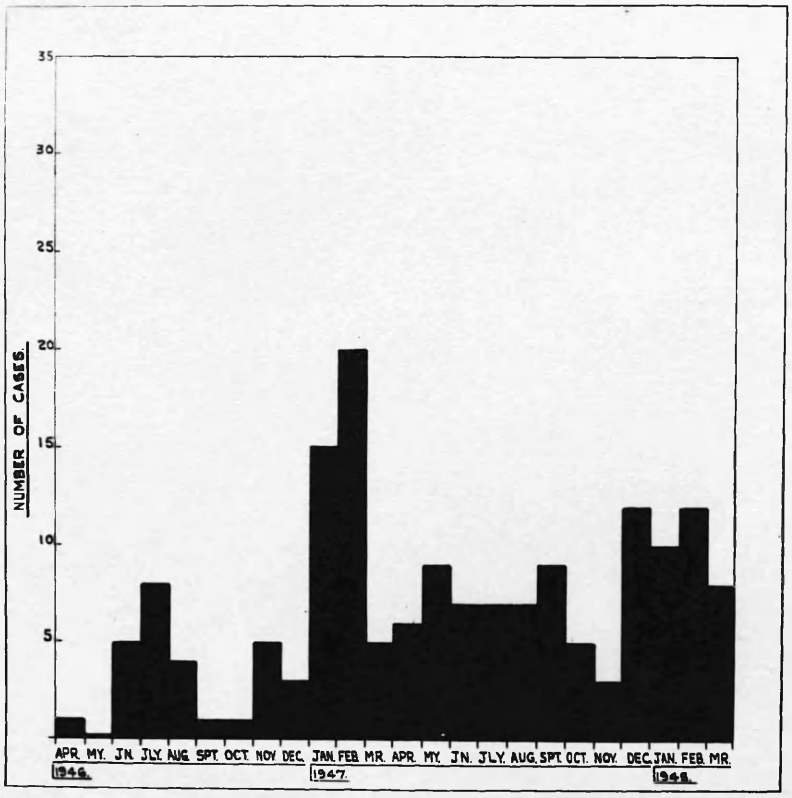
Six other cases, in the total 179 patients, were detected by mass radiography but proved to be non-pneumonic, bronchiectasis or tuberculosis.

(6) Age Incidence in 163 cases of pneumonia

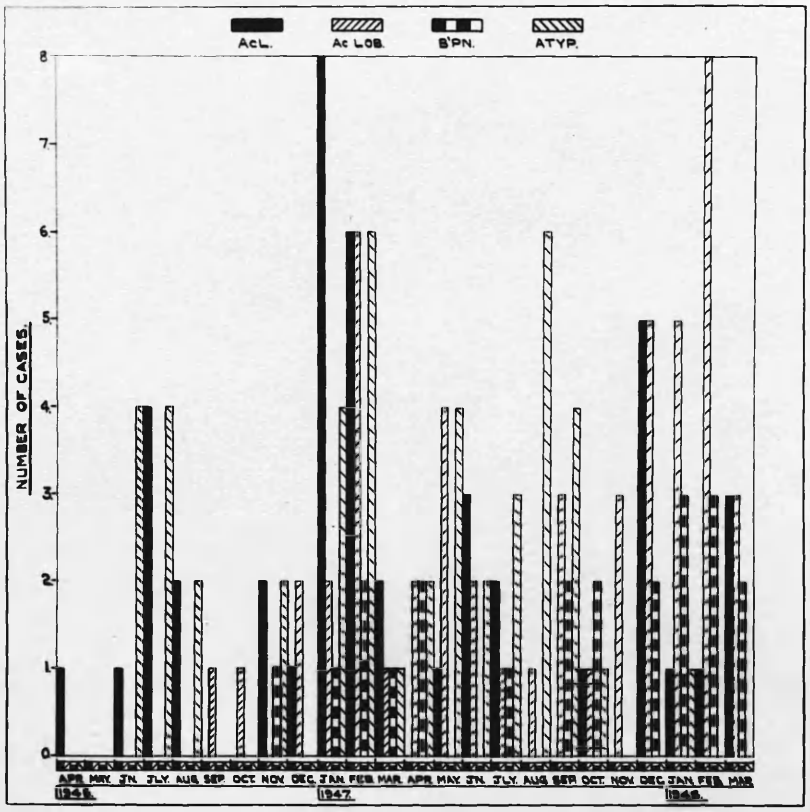
Age in years	17	18	19	20	23	24	26	30	32	46
Number of cases	4	129	15	6	1	2	3	1	1	1

(7) Seasonal Incidence

(a) In 163 cases: All types of pneumonia.


NUMBER OF CASES.
35
30
25
20
15
10
5
APR. MY. JN. JLY. AUG. SPT. OCT. NOV. DEC. JAN. FEB. MR. APR. MY. JN. JLY. AUG. SPT. OCT. NOV. DEC. JAN. FEB. MR.
1946.
1947.
1948.

(b) In 163 cases: Different types of pneumonia.



(8) PAST HISTORY OF RESPIRATORY DISEASE

Personal

(i) Recurrent nasopharyngitis

27 (16.5%) of total 163 cases

Sinuses X rayed in 19 of 27 cases with history of recurrent nasopharyngitis

(Evidence of sinusitis in 15 (73.6%) of these 19 cases.)

(Coryza on admission in 10 (52.6%) of these 19 cases)

(ii) Chest Trouble

57 (34.9%) of total 163 cases

Past history of	pneumonia	in 25	(15.3%)	cases
" "	pleurisy	" 8	(4.9)	"
" "	bronchitis	" 26	(15.9)	"
" "	asthma	" 3	(1.8)	"

Family

19 (11.6%) of total 163 cases.

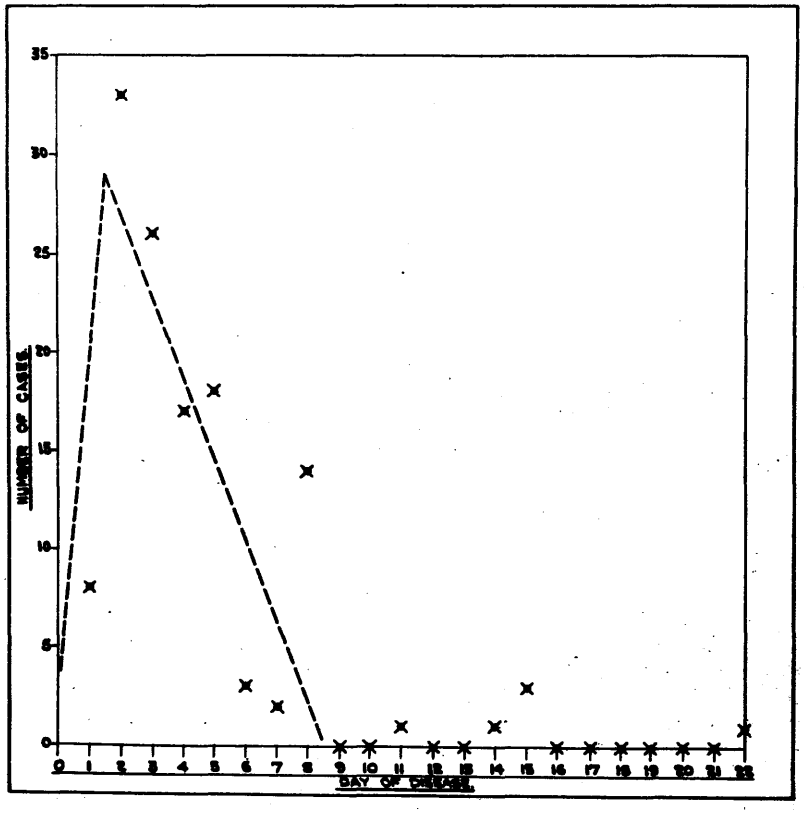
Family history of	pneumonia	in 4	(2.4%)	cases
" "	pleurisy	" 3	(1.8%)	"
" "	bronchitis	" 8	(4.8%)	"
" "	+ asthma	" 2	(1.2%)	"
" "	tuberculosis	6	(3.6%)	"

+ Both associated with attacks of bronchitis.

(9) Duration of symptoms on admission to hospital.

(In 127 of the total 163 cases; selected for reliability).

	Average Day of Disease on admission.	
Lobar pneumonia	3.9	(in 36 cases)
Lobular pneumonia	3.7	(in 46 cases)
"Atypical" pneumonia	5.3	(in 25 cases)
Bronchopneumonia	5.0	(in 20 cases)


NUMBER OF CASES
35
30
25
20
15
10
5
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
DAY OF DISEASE

(10) Presenting Symptoms and signs.

(i) In General.

(163 cases, in order of frequency)

	Number of cases	Percentage
Pyrexial state		
Shivering	43	(26.3)
Malaise	43	(26.3)
Lassitude	33	(20.2)
Sweating	24	(14.7)
Fascial pains	19	(11.5)
Anorexia	15	(9.2)
Backache	5	(3.1)
Joint pains	2	(1.2)
Respiratory symptoms		
Cough	130	(79.7)
Coryza	84	(51.5)
Sputum	75	(46.0)
Pain in Chest	73	(44.7)
Sore throat	41	(25.1)
Dyspnoea	14	(8.5)
Shortness of breath	9	(5.5)
Other Symptoms		
Headache	56	(34.3)
Meningism	1	(0.6)
Physical signs		
General & Localised crepitations	126	(77.2)
Impaired percussion note	80	(49.0)
Rhonchi	49	(30.0)
Diminished air entry	43	(26.3)
Diminished movement	38	(23.3)
Consolidation	19	(11.5)
None	12	(7.4)
Pleural friction	6	(3.6)

(ii) In the different types of pneumonia

	Ac.Lobar	Ac.Lobular	+"Atypical"	Broncho-pneumonia
No. of cases	44	51	46	22
Malaise	12 (27.2%)	15 (29.4)	8 (17.4)	2 (36.3)
Shivering	10 (22.7)	18 (35.3)	6 (13.0)	9 (40.4)
Lassitude	7 (15.9)	13 (25.5)	8 (17.4)	5 (22.7)
Anorexia	4 (9.6)	9 (17.6)	2 (4.4)	0 (0.0)
Sweating	7 (15.9)	9 (17.6)	1 (2.1)	7 (31.8)
Fascial Pain	7 (15.9)	7 (13.7)	3 (6.5)	2 (9.0)
Joint pains	1 (2.2)	0 (0.0)	0 (0.0)	1 (4.5)
Backache	0 (0.0)	3 (5.9)	1 (2.1)	1 (4.5)
Cough	38 (86.3)	44 (86.2)	30 (65.2)	18 (81.8)
Sputum	19 (43.1)	23 (45.1)	24 (52.1)	9 (40.4)
(Blood stained)	2 (4.5)	0 (0.0)	1 (2.1)	0 (0.0)
Pain in chest	27 (61.3)	26 (50.9)	11 (23.9)	9 (40.4)
Shortness of Breath	1 (2.2)	4 (7.9)	1 (2.1)	3 (13.6)
Dyspnoea	6 (13.6)	4 (7.9)	1 (2.1)	3 (13.6)
Headache	13 (29.5)	25 (49.0)	11 (23.9)	7 (31.8)
Sore throat	12 (27.2)	18 (35.3)	6 (13.0)	5 (22.7)
Meningism	1 (2.2)	0 (0.0)	0 (0.0)	0 (0.0)
Coryza	19 (43.1)	31 (60.8)	20 (43.6)	14 (63.6)
Diminished Movement	16 (36.3)	8 (15.7)	6 (13.0)	8 (36.3)
Impaired Percussion	30 (68.4)	27 (52.9)	13 (28.2)	10 (45.4)
Diminished A.E.	16 (36.3)	18 (35.3)	4 (8.7)	5 (22.7)
Consolidation	15 (34.1)	3 (5.9)	1 (2.1)	0 (0.0)
Localised Creps.	35 (79.5)	43 (84.3)	29 (63.0)	19 (86.3)
Rhonchi	13 (29.5)	15 (29.4)	14 (30.4)	7 (31.8)
Pleural friction	3 (6.8)	1 (1.9)	2 (4.4)	0 (0.0)
Leucocytosis on admission	26 (of 27) (96.5)	36 (of 39) (92.3)	4 (of 24) (16.6)	16 (of 19) (84.2)

+ "Atypical" Pneumonias

Associated with coryza, probably "aspiration pneumonias" 20 (43.5)

Unassociated with obvious coryza, probable "viral pneumonias" 26 (56.5)

(11) SPUTUM CULTURE IN 43 CASES (SINGLE SPECIMEN)

PREDOMINANT ORGANISM GROWN

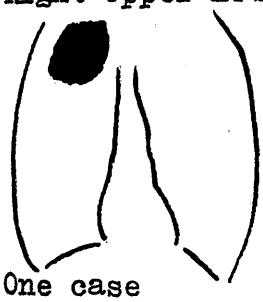
TYPE OF PNEUMONIA.	NO. OF CASES	Pneumo cocci.	Mixed	Commen-sals of Pharynx	Staphylo cocci.	Fried-lander's	H. Strepto-cocci.
Lobar	17	64.7%	11.8	5.8	17.6	-	-
Lobular	12	66.6	8.3	16.6	8.3	-	-
Atypical	7	14.3	28.6	28.6	28.6	-	-
Broncho-pneumonia	7	14.3	28.6	28.6	-	14.3	14.3

(12) Radiographic Appearances (163 cases)

(i) Unilateral

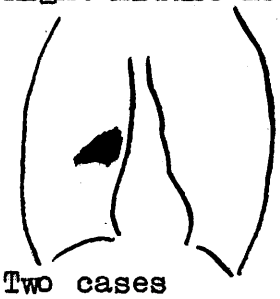
Homogeneous lobar consolidation, with or without collapse

Right Upper Lobe



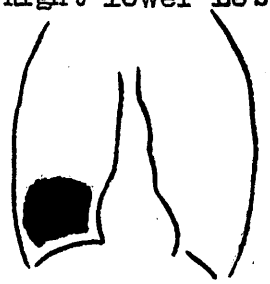
One case

Right Middle Lobe



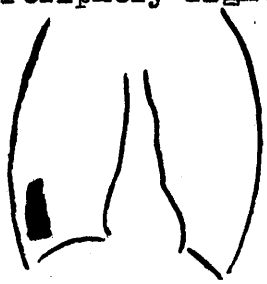
Two cases

Right lower Lobe



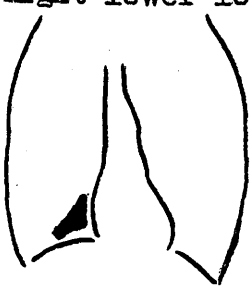
Fourteen cases

Periphery right lower lobe



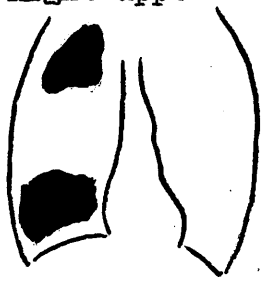
One case

Right lower lobe c. partial collapse



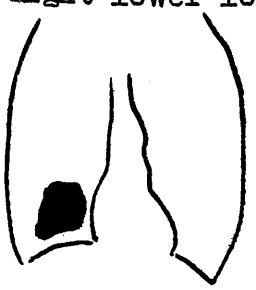
Three cases

Right upper and lower lobes



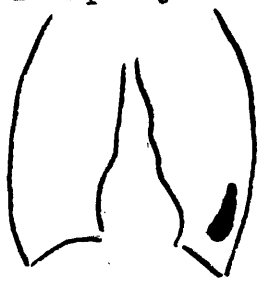
One case

Right lower lobe, c. partial collapse



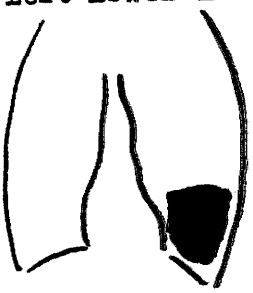
Three cases

Periphery left lower lobe



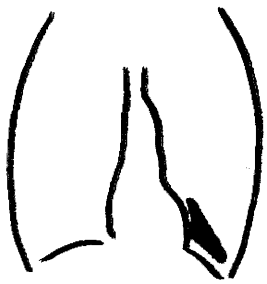
One case

Left lower lobe



Thirteen cases.

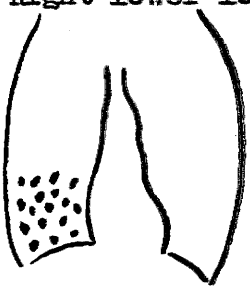
Left lower lobe, partial collapse



Six cases.

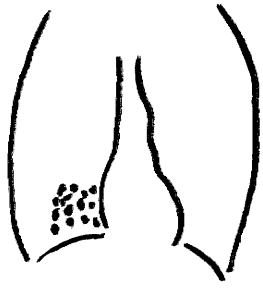
Patchy scattered consolidation, mainly lobar.

Right lower lobe



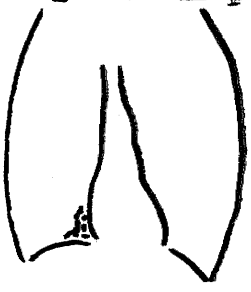
One case

Part of right lower lobe



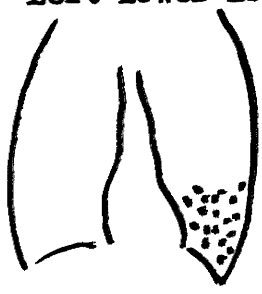
Nineteen cases.

Right cardiophrenic angle



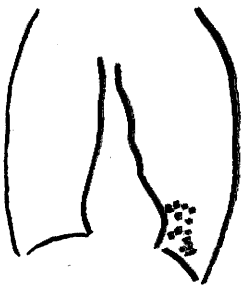
Nineteen cases

Left lower lobe



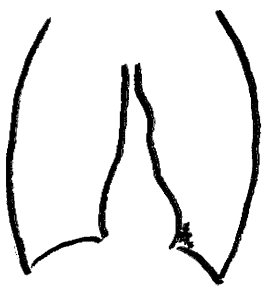
Seven cases

Part of left lower lobe



Twenty-nine cases

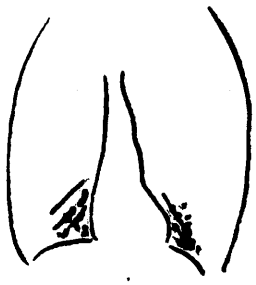
Left cardiophrenic angle



Three cases

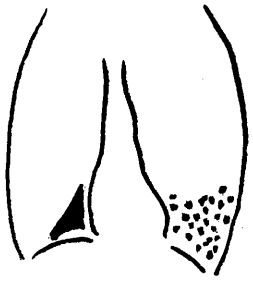
(ii) Bilateral

Scattered consolidation both lower lobes increased broncho-vascular markings.



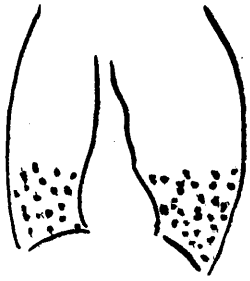
Twenty cases.

Homogeneous consolidation and partial collapse, right cardiophrenic angle, scattered consolidation left lower lobe.



Two cases.

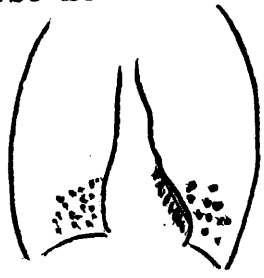
Scattered consolidation both lower lobes.



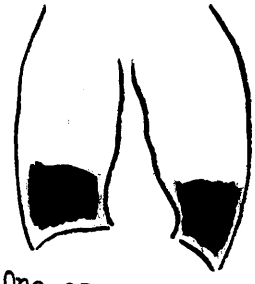
Six cases

Scattered area of consolidation in both lower lobes with partial collapse left lower lobe

One case

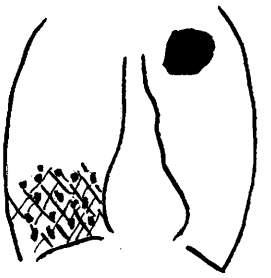


Homogeneous consolidation both lower lobes.



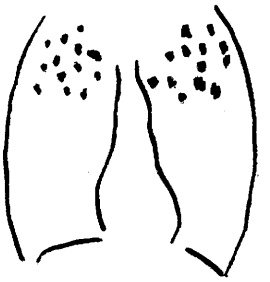
One case.

Scattered consolidation with superimposed uniform loss of translucency right lower lobe, area of homogeneous consolidation left upper lobe.



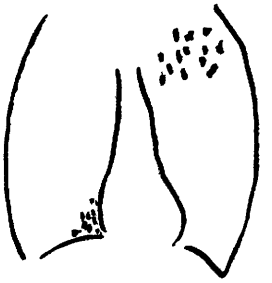
One case.

Scattered consolidation both upper lobes.



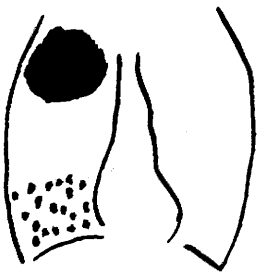
One case.

Scattered consolidation right cardiophrenic angle and left upper lobe.



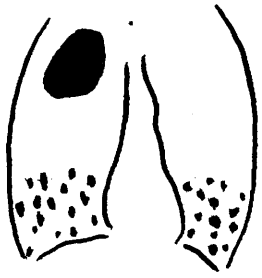
One case.

Homogeneous consolidation right upper lobe, scattered consolidation right lower lobe.



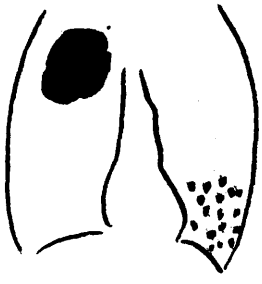
One case.

Homogeneous consolidation right upper lobe, scattered consolidation both lower lobes.



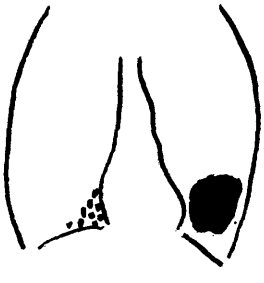
One case.

Homogeneous consolidation right upper lobe and scattered consolidation left lower lobe.



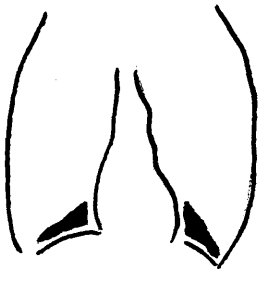
One case.

Homogeneous consolidation left lower lobe, scattered consolidation right cardiophrenic angle.



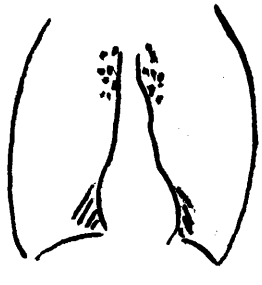
One case.

Homogeneous consolidation $\overline{c}$ partial collapse both lower lobes.



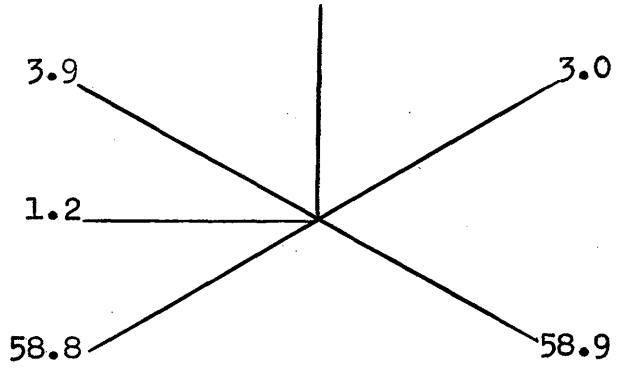
Two cases.

Scattered consolidation of lulum of both upper lobes, increased broncho-vascular markings both lower lobes.



One case.

Number of times individual lobes are involved in 163 cases (expressed as a percentage).



Pneumonia with predominant	homogeneous consolidation	43.7%
" " "	scattered consolidation	56.3%
Two or more lobes involved		16.9%

Lower lobes are the ones most involved, and with almost equal frequency.

(13) Response to treatment.

	Average number of days till apyrexial	
Lobar pneumonia	3.3	(in 33 cases)
Lobular pneumonia	3.2	(in 47 cases)
"Atypical" pneumonia	2.6	(in 24 cases)
Bronchopneumonia	3.9	(in 17 cases)

The majority of the cases requiring treatment received sulphonamide drugs. When there was no defervescence within 24 hours this was augmented with penicillin.

The sulphonamide drugs used were sulphadiazine, sulphathiazole, and in the last few months, sulphamezathine. They were administered four hourly. No set amount was given, each case receiving a total according to the response which was noted. Terminally the course was completed by giving 1 G thrice daily for two days.

The total dose given was often large, compared with that in general use. In the absence of toxic effects it was decided to give large loading and maintenance doses to try and obtain the quickest and best cure.

Alkalis were not given routinely. Each day it was ensured there was a minimal fluid intake of at least 120 fl.ozs. in each case.

The response obtained to sulphonamide administration in 85 cases (Pneumococcal pneumonia 71, Bronchopneumonia 12, Atypical pneumonia 2).

Total Sulphonamide.	Number of Cases.	Average Number of days till totally	Complications.
20 - 35 G.	11	4.5	Two cases c sterile effusion.
36 - 55 G.	26	4.9 (+4.0)	Three cases had some pyrexia following initial crisis.

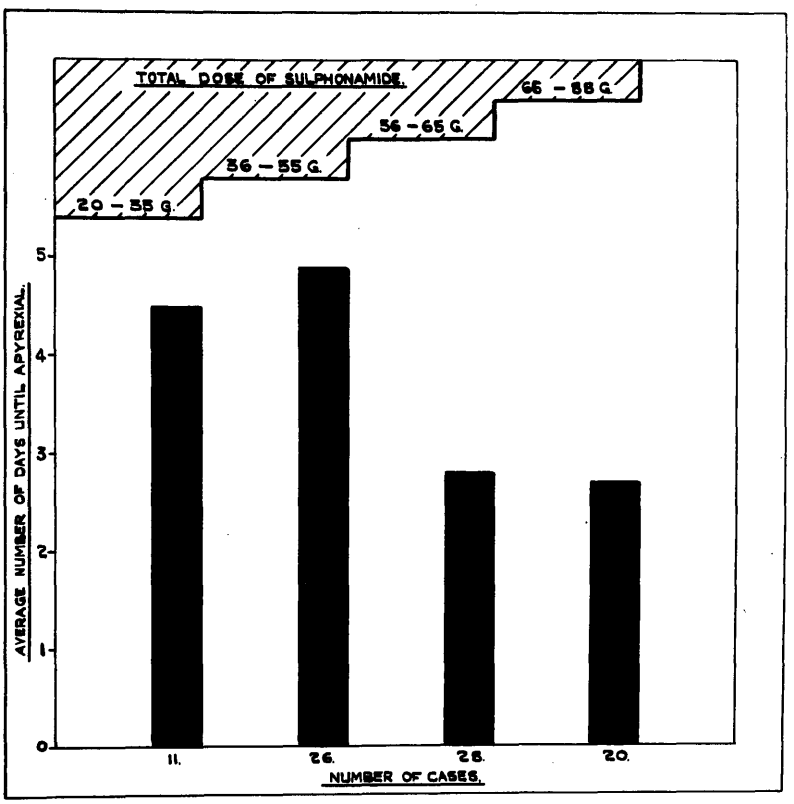
56 - 65 G	28	2.8	None.
66 - 88 G	20	2.7	One case $\bar{c}$ sterile effusion.

+ Figure if initial crisis is taken in the three cases with relapse.

The patients with bronchiectasis are excluded, the pneumonia being of a secondary nature. These 85 cases don't include all the cases treated with sulphonamide drugs but are the ones in which the exact total dose given and the day of apyrexia are known with certainty.

Sixteen patients treated with both sulphonamide and penicillin are excluded. They represent the cases with the severest illness.

Only two patients received penicillin alone.


TOTAL DOSE OF SULPHONAMIDE.
66 - 88 G.
56 - 65 G.
36 - 55 G.
20 - 35 G.
AVERAGE NUMBER OF DAYS UNTIL APYREXIAL.
0
1
2
3
4
5
11.
26.
28.
20.
NUMBER OF CASES.

While the number of patients included in each group is not large, the trend showing a quicker and better response to larger doses is noted.

One patient received two consecutive courses of sulphonamide, with a total of 129 G, yet no toxic symptoms or signs were seen. Another patient developed haematuria after 36 G. Sulphadiazine crystals were present in the urine, and there was urea retention. Both these and the haematuria were transient. The sulphonamide was stopped immediately and replaced by penicillin. In this case a discrepancy between the fluid taken and that recorded was suspected.

One patient with bronchopneumonia (case 57) failed to respond to a full course of sulphonamide (77 G) and penicillin (50,000 units three hourly to a total of 3.9 mega units). Repeated examination of the sputum showed the organisms to be penicillin sensitive. As previously noted it was decided to try a dose of 200,000 units four hourly. There was, for the first time, an immediate response to penicillin, a further total of 2.7 mega units sufficing.

(14) <u>Relationship of Upper Respiratory Infection to Pneumonia in the cases treated.</u>

Number of cases of pneumonia with coryza on admission	84
" " " of pneumonia with a sort throat on admission .... (without any obvious coryza)	21

i.e. in 163 cases of pneumonia there was symptomatic evidence of an upper respiratory infection in 64%.

Types of pneumonia in 105 cases with simultaneous upper respiratory infection.

Type of pneumonia	Number of cases	Percentage
Acute lobar	27	25.7
Acute lobular	39	37.1
Broncho pneumonia	17	16.1
"Atypical" pneumonia	22	20.9

Total number of cases in which sinus X rays were taken ... 71
Evidence of sinusitis detected in 53 (74.6%) of the 71 cases.

Type of pneumonia in the 53 cases with radiological evidence of sinusitis.

Type of pneumonia	Number of cases	Percentage
Acute lobar	9	16.9
Acute lobular	23	43.2
Bronchopneumonia	12	22.6
"Atypical" pneumonia	9	16.9

Coryza was present on admission in 43 (60.5%) of these 71 cases. In 13 (18.3) cases, coryza was present on admission yet the sinuses were clear radiologically.

(15) Cases admitted as pneumonia and having underlying bronchiectasis.

In 179 patients admitted as having pneumonia, 13 were found to have underlying bronchiectasis. This was shown either by persistent increased expectoration with radiological signs, or by a bronchogram. The latter investigations were performed personally at first but latterly at the chest unit to which suitable cases were referred.

Past history in the cases with bronchiectasis.

	Number of cases
Recurrent nasopharyngitis	3
Pneumonia	5
Pleurisy	1
Chronic bronchitis	3
Family history of bronchitis	1

Cases with pyrexia on admission	8
Cases with coryza on admission	9
Cases detected by mass radiography	5

Evidence of sinusitis was found in 5 of 6 cases in which the sinuses were X rayed. The other cases were referred to the chest unit for investigation including that of the upper respiratory tract.

The lower lobes were the ones involved in all cases.

Right lower lobe	4 cases
Left lower lobe	4 cases
Both lower lobes	5 cases

Lobes involved in 5 cases with known radiological evidence of sinusitis.

Right lower lobe	2 cases
Left lower lobe	1 case
Both lower lobes	2 cases

Part III. PNEUMONIA IN THE YOUNG ADULT

(a) Comparison of different series of pneumonia in patients with an average age of 18 to 28 years.

In 1920 Abrahams published an analysis of five hundred and fifty-eight cases of lobar pneumonia, occurring in an Army Command at Aldershot. The cases were observed over a period of two and a half years. As in the present series, Abrahams' patients were predominately recent recruits. The average age was approximately twenty eight years. It was especially noted that out of the whole five hundred and fifty-eight cases no fewer than eleven percent fell sick within twelve days of joining up and that five hundred and fifty three of the patients (93.7%) had less than twelve months service. In the present series the majority of cases developed pneumonia for the first time in their lives within days to weeks of recruitment.

Abrahams made no mention of large numbers of cases failing to comply with the standard picture of lobar pneumonia. Only a few of the cases witnessed during the period covered had to be excluded because of some doubt in diagnosis. Further it is specifically stated that the investigation was finally abandoned when, with the introduction of "influenzal pneumonias" the picture became confused.

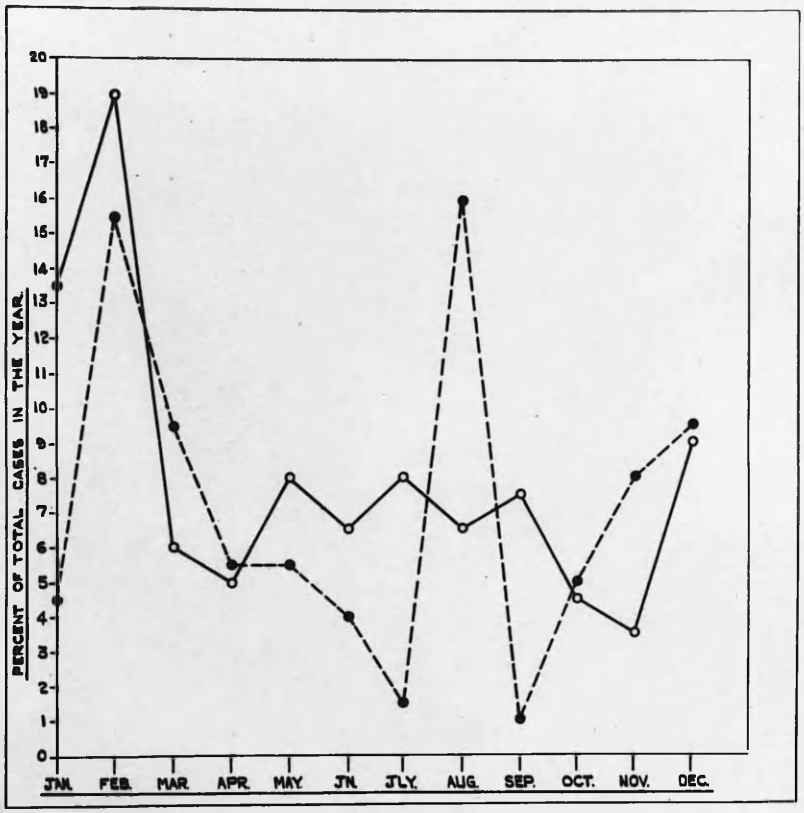
In 1941 Lyght and Cole published their description of pneumonia in Young Adults. Their three hundred consecutive cases occurred among students, at the University of Wisconsin, U.S.A. The average age was approximately twenty-one years. The patients were observed from 1931 to 1939.

Lyght and Cole draw attention to the meagreness of articles presenting data with regard to pneumonia in relatively healthy young subjects. They also felt the need to reclassify the pneumonias and to revise the description of so called "typical pneumonia" rather than label "atypical" the cases of pneumonia commonly observed in the Young Adult which otherwise would be excluded. Here ten years ago, as in the present series, these authors stress the prevalence of the latter type of pneumonia in the Young Adult. How much the introduction of the sulphonamide drugs has contributed to the change in the clinical picture will be shown by comparison with the present series.

These two preceding surveys and the present one are comparable in age group. The average age in the present series is eighteen years.

Seasonal Incidence.

Abrahams	1916	71 cases	●- - - -●
Present Series	1947	117 cases	○——○


PERCENT OF TOTAL CASES IN THE YEAR.
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
JAN.
FEB.
MAR.
APR.
MAY.
JN.
JLY.
AUG.
SEP.
OCT.
NOV.
DEC.

Abrahams accounts for the increased number of cases in August 1916 by noting the fact that this corresponded with the arrival of an unclimatised contingent of troops from Canada.

Otherwise the incidence is similar, the darkest winter months showing the greatest incidence.

Association with other respiratory illnesses.

Lyght and Cole noted the peaks in respiratory illness other than pneumonia were closely followed in direction by the curve tracing pneumonia. In the present series this similarity to the curve representing upper respiratory infection has been noted and the details are recorded in the section on predisposing factors.

Past History.

	Lyght & Cole (300 cases) 1931 - 39	Present Series (163 cases) 1946 - 48
Frequent acute upper respiratory infection	27.6%	16.5%
Previous attacks of pneumonia	12.0	15.3
Chronic bronchitis	2.3	15.9
Bronchial Asthma	2.3	1.8
Acute pleurisy	1.0	4.9

The incidence of recurrent acute catarrhal respiratory infections varies. There is close agreement however in the past history of bronchial asthma, a more defined illness.

Both series also show that in these young adult patients there is already a history of pneumonia, approximately one in every nine.

Symptoms on admission.

	Abrahams (558 cases) 1915 - 17	Lyght & Cole (300 cases) 1931 - 39	Present Series (163 cases) 1946 - 48
Cough	24.0%	81.6%	79.7%
Chest Pain	60.0	38.0	44.7
Shortness of breath or dyspnoea	2.0	5.3	7.0
Spitting of blood	1.6	3.6	1.8
Headache	35.6	55.3	34.3
General muscle aches	9.0	61.0	11.5
Chilliness	69.0	50.3	26.3
Malaise	7.6	-	26.3
Weakness	-	2.3	20.2
Coryza	-	31.3	51.5
Sore throat	2.3	31.6	25.1

The frequent occurrence of cough in the two later series differs from that recorded by Abrahams, being present on admission in only about one quarter of his cases. Unfortunately Abrahams did not record the rate of associated upper respiratory infections; but taking into account the low incidence of tonsillitis it probably was correspondingly infrequent. Further, Abrahams records only cases of definite lobar pneumonia and this type of pneumonia, in the present series, is less commonly associated with upper respiratory infection. The high incidence of upper respiratory infection in the present series probably also accounts for the more frequent history of a cough on admission to hospital, by an aspiration effect.

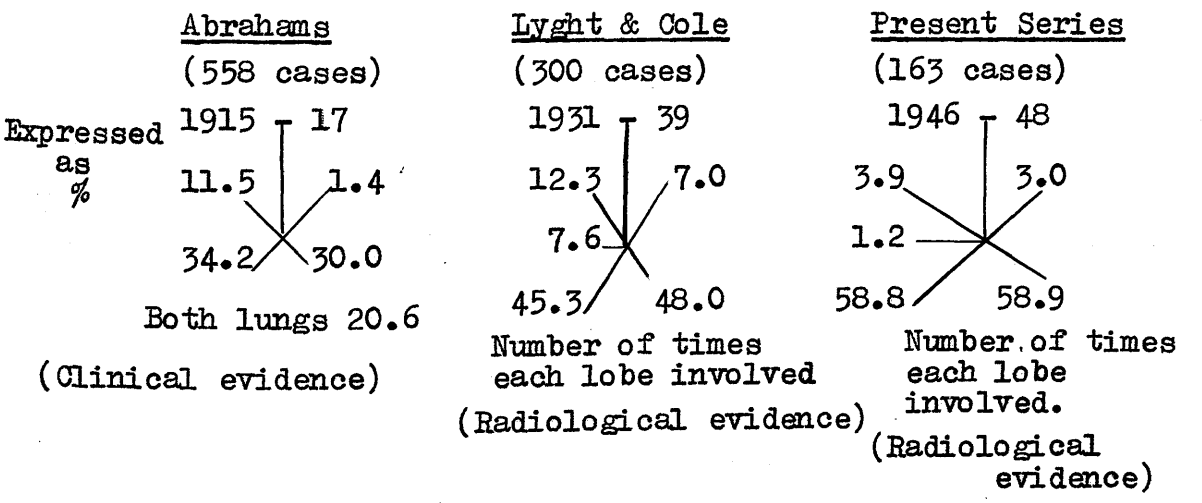
The toxaemic symptoms vary (general aches, chilliness, malaise and weakness). The more definite ones of chest-pain and dyspnoea show some uniformity. Headache, however, was found to be present more frequently by Lyght and Cole than by Abrahams or in/

in the present series. A small percentage of haemoptysis is found in all three series.

Lyght and Cole reported absent or very scanty sputum in all of their patients; in the present series productive cough was noted in only one third of the patients.

The predominant temperature and pulse-rate on admission, 102°F. and 100/minute, are similar in the two more recent series. Abrahams, however, records a temperature of over 102°F. on admission in sixty-six precent of his cases. A low respiratory rate is recorded by Lyght and Cole and was also noted in the present series.

Lobes of the lung involved.



	Lyght and Cole	Present Series
Involvement of a whole single lobe or less	81.3%	83.1
Involvement of two or more lobes or part of several lobes	18.6	16.9

In all three series the lower lobes were the ones most often affected, and on each side with almost equal frequency.

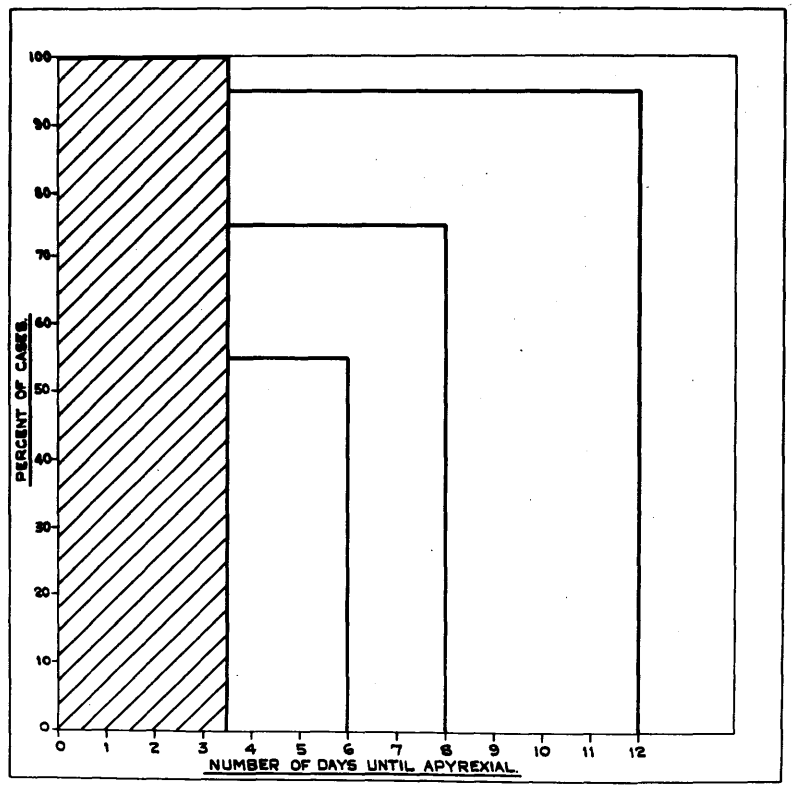
White cell count on admission.

The total white cell count in the present series was greater than that noted by Lyght and Cole in range (5 to 27,000/ c.m.m. c.f. 8,500 - 13,000/c.m.m.) and on an average (14,000/c.m.m. c.f. 10,000/c.m.m.) Yet in both series they were not the usual high levels of severe lobar pneumonia.

Duration of acute illness, as judged by the number of days till apyrexial.

Lyght & Cole

Present Series



Abrahams noted a crisis in three hundred and fifteen of his cases, and on the average this occurred during the seventh day.

The majority of cases in the present series were treated by sulphonamide drugs. Here all of the cases, without complications, and on an average, were apyrexial by the end of the third day. Lyght & Cole, whose cases were mainly treated symptomatically, found that about three-quarters of their cases were apyrexial by the end of the eighth day. (They omitted fatal cases and others with subsequent septic course due to some concurrent infection).

Complications.

	Abrahams (558 cases) 1915 - 17	Lyght & Cole (300 cases) 1931 - 39	Present Series (163 cases) 1946 - 48
Pleurisy			
c simple effusion	-	5.0%	1.8%
c empyema	20.8% (only 30 cases required rib resection)	1.3%	0.0
Acute toxic myocarditis	-	1.0	0.0
Infective endocarditis	0.7	-	0.0
Pericarditis	2.0	0.7	0.0
Meningitis	1.0	-	0.0
Acute nephritis	-	0.7	0.6 (one case)
Spontaneous pneumothorax	-	1.0	(0.6)

Fatal Issue	Abrahams 1915 - 17	Ryle & Waterfield 1922 - 30	Lyght & Cole 1931 - 39	Present Series 1946 - 48
Percent	10.9	11.5	3.7	0.0

+ (In 43 cases with an age of 19 to 29 years. Cases extracted from a series of 154).

Comparison of Abraham's and the present series shows striking differences, in the rate of defervescence, the number of complications and in mortality rate. All the cases in Abraham's series were judged on clinical grounds, to be lobar pneumonias and presumably were pneumococcal in origin. Though in comparison in the present series only fifty-eight percent of the cases showed clinical features of pneumococcal pneumonia (abrupt onset with leucocytosis and pyrexia of over 102°F) this lower incidence alone does not account for the trivial complications and complete absence of fatality. Such are the changes we now expect as result of the introduction of chemotherapy.

It is also obvious, on comparison, that though, in America, Lyght & Cole also describe pneumonia in the Young Adult theirs must be different in type from that seen by Abrahams and from that occurring generally in the present series. They describe three hundred "consecutive" cases of pneumonia, seen from 1931-1939, yet their description is never that of acute pneumococcal pneumonia. There is an unusually high incidence of headache and general muscle aches. The highest temperature recorded is only 103°F. in "three hundred cases"; the pulse rate is usually about 100/minute and the respirations 20 to 24/minute. The overall white blood count on admission is just 8,500 to 13,000/c.m.m. In these three hundred cases treated <u>symptomatically</u> there is on comparison with Abraham's series a reduction in complications and fatalities almost equal to that in the present series, which is largely composed of treated cases. That such successful results would have been attained in the cases of pneumococcal pneumonia seen in the/

the present series had they been treated symptomatically is unbelievable.

Lyght & Cole between 1931 and 1939 must have seen few if any cases of pneumococcal pneumonia. Their three hundred consecutive cases correspond almost entirely to the pneumonias classified as "atypical" in the present series and Reimann (1947) actually published all these three hundred cases as ones of "atypical" (viral) pneumonia.

Though Lyght & Cole stress the prevalence of this type of pneumonia in the Young Adult the incidence here is extreme. The more conservative proportion of "atypical" pneumonias in the present series is a truer representation of its occurrence rate in this country and in America. (Allen 1936, Dingle 1943, Painton 1946, Glover 1948).

(b) The present investigation related to :-

(1) Pneumonia in general.

(2) Pneumococcal pneumonia in general.

(1) In 1933, Ryle and Waterfield reported "the natural history, prognosis and treatment of pneumococcal fever (lobar pneumonia)". They gave an analysis of one hundred and fifty-four cases seen at Guy's Hospital, London, between 1922 and 1930 inclusive. All of their cases were over thirteen years of age. Younger patients were excluded because of the difficulty to record accurately their symptoms and signs. This series serves as a useful control, the treatment being symptomatic.

A recent series by Humphrey etal (1948) analyses the findings in three hundred and fifty-one cases between twelve and seventy years of age. These patients came from North West London and the period covered is 1942 to 1944. The cases were classified in retrospect, after clinical, radiological and bacteriological examination. This showed that two hundred and seventy-eight cases were pneumococcal pneumonia, twenty cases were due to bacteria other than pneumococci and fifty-three cases were of uncertain origin. Ninety-six percent of their cases were treated by sulphonamide drugs.

Ryle and Waterfield (1933), as previously noted in Abraham's series (1920), make no mention of witnessing a group of pneumonias which could not be attributed to bacterial infections. Yet Humphrey etal (1948) as in most modern reviews and the present series, when trying to classify their cases found the large proportion of these non-bacterial types a serious problem.

	Pneumococcal in origin.	Uncertain etiology.
Humphrey etal (a)	79.2%	15.1%
Present series (b)	58.0	28.2 (19.0)

(a) 4.5% (16 cases) diagnosed as pneumococcal without isolation of the organism.

(b) Clinical assessment, i.e. presumed pneumococcal in origin (Acute lobar pneumonia and acute lobular pneumonia)

Assessed by clinical examination, X ray, white blood count and response to sulphonamides, Hodges etal. (1946) showed that such pneumonias assessed clinically were bacterial pneumonias and almost all were pneumococcal pneumonias.

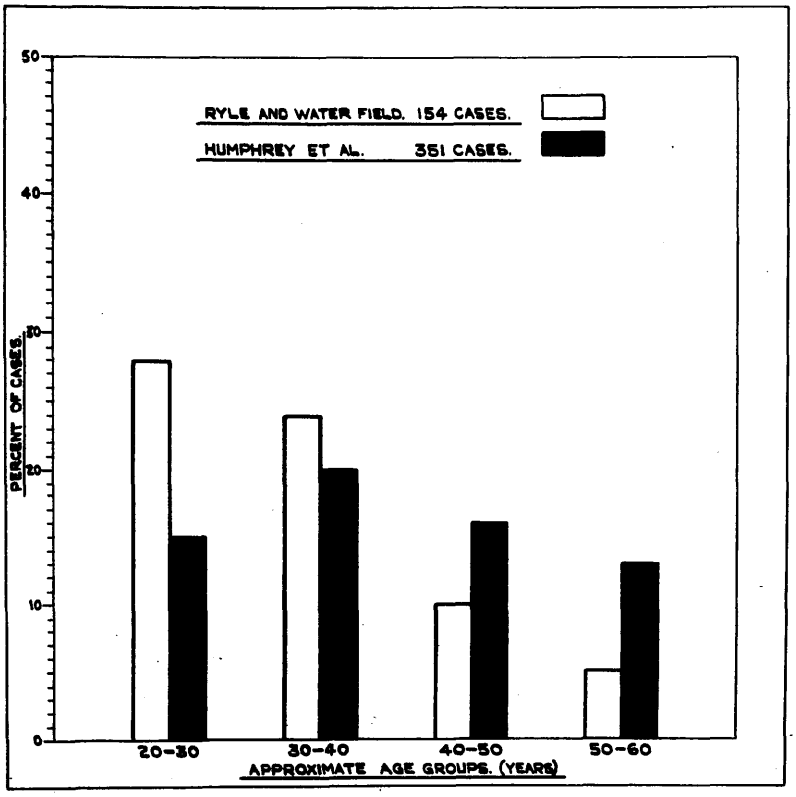
Humphrey etal, with the assistance of a thorough bacteriological examination, failed to find a cause for the pneumonia in only 15% of the cases. In the present series the cause could not be determined in 28%, almost twice as many cases, there being limited bacteriological investigation.

A considerable number of the cases of uncertain origin in the present series come from an unusual source, mass radiography. The withdrawal of these special cases leaves 19.0% of the total cases in which the cause is uncertain. Should the cases of doubtful origin, yet with upper respiratory infection be excluded, the pneumonia being of a secondary nature, then in 15.9% of the pneumonias no known cause was detected.

In the present series the proportion of the cases judged to be pneumococcal in origin after clinical and radiological examination/

examination is therefore not dissimilar to the number of cases seen by Humphrey et al and proved to be pneumococcal in origin.

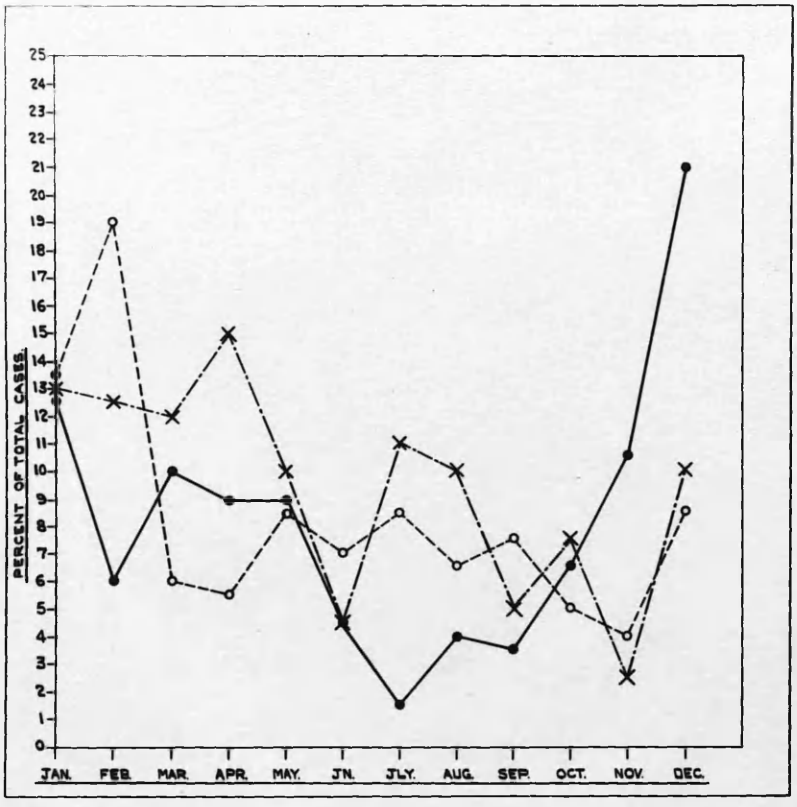
Incidence of pneumonia - Age groups.



It is evident, from the number of pneumonias occurring in each age group, that the young adult group, normally a healthy time in life, does account for a considerable proportion of cases of pneumonia.

Seasonal Incidence.

Ryle & Waterfield	135 cases	(General)
Humphrey etal	222 cases	(General)
Present series	117 cases	(Young Adult)



(Joules (1933) in 496 cases; 70% occurred between October & April).

The seasonal incidence of pneumonia is the same in the Young Adult as pneumonia in general. The largest number of cases in each occurs between December and February.

Incidence of cases with a past history of chest illness.

Series	No. of cases	Pneumonia	Chronic Bronchitis
Ryle & Waterfield	154	18.0%	18.0%
Humphrey	351	23.0%	23.0%
Present series	163	15.3%	15.9%

Humphrey etal considered the number of patients giving a past history of previous chest illness to be surprisingly high, and their figures are only just greater than those of Ryle and Waterfield. In the present series, although the average age is 18 to 19 years, a similar history is obtained in about two-thirds as many patients. There is a further similarity in all three series, the almost identical radio of the occurrence rate for both pneumonia and chronic bronchitis.

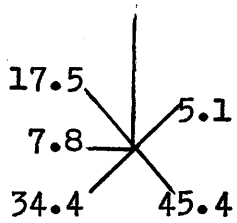
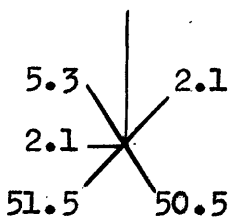
(2.) Comparison of patients with pneumococcal pneumonia

Ryle & Waterfield 154 cases

Humphrey 278 cases

Present series 95 cases (Acute lobar and lobular pneumonia).

Frequency of certain symptoms.

	Ryle & Waterfield 1922 - 1930	Humphrey 1942 - 44	Present series 1946 - 48
Shivering	48.0%	-	29.0%
Pain in chest	85.0	-	56.1
(Rigors and chest pain)	-	54.0	-
Lungs. (Times each lobe involved) %		-	
Two or more lobes involved	31.0%	29.8	14.7
Leucocytosis on admission	-	74.0	94.4 (in 66 cases examined)
Radiographic appearance of homogeneous lobar consolidation (with or without collapse)	-	69.0	45.0
Radiographic appearance of patchy scattered consolidation (mainly lobar)	-	31.0	55.0

The fewer number of cases in the present series with two or more lobes involved, and without homogeneous lobar consolidation, are probably accounted for by the admission of these cases at an earlier stage. It has already been postulated that the large number of acute lobular pneumonias seen were an earlier stage of acute lobar pneumonia, and that they were pneumococcal in origin. In these cases the average duration of the illness on admission was 3.7 days, compared with 4.1 days in the cases of bacterial pneumonia seen by Humphrey etal, 93% of which were pneumococcal.

In the present series the average of 3.9 days in the cases of acute lobar pneumonia is almost exactly the same as the time in this latter series, supporting the hypothesis further.

Series	Type of Pneumonia	Average duration of symptoms on admission.
Humphrey et al	Bacterial (93% pneumococcal)	4.1 days
Present series	Presumed pneumococcal acute lobar pneumonia	3.9
	acute lobular pneumonia	3.7

Though the difference of 3.7 and 3.9 days i.e. approximately 5 hours, between the acute lobular and lobar pneumonia is not significant in the numbers seen, it is in keeping in these early cases with the rapid spread of acute pneumonia noticed clinically. Patients admitted with pyrexia and doubtful physical signs in the chest when examined a few hours/

hours later often showed definite signs of pneumonia, especially localised persistent crepitations, treatment then being started.

Response to treatment.

In Ryle and Waterfield's presulphonamide series, crisis occurred on an average on the seventh day.

Humphrey et al administered sulphonamides orally, using sulphapyridine, sulphathiazole, sulphadiazine, or sulphmezathine. They used a total dose of 24, 34 and 28 G in four days, respectively. The response, judged by the number of days till apyrexial, was almost identical using sulphadiazine, sulphathiazole or sulphamezathine. A slightly higher percentage of cases responded more rapidly to sulphapyridine. In the present series the patients were treated with sulphadiazine, sulphathiazole or sulphamezathine. The majority received sulphadiazine. In both series, at least six pints of fluid daily was taken orally.

Series	Total Sulphonamide	Day of Treatment	
		4th	7th
Humphrey et al	24 to 34 G	+63.0%	83.0%
Present series	20 to 35 G	58.3	75.0
	36 to 55	66.6	83.3
	56 to 65	86.9	91.3
	66 to 88	93.3	93.3

+ Percentage of cases apyrexial (without further relapse).

It would be unwise to draw conclusions from seventy-eight cases alone; but by comparison with the two hundred and seventy-eight cases of pneumococcal pneumonia treated by Humphrey et al, certain trends might be justifiably noted.

The number of cases in the present series treated by the same amount of sulphonamide and apyrexial by the fourth or seventh day, is comparable to these reported by Humphrey et al. It is, however, noteworthy in the present series that the bigger loading and maintenance doses of sulphonamide apparently resulted in a correspondingly quicker defervescence, even though patients who received the largest doses were usually these with the severest illness.

The larger amounts of sulphonamide given in the present series did not result in toxic manifestations, nor did they in a much greater number of cases of acute streptococcal tonsillitis also treated personally with similar quantities. Though no alkali was given concurrently with the sulphonamides, as a routine, a minimum daily output of urine of 100 fl. ozs. or more was ensured in every case.

Complications of pneumococcal pneumonia

	Ryle & Waterfield (Presulphonamide General age)	Joules (Presulphonamide General Age)	Humphrey et al. (Sulphonamide General Age)	Present Series (Sulphonamide Young Adult)
Non-purulent effusion	5.0%	1.0	5.0	3.2
Empyema	3.0	3.6	4.0	0.0
Abscess of lung.	0.6 (one case)	1.2	1.0	0.0
Pericarditis	0.6 " "	-	1.4	0.0
Jaundice	1.3	-	2.0	0.0
Acute nephritis	0.0	-	0.0	1.1 (one case)

Complications, including pulmonary, are now rare in Young Adults treated early with sulphonamide drugs. Anderson (1945) found chemotherapy to be more effective in younger than in older patients. There is an absence of complications in the present series of Young Adults compared with that of the general age of patients seen by Humphrey et al.

Mortality rate in pneumococcal pneumonia.

MORTALITY RATE (PERCENT)

	PRESULPHONAMIDE										SULPHONAMIDE
	Royal Soc.Med.	Cowan & Harrington	Ryle & Waterfield	Midsex & Royal Free Hosp.Records	Armstrong	M.o.H. Glasgow	M.o.H. Glasgow	Cruik-shank	Langley	Med. Research Council Report	Humphrey et. al.
GENERAL	1897-1906 (6735)	1920-29 (1415)	1922-30 (154)	1922-31 (889)	1925-29 (706)	1929 (3815)	1930 (1225)	1933 (1118)	1933 (99)	1934 (301)	1942-44 (278)
	23.0	21.5	21.5	19.0	16.6	31.1	30.0	10.8	20.0	15.0	5.0
YOUNG ADULT	Royal Soc.Med.	+Cowan & Harrington	Abrahams	Midsex & Royal Free Hosp.Records	Cecil et al. U.S.A.		Lyght & Cole U.S.A.		Joules		Present Series
	1897-1905	1906-1929 (198)	1915-17 (558)	1922-31	1927		1931-39 (300)		1933		1946-48 (95)
	14.2	10.6	10.9	6.0	16.0		3.7		14.9		0.0

+ Omitting 1916-17-18

It is noticeable that in Great Britain, the mortality rate for Young Adults was lower than that for the population as a whole before the use of chemotherapy. Also statistics showed clearly that mortality increases with age (Joules 1933, Davies 1935).

Anderson (1945) compared mortality in the presulphonamide and sulphonamide eras. He quoted personal cases seen from 1931 to 1934 and 1939 to 1940, also from collected series 1931 to 1932 (1,077 cases) and 1938 to 1942 (1,949 cases). From this observation he concluded "the reduction in mortality is most marked between 1 and 40 years, below and above this age deaths have only been reduced by 25 to 35% of the sulphonamide average".

In the present series there were no deaths, i.e. in a Young Adult group treated with sulphonamide drugs.

(c) Bronchopneumonia in the Young Adult

In the present series the cases of bronchopneumonia were all primary infections.

The greatest incidence of bronchopneumonia is early childhood and old age (Coope 1948). In general there are much fewer cases of bronchopneumonia than of lobar pneumonia. In 1,276 cases of pneumonia seen at Bellvue Hospital, U.S.A. only 264 (20.7%) were bronchopneumonias (Cecil 1948). Only 17 (14.6%) of all types of pneumonia seen in the present series were bronchopneumonias.

Bronchopneumonia is largely an endogenous infection, the soil being prepared for invasion by lowering of the resistance in the individual. (Cruikshanks 1933, Coope 1948). The factors influencing resistance in the present series are discussed in a later section.

Being a Young Adult group, the number of cases of bronchopneumonia are few and only indefinite generalisations may be made. The patients with bronchopneumonia were these with the severest illness. The criteria for segregating these cases in a separate group are indefinite. The more insidious onset, the greater degree of lung involved, with bronchial distribution, and the slower response to treatment were the main differences noted. The cases in which the sputum was cultured showed absent or only a few pneumococci, Physical examination showed widely scattered rhonchi and crepitations. Radiologically there was in general increased bronchovascular markings and scattered opacities.

There was obvious coryza present on admission in 63.6% of the/

the cases. The lower lobes, usually bilaterally, were involved in every case.

These cases of bronchopneumonia represent a minority of patients, probably with very low resistance. The upper respiratory infection and secondary aspiration effect produced conditions which were conducive to bronchopneumonia.

(d) Primary "atypical" pneumonia, as seen in the Young Adult, especially.

The term primary "atypical" pneumonia was selected as the most convenient one to describe the cases of "new" pneumonia in the present series. These "new" pneumonias fail to conform to any of the clinical syndromes associated with the other established types of pneumonia e.g. pneumococcal pneumonia. It has already been stated that this type of pneumonia became prominent when frequent and early radiological investigation was performed in large numbers of patients with milder respiratory infections.

These "atypical" pneumonias have a very different and benign course compared with "typical" pneumococcal pneumonias. Many investigations have been carried out and reports published, yet in the majority of cases the course of the illness is still in doubt.

Most of the observations on "atypical" pneumonia have been made in Young Adults, usually in the services. An attempt has been made to consult, in some detail, the vast amount of literature which has accummulated on this subject in recent years. The majority of the articles have described transient pneumonias occurring in personnel in countries other than Great Britain, in America, the Mediterranean and Scandinavian countries. Several of the best articles published by medical practitioners of this country have described cases seen in British personnel while serving in the armed forces overseas, (Turner, 1945, Adams 1946, and Stephens 1948). Fewer authors have described cases seen/

seen in Great Britain, (Drew 1943, Scadding 1948, Glover 1948).

Many synonyms have been applied to these transient pneumonias, e.g. acute diffuse bronchiolitis, acute interstitial pneumonitis, acute pneumonitis, disseminated focal pneumonia, benign broncho-pulmonary inflammation, viral pneumonias, broncho-pneumonias, symptom-poor-pneumonia. (Ramsay & Scadding 1939, Karpel 1945, Reimann 1947, Scadding 1948). In America a commission on pneumonia in the United States Army proposed the term "Primary atypical pneumonia, etiology unknown" be used until the precise etiology is known. This official nomenclative in America gained wide acceptance in the world in general. Scadding (1948) believes the choice of this term to be unfortunate. It implies a specifity which is not justified. Also the terms "primary" and "atypical" maybe criticised on factual and logical grounds, respectively. He suggests the name "primary atypical pneumonia" be abandoned and cases of proved etiology should be labelled appropriately, e.g. psittacosis pneumonia and rickettsia pneumonia. When there is evidence to suggest the infection be due to an unidentified pneumotropic virus, then the case should be labelled"pneumonia, presumably due to an unidentified virus". If the evidence suggests a non-specific infected atelectasis complicating respiratory catarrh the labels "infected atelectasis" or "aspiration pneumonia" should be applied.

While it is desirable that titles should define all conditions exactly as possible, many different entities apparently comprise this heterogeneous group of transient pneumonias. The title/

title "Primary atypical pneumonia" has gained universal favour at the moment and it would be customary to accept this term. It is agreed that a change in terminology is desirable but let it be reserved for the day when exact knowledge of the cause of all these pneumonias is available and final titles may be applied in exact terms.

That "primary atypical" pneumonia is no single entity is generally accepted. There may be multiple causes and several are already known. (Dingle 1943, Van Ravenswaay 1944, Meiklejohn 1945, Commission 1945, Reimann 1947, Scadding 1948, Appelbaum 1948). Although a causal factor has been demonstrated in several of the outbreaks of "atypical" pneumonia, especially in America, in the majority of cases no causal factor can be demonstrated, especially in this country.

Among the agents which have been shown to cause outbreaks of atypical pneumonia are the viruses of psittacosis (ornithosis), of lymphocytic choriomeningitis pneumonia, of influenza A & B and the rickettsia of "Q" fever, (Van Ravenswaay 1944, Horsfall 1946). The pneumonias in which these agents can be demonstrated, by laboratory investigations, account for only a small portion of the " atypical" pneumonias in general.

Pneumonias of known "true" viral origin have features which are similar to the severer forms of primary atypical pneumonia, "etiology unknown". Other diagnostic features should, however, be evident, e.g. the rash of measles, variola or vaccinia, or the demonstration of antibodies, and these distinguish them from primary "atypical" pneumonia.

Primary atypical pneumonia in which the etiology is unknown.

In the majority of "atypical" pneumonias known causes can be excluded. The problems involved in trying to prove their exact etiology have provoked much discussion and no solution has as yet been found.

In America, Reimann (1947) published an extensive article on this subject. He believes these pneumonias are probably viral in origin and superimposes them on a background of known "true" viral pneumonias, e.g. measles and variolar pneumonia; also that these pneumonias of probable viral origin form a common syndrome, being composed of a number of entities.

The opinion expressed by Reimann that they are due to a virus is based on three factors in particular.

(1) The close analogy with other diseases of known viral origin as regards epidemiological, clinical, pathological and therapeutic characteristics.

(2) The inability to demonstrate causal bacteria.

(3) The result of studies.

Many such studies have been carried out since 1938 and many unrelated filterable agents have been encountered. In America to-day it is believed by many investigators that a virus or several viruses acting alone or in symbiosis with certain streptococci cause these pneumonias (Reimann 1947).

Reimann (1947) also believes that the majority of cases of "atypical pneumonia" ("presumed" viral pneumonias) don't advance beyond a mild stage and that the mildest forms are indistinguishable from a "cold" i.e. only a percentage have lung/

lung involvement with subsequent radiological evidence of pneumonia, Gallagher (1941) when describing "acute pneumonitis" in adolescents thought it not unlikely that the etiological agent of this pulmonary infection also caused an illness in which cough and X ray evidence of lung involvement are absent. However, he does stress that repeated X ray films taken in oblique positions might reveal previously obscured lesions. Dingle (1943) thought it probable that at least some of the minor illnesses of the respiratory tract were of the same specific nature as "atypical" pneumonia. Curnen (1945) thought from the mode of occurrence of "atypical" pneumonia that this form of pneumonia was but one manifestation of a widespread respiratory disease. In America the Commission on Acute Respiratory Diseases (1945) stated that Atypical pneumonia may have only one clinical form with involvement of the lungs or it may vary from the mildest infection of the upper respiratory tract to the most severe and fatal pneumonia. The results of experiments to transmit primary atypical pneumonia to human volunteers were described by the same Commission a year later (1946). Their experiments indicated, to their satisfaction, that bacteria free filtrates, presumably containing a Virus, can induce primary atypical pneumonia in man. They also demonstrated that inoculum from individuals with characteristic illness and from individuals with experimentally induced atypical pneumonia caused minor respiratory illnesses and they thought that this suggested a relationship of this group of disease to atypical pneumonia.

Reimann (1947) believed that much of the confusion over "atypical"/

"atypical" pneumonias ("presumed" viral pneumonias) arose as a result of habitual comparison with lobar pneumonia or thought of as secondary diseases, as descending infections or complications of mild diseases of the respiratory tract. "They comprise an important independent syndrome of which influenza is a closer analogue". Eaton et al (1947) studied serological reactions in two hundred and thirteen cases of respiratory infection with special reference to primary atypical pneumonia. They tried to evaluate the etiological relation of a virus of primary atypical pneumonia to epidemic and sporadic acute respiratory disease with or without pneumonia. They claimed that their serological results helped to define primary atypical pneumonia as an etiological entity.

In Great Britain, Scadding (1948) presents a very different viewpoint. He proffers evidence against a single specific virus origin.

(1) The outbreaks described under primary atypical pneumonia vary enormously in clinical picture and severity. Apart from the specific types caused by e.g. psittacosis or rickettsia, the outbreaks described as primary atypical pneumonia vary from mild epidemic upper respiratory catarrhs, in a small proportion of which transient pulmonary consolidations have been discovered radiologically, to more severe respiratory infections in which pulmonary consolidations occur in a high proportion of cases and may cause a febrile illness of several weeks duration with some mortality.

(2) Though some published radiograms show lesions of a diffuse non-segmental distribution or in small scattered foci, many/

many of them show segmental shadows which might be interpreted as aspiration pneumonias.

(3) Attempts to isolate a virus in primary atypical pneumonia, excluding psittacosis or rickettsiasis, have met with little success.

Scadding (1948) believes that the results of the virus studies are equivocal and certainly that no constant virus has been isolated. He has several faults to find with the report issued by the Commission on Acute Respiratory Diseases (1946), already quoted, and believes their results must therefore be interpreted with caution. The faults are mainly ones of technique during their experiments in the transmission of primary atypical pneumonia.

Epidemic respiratory infections are caused by probably several viruses. A varying proportion of cases may be complicated by pneumonias not due to specifically invasive bacteria. The illnesses that these viruses cause are of variable severity. In association with some of them lung lesions of virus origin may develop, but non-specific lesions of the infected atelectasis type may develop in any of these epidemic respiratory infections, as they may in any respiratory catarrh. (Scadding 1948).

Amberson (1937) showed how lipiodal deposited in the nasopharynx in the evening could be demonstrated in the bronchi, on radiological examination, in the following morning. In animals the introduction of viscid mucus into the bronchial tree has been found to cause not only atelectasis of pulmonary segments but also transient inflammation of these segments.

Scadding (1948) postulated that infected mucus originating in/

in the bronchi, or trickling down into the bronchi from the nose, obstructs the lower bronchi or bronchioles and causes beyond the obstruction, an atelectasis and inflammation (i.e. pneumonia). The sputum of these pneumonias contains the type of bacteria which may be present in the respiratory tracts of healthy persons. Scadding also stressed that this type of pneumonia need not be associated with epidemic respiratory infection but may occur where there is a chronic catarrh of the respiratory tract. This would explain the sporadic cases; cases unlikely to be due to a pneumotropic virus.

The importance of upper respiratory tract infection as a predisposing factor common to all types of pneumonia in the Young Adult, will be discussed later. However, with special reference to "atypical" pneumonia it would be more convenient to examine this relationship at present.

Becker (1943) emphasised that "atypical" pneumonia commonly occurred during the course of a mild upper respiratory infection, in Young Adults. He found "abundant evidence" indicating that "atypical" pneumonias with all their protean manifestations are extremely common in acute and subacute upper respiratory infections. Also, he was equally certain that they are frequently due to some degree of bronchial or bronchilar obstruction. In one thousand cases of "atypical" pneumonia reviewed by Crysler (1946) evidence of minimal atelectasis was found in twenty percent. This, he thought, combined with the occasional secondary infection and the distribution of the lesions seen, suggested that the infection results from aspiration of infected material. Adamson (1947) noted the striking

unanimity/

unanimity of observers in describing the preponderance of shadows in the lower lobes in "atypical" pneumonia, suggesting that some of these lesions are the result of aspiration.

Incidence of "Atypical" pneumonia, with special reference to the Young Adult.

The exact incidence of "atypical" pneumonia in general is unknown. Only a guess can be hazarded at the present time. The expansion of mass radiography to include all sections of the community would provide reliable figures. At present the approximate incidence is better known in the Young Adult group.

Stuart (1945) in 19,050 pre-enlistment chest X rays found an incidence of 0.2%, suggesting that 1 in 500 of the ambulant population are daily going about with "undiagnosed parenchymal inflammation of the lung". He did make the proviso that though this gives some indication of the extent to which it exists undiagnosed among the general civilian adult population, it does refer specifically to a Young Adult group of 18-38 years.

The majority of reports on the incidence of primary atypical pneumonia have concerned service personnel. Drew (1943), however, found no reason to think the infection less common in civil life. McDonald (1946) similarly found the incidence as high in service personnel, 18-35 years, when compared with that noted in civilian practice (Smith, 1944).

Becker (1943) stated that there was a high percentage of "atypical pneumonia" in childhood as well as in Young Adult life.

Although there are uncertainties in the diagnosis of "atypical" pneumonia, the incidence apparently varies greatly from/

from year to year. In 1941 Reimann, in America, found 15% of all pneumonia to be "atypical" ("presumed viral") in origin. In 1942 they outnumbered pneumococcal pneumonias 3 to 1, yet in 1947 pneumococcal pneumonias again exceeded the "viral" forms in number (Reimann, 1942, 1947). Horsfall (1946), also in America and in service personnel, found "atypical" pneumonia was more common than all other forms of pneumonia combined.

	Ratio, "atypical" pneumonia : Pneumococcal or other bacterial pneumonias.				
Author.	Types of pneumonia.	No. of cases.		Ratio.	
Allen (1936) U.S.A.	Atypical: pneumococcal	68	: 53	1.3	: 1
Dingle (1943) U.S.A.	" "	69	: 11	6.2	: 1
Van Ravenswaay U.S.A.(1944)	" "	1,862	: 62	30.0	: 1
Turner (1945) Italy	" bacterial	286	: 57	5.0	: 1
Painton (1946) U.S.A.	" pneumococcal	491	: 187	2.6	: 1
Gelfer (1947) Russia	" "	153	: 135	1.1	: 1
Glover (1948) London	Non-bacterial : bacterial	53	: 298	1.0	: 5.6
Present series (1946-48) Manchester Area	Atypical : presumed pneumococcal	46	: 87	1.0	: 1.8

Clinical features of primary atypical pneumonia.

Primary atypical pneumonia is probably caused by several different agents and therefore the clinical features are variable. Some describe a very mild almost symptomless illness, while others find an acute illness of increased severity and in a few cases it has been fatal. However, although this group of primary atypical pneumonias does include many different entities there are common factors.

The onset is usually insidious. At first there usually is malaise and headache. There is a moderate fever, remittent in character. At first a troublesome persistent non-productive cough is a noticeable feature of the illness. The respiratory rate is little, if at all, raised. On examination there are few physical signs to be found. Impairment to percussion, diminished air entry and crepitations are the ones oftenest detected. Most notable of all is the discrepancy between the meagre findings in the chest and the more extensive lesion demonstrated radiologically. There is little alteration in the white cell count. Defervescence occurs by lysis and resolution is slow. The sulphonamide drugs have no marked affect on the course of the disease.

Common features of pneumococcal lobar pneumonia are lacking. Early in the disease, pleuritic pain, rusty sputum and a definite leucocytosis are infrequently present in primary atypical pneumonia. (Meiklejohn etal 1945).

While this general description serves a useful purpose it must be appreciated that there will be considerable modifications according/

according to the forms encountered.

The clinical features of primary atypical pneumonia are best assessed by comparing their incidence in different series. These series describe the infection as it has been witnessed in several different countries.

Analysis of 3,132 cases of Primary Atypical Pneumonia.

AUTHORS	Gallagher	Lyght	Green	Campbell	Young	Drew	Van Ravensway	Commission (Dingle etal)	Karpel	Curnen	Turner	Adams	Hamburger	Painton	McCoy	McDonald	Lamell	Stephens	Present Series	Comments
	1941	1941	1942	1943	1943	1943	1944	1944	1945	1945	1945	1946	1946	1946	1946	1946	1948	1948	1946-8	
Number of Cases	52	300	80	200	40	50	297	69	500	106	286	50	70	321	420	75	112	58	46	
Onset Gradual	-	-	-	63	Most	Most	67	26	26	73	-	30	-	70	-	60	53	Abrupt	65	Majority
Cough	80	80	-	51	100	+	86	99	69	98	+	94	79	66	95	56	90	+	65	Common
Malaise	90	-	88	-	-	+	70	77	-	61	+	100	-	33	34	-	36	-	17	Fairly common
Anorexia	-	-	-	-	-	-	-	-	-	35	+	100	-	6	5	-	9	+	5	Infrequent
Headache	70	55	47	-	80	+	48	78	-	65	+	100	68	20	25	47	30	++	24	Fairly common
Aching	-	60	42	25	80	+	-	-	-	28	+	30	33	-	23	47	6	-	7	Fairly common
Chills	14	50	48	-	50	+	68	75	44	59	+	74	-	30	42	47	37	+	-	Common
Rigor	-	-	-	-	9	-	11	13	3	-	Rare	-	24	-	-	-	-	-	13	Seldom
Sweating	-	-	-	-	-	-	-	-	-	-	+	56	-	-	1	-	-	+	2	Variable
Coryza	-	30	-	-	20	Some	49	41	-	-	Not marked	-	-	60	3	56	10	-	48	Fairly common
Sore-throat	-	30	20	26	20	Some	47	36	-	36	-	-	-	25	25	47	8	-	13	Fairly common
Epistaxis	0	-	-	-	-	-	-	-	-	15	-	6	-	-	1	-	4.5	-	0	Rare
Sputum	50	-	-	-	-	-	74	81	44	82	Seldom	88	17	20	-	95	36	Seldom	52	Fairly common
Bloody sputum	-	4	14	6	-	2	26	10	-	25	-	28	4	3	-	-	7.4	8.6	2	Seldom
Chest pain	10	38	35	44	50	Common	69	40	20	39	Occ.	46	37	25	24	40	23	-	24	Fairly common
Dyspnoea	-	5	9	3	30	Rare	21	-	-	5	Rare	8	-	-	0.5	47	6	-	2	Seldom
Dizziness	-	0	-	-	-	-	-	-	-	-	-	22	-	3	1	-	-	-	-	Variable
Nausea	4	10	27	-	-	-	-	Occ.	-	28	-	-	-	5	-	-	3.8	-	-	Variable
Vomiting	-	-	-	-	-	-	-	Occ.	-	24	-	-	-	5	5	-	1.8	-	0	Rare
Duration of fever in days	2-18	-	-	Less than 6 in 75%	-	7-10	-	7 in 63%	4 in 60%	Ave.10	7-10	6	-	1-9 in 84%	6 in 70%	2-5	-	4-11	T.normal in 47.8% Ave.2.6	About one week
Fever	-	-	73	-	55	Moderate	97	81	-	95	High	100	86	90	63	97.3	98.0	+	52	Usual
Average w.b.c.	-	Normal	-	-	15,000 Maximum	-	-	Normal	Normal 56.6	Normal 75.0	Normal	Normal	-	Normal 68.0	Normal	Normal	Normal	-	Normal	Normal
Pharyngitis	-	-	65	-	-	-	-	61	-	69	-	-	-	60	-	-	63	-	-	Fairly common
Rales	60	-	92	-	-	+	56	93	54	93	+	96	39	60	81	70	73	+	65	Common
Dullness	60	-	58	-	-	+	28	41	25	54	Occ.	22	6	20	28	70	37	-	24	Fairly common
Diminished Air Entry	-	-	-	-	-	-	19	-	-	-	+	24	-	-	-	70	-	-	8.3	Variable
Friction	-	-	-	-	-	1.5	-	-	-	?	-	12	6	6	3	-	-	-	5	Seldom
Cyanosis	-	-	11	2	-	-	3	-	-	-	-	-	-	-	-	40	8	-	-	Rare
Lymphadenitis	-	-	5	-	Several	-	-	-	-	24	-	60+	-	-	-	-	-	-	-	Variable
Pleural fluid	-	-	-	-	0.5	-	6	-	0.6	1	3.8	-	-	2.0	-	12.0	-	-	0	Rare
Meningeal signs	-	-	-	-	-	-	0.4	-	-	6	-	2	-	-	-	-	-	-	0	Rare
Complications	-	27	-	-	-	-	37	-	3	Rare	4.2	-	-	-	-	16.0	-	-	0	Seldom

Seasonal Incidence of Primary Atypical Pneumonia.

In America the Commission on Acute Respiratory Infection (1945) concluded that primary atypical pneumonia might be sporadic or endemic. That atypical pneumonia is quite common throughout the entire year is supported by other series. (Drew 1943, Painton 1946, Laurell 1948). In the present series cases of atypical pneumonia were also encountered throughout the year.

The months with the highest incidence are generally November to March (Drew 1943, Painton 1946, Laurell 1948). In the present series the highest monthly incidence was reached in February 1947. It has also been noted that in the present series the number of cases arising between June and August 1947 shows an incidence only just less than that seen in February 1947. Young (1943) described an outbreak with its peak in August.

Past History. Painton (1946)		Present Series (1946-48).	
Pneumonia	15.5%	15.2	
Bronchitis	-	15.2	
Pleurisy	-	2.2	(one case)
Frequent colds or Sinusitis	9.0	10.9	
Tuberculosis	3.0	0.0	

"A thorough past history exhibited no relation either to the incidence or severity of the disease". (Painton 1946).

Radiological findings in primary atypical pneumonia.

The radiological findings in primary atypical pneumonia are variable. Dingle (1943) described several types.

Primary atypical pneumonia more commonly begins as a hilar spread (Dingle 1943, Campbell 1943, Becker 1943, Karpel 1945, Stephens 1948, Painton 1946). At first there is an accentuation of the hilar markings which fade to normal lung. Cases are more rarely encountered where it originates peripherally. The opacity usually involves part of a lobe and may be multiple or migratory. (Dingle 1943, Karpel 1945, McCoy 1946). These opacities may present a mottled appearance. At a later stage the patches tend to become confluent. (Dingle 1943, Campbell 1943, Adams 1946, Crysler 1946). In other cases the opacity presents as a homogeneous density (Dingle 1943, Campbell 1943, Turner 1945, Adams 1946). When superimposed on each other these two types of opacity, the mottling and the homogeneous density, result in an appearance which is akin to "ground - glass". It has been suggested that the smooth component is caused by pleural involvement. (Campbell 1943).

In the present series both these radiological characteristics were noted. The mottled opacity, often with superimposed haziness, being observed in 74% and a more homogeneous density alone in 26% of cases.

Site of atypical pneumonia, as judged by radiological appearances.

Series.	Percentage involvement of individual lobes.						
	R.U.	R.M.	R.L.	L.U.	L.L.	R or L. Hilum.	Misc. (Bilateral or multiple).
Campbell (1943)	2.0	6.0	26.0	18.0	38.0	10.0	-
Young (1943)	5.0	2.5	27.5	5.0	30.0	-	30.0
Dingle (1943)	6.7	2.5	29.8	5.6	33.7	12.6	26.0
Owen (1944)	5.5	3.5	36.0	5.0	50.0	-	-
Moore (1944)	6.0	1.0	33.0	2.5	43.0	-	11.5
Karpel (1945)	9.4	11.6	52.8	6.2	39.6	-	25.4
Turner (1945)	10.7	7.1	25.0	13.2	18.5	-	25.5
McDonald (1946)	2.5	3.0	47.0	7.5	34.0	-	7.0
Painton (1946)	6.0	1.0	33.0	2.5	43.0	-	11.5
Present Series	2.1	0.0	50.0	4.4	56.5	-	13.0

Though primary atypical pneumonia may involve any lobe, it is clear that the lower lobes are the ones most commonly affected. Other authors, while failing to specify the exact number of times the individual lobes are involved, also found that the lower lobes were the commonest site for the pneumonia (Adams 1946, Reimann 1947, Laurell 1948).

Complications of primary atypical pneumonia.

	Van Ravenswaay.1944. (493 cases)	Turner 1945 (286 cases)	Karpel 1945 (500 cases)	Painton et al. 1946 (321 cases)	Mc.Donald 1946 (75 cases)	Present Series 1946-48 (46 cases)
Pleurisy & Effusion	9.7%	*3.8	0.8	2.0	12.0	None
Bronchiectasis	2.2	-	2.0	0.6	-	None
Lung Abscess	0.0	-	0.4	-	4.0	None

* One case of transverse myelitis.

Considering that the majority of cases of primary atypical pneumonia receive only symptomatic treatment the complications are very few in number. For the most they are trivial in nature, resolving spontaneously.

It has already been stressed that it is doubtful at present whether primary atypical pneumonia does predispose to true bronchiectasis, or that the pneumonia is secondary to a previously established bronchiectasis and simulates primary atypical pneumonia (Scadding 1948).

Karpel (1945) suspected that bronchiectasis might develop after primary atypical pneumonia, because in such cases no relevant previous history was obtained and recent "induction X rays" to the forces were negative. He does agree, however, that it is possible minimal bronchiectasis is commoner than is generally accepted and, as such, is not detectable on a routine film.

The low figure of complications also surpised Karpel (1945). "One would expect secondary infection to be common in such an illness".

Treatment.

It is generally accepted that there is no specific treatment for primary atypical pneumonia, sulphonamide drugs being of no value (Ravenswaay 1944).

Painton (1946), however, in 25% of 109 cases of primary atypical pneumonia treated with sulphonamides found a good to excellent response. He remarked that this was at variance with the general finding and thought that it was fair to conclude that the disease was frequently complicated by secondary bacterial invaders. If such were the case then it also must be an unusual feature.

Resolution of primary atypical pneumonia.

Series.	Dingle 1943	Becker 1943	Van Ravenswaay 1944	Karpel 1945	Stephens 1948
Average number of days till resolved	7	5-10	32	20	28-35

The rate at which the pneumonia resolves is very variable and this undoubtedly depends on the different causal factors. Also, it will depend on the individual care taken by the author to exclude the many obvious fallacies. In the present series it is felt that so often radiological confirmation of resolution, the only valid guide in this disease, was delayed for reasons quite/

quite dissociated from the illness that any figure offered would be invalid. Patients were sent on sick leave during convalescence and a clear X ray film taken on return gives no accurate indication of the day of cure. Similarly administrative delays must be excluded before accepting as a basis of cure the stay in hospital.

Mortality in primary atypical pneumonia.

Series.	Dingle 1943 (285 cases)	Turner 1945 (286 cases)	Karpel 1945 (500 cases)	McCoy 1946 (420 cases)	McDonald 1946 (75 cases)	Present Series 1946-48 (46 cases)
Percentage Mortality	0.3	None	0.2	0.2	None	None

PART IV.

The factors predisposing to pneumonia in the Young Adult.

Age.

The patients treated were all young adults. Generally at this age resistance is high and health is therefore more likely to be maintained than in early or later life.

Joules (1933) found that the prognosis in pneumonia depended more on age than any other factor. In pneumococcal pneumonia there is a gradual increase in mortality with age (Cecil et al 1927, Davies 1935). More recentlyHumphrey et al (1948) in 351 cases of pneumonia showed there apparently is a gradual rise in numbers through adolescent and young adult life.

Sex.

All of the patients were males, being drawn from a solely male population. There apparently is no significant difference in the occurrence rate of pneumonia between the two sexes, especially throughout adolescent and young adult life. (Humphrey et al 1948).

Personal and living conditions.

The personnel were recruits who recently had arrived from surroundings in which, presumably for the most part, they had grown up and to which they had been accustomed. They would be used to the comforts of a life at home and the change was sudden.

Though drawing from an army command largely dominated by recruits, Abrahams (1920) found no fewer than 11% of his patients fell sick within twelve days of joining up and that 523 (93.7%) had/

had less than twelve months service. This high incidence he thought must be due to the change to military conditions. When reviewing over 1,600 cases of pneumococcal pneumonia, occurring mostly in new recruits to the U.S.A. Army Air Force, Hodges (1946) showed that in comparison with other training camps the lack of seasoning predisposed to respiratory tract infections. The much greater incidence of respiratory disease in new recruits compared with seasoned soldiers was also noted by Reimann (1947). In primary atypical pneumonia recordings have been made of a high incidence in recruits (Commission 1945, Painton 1946).

The constitution of the personnel seen, in general, would influence their resistance. The importance of physique was stressed by Abrahams (1920) as having an important influence on the incidence of pneumonia. In the present series the majority of the patients were eighteen years of age and therefore were similar in physique. As already noted, on recruitment there was generally a slight undernourishment. This was subsequently confirmed by a universal gain in weight. In no patient did this amount to malnutrition. It is unlikely this played much part because the majority of patients developed pneumonia for the first time in their lives while receiving better nourishment and while gaining weight.

The amount of physical fatigue experienced would for the most be greater than at any previous time in their lives, but fatigue is not a prime factor predisposing to pneumonia, according to experiments conducted by Hodges (1946). The amount of sleep was regular for all.

Service personnel are uniformly dressed and improper clothing would play little part compared with the variations in civilian life.

Prior to the onset of pneumonia in these patients, they spent most of the day out of doors or in classrooms. At night they slept in wooden huts. Although precautions were taken to prevent unnecessary exposure to inclement weather, this was seldom practical for long. If the weather was wet the changes in clothing made largely depended on the airman's initiative. Facilities for the drying of wet clothing, while an individual problem at home, assumes gigantic proportions in the services. Adequate facilities are seldom to be found. The huts were heated by coke-stoves. They tended to be either cold or over-heated and there was uneven distribution of heat throughout. In cold weather there would be rapid and frequent chilling (Hodges 1946). In almost any service billet the ventilating system is easy prey and succumbs at an early stage.

Overcrowding encourages the spread of any infectious disease. Though regulations are enforced in the services to prevent gross overcrowding, the communal life presents many opportunities for close contact with ones neighbours. Also the air, air droplets and dust are common to all. Hodges (1946) believed the spread of respiratory disease to be greater in classrooms than barracks, and there is usually closer contact and more dust in the former.

Hodges (1946) could not assess exactly the affect of chilling/

chilling but he found little evidence that it predisposed to pneumonia. Yet by others, lowering of the temperature has been shown to affect resistance to respiratory infection (Young 1924, Van Loghem 1926). More recently Reimann (1947) also considered chilling to be a predisposing factor.

The carrier rate could not be investigated in the personnel reviewed, however, it has not been found to bear close relationship to the incidence of either non-bacterial respiratory disease or pneumococcal pneumonia (Hodges 1946).

Meterological Conditions.

The influence of weather conditions on the mortality from bronchitis and pneumonia in children under five years was studied in Glasgow, Edinburgh, Aberdeen, Dundee and London by Young (1924). The meterological factor with the greatest influence appeared to be the prevailing temperature. The lower the mean temperature in the preceding two weeks, the greater the fatality from bronchitis. Mortalities from bronchitis and pneumonia were not influenced in any consistent manner or degree by the amount of rainfull. Finally, there was some evidence that a high relative humidity, when associated with a low temperature, had some influence.

Dingle (1943) obtained a history of exposure to cold and damp in 42% of his patients with primary atypical pneumonia.

Hodges (1946) also noted the effects of cold and damp, especially prevailing in the spring months.

Seven thousand informants in the Netherlands were used to study the epidemiology of respiratory diseases by Van Loghem (1928). The importance of falls in temperature of the air was one of the facts/

facts that emerged from this investigation. "Most colds and pneumonia are founded on a disturbance of the thermo-regulation".

Past history of pulmonary infection.

The past history of pulmonary infection elicited in the cases of pneumonia seen, has been listed along with the descriptions of the individual types of pneumonia. Although the incidence of past pulmonary infection is higher than might have been expected in the young adult (36% of the cases), only a few patients gave a history of chronic chest symptoms. The majority of previous respiratory illnesses were transitory and apparently had caused no gross pulmonary damage.

The relation of pneumonia to upper respiratory infection.

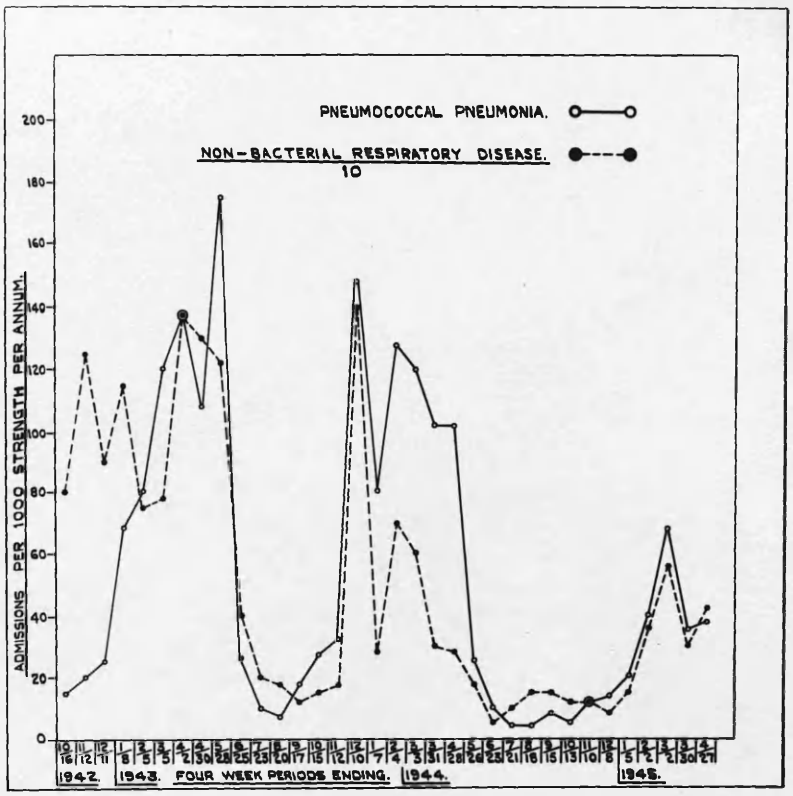
That pneumonia clinically is commonly preceded by a common cold has been a traditional observation (Hodges 1946). This was true of the classical pneumonias readily recognised, by their acute onset, their definite signs and symptoms. That benign transient pneumonia frequently complicates mild respiratory infections is only now gaining wider recognition. The pneumonia presenting little added symptoms and indefinite signs is often unsuspected. Becker (1943) thought the frequency with which pneumonia occurred during the course of a "common-cold" was still not sufficiently widely recognised.

The close relationship of pneumonia and upper respiratory infection is shown by their almost identical seasonal incidence. An epidemic of common-cold is soon followed by an increase in the number of cases of pneumonia.

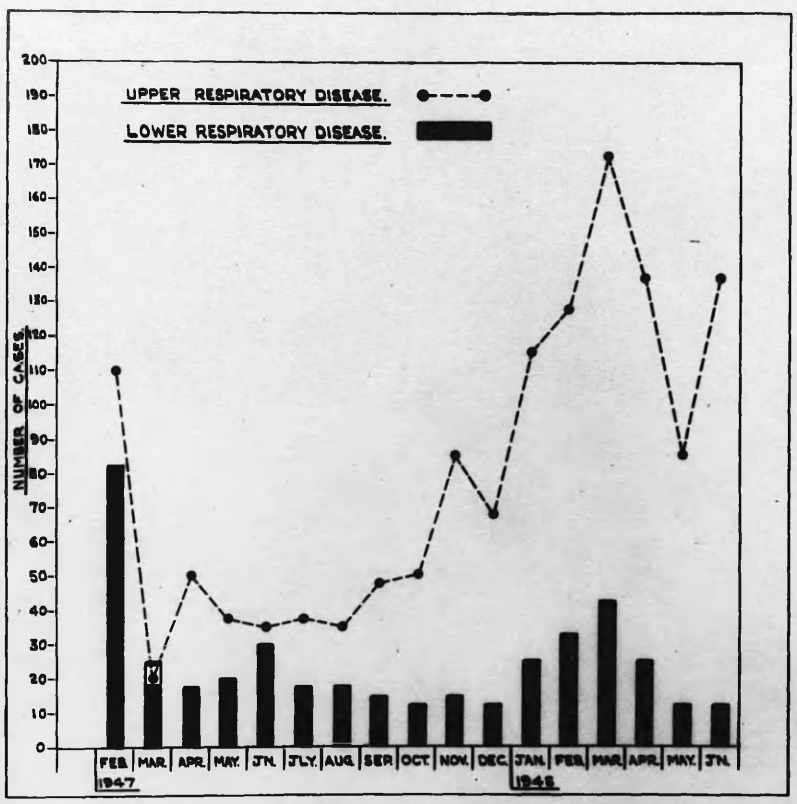
Hodges (1946) compared the monthly incidence of pneumococcal pneumonia and non-bacterial respiratory disease rates from October/

October 1942 to May 1945.

(The rates for non-bacterial respiratory disease have been divided by 10).



A similar incidence of upper and lower respiratory disease is found by comparing the number of cases seen in an R.A.F. Recruits Training Centre adjacent to that described in the present series.



Van Loghem (1926) among his 7,000 informants on respiratory disease, found evidence to support the idea that catching cold reduces resistance to pneumonia.

Bock (1938) found in 1,667 cases of acute respiratory infection 52 cases of pneumonia. The great majority of these pneumonias he believed to be virus in origin.

Schwartz (1938) described 654 cases of pneumonia in which over half gave histories of upper respiratory infection prior to the onset of the disease.

McKinlay (1940) in a young adult group found 74% of their cases with "bronchopneumonia" had a preceding respiratory tract malady.

Lyght (1941) found, in young adults, a past history of acute upper respiratory infection in 73 out of 300 cases of pneumonia. Recurrent, usually severe, acute upper respiratory tract infection was the most frequent of the handicapping conditions.

Gallagher (1941) found in 87 cases of mild bronchopneumonia in adolescents that 48 were preceded by a "cold" or sore-throat.

Kennedy (1943), in cases detected by mass radiography, found that in a 100 cases of pneumonia 74 recently had had a "cold in the head".

Iverson (1943) estimated that in a camp of 100 people, in an 8 week period, 60-80 had a cough and of these there was "atypical" pneumonia in 8 cases.

Reimann (1947) found, in atypical (viral) pneumonias, catching a cold was a predisposing factor. The majority of cases/

cases don't advance beyond a mild stage and the mildest forms are indistinguishable from a cold.

Scadding (1948) described pneumonia to be frequently associated with epidemic acute respiratory infections and with chronic catarrh of the respiratory tract.

On admission 105 out of the 163 patients with pneumonia in the present series had a coryza or sore-throat, i.e. 64%. A past history of recurrent nasopharyngitis was obtained from 27 patients (16.5%).

While many have reported the relationship of the "common-cold" and pneumonia, the significance of sinusitis in pneumonia in the young adult especially, has been passed over or ignored by almost all authors.

Campbell (1934) claimed to have demonstrated the existence of nasal sinusitis in everyone of 130 cases of pneumonia. The great majority of these patients were young children (52 under 1 year; 24 between 1 and 2 years; 47 were 2 - 15 years, only 7 were adults). The diagnosis was made in practically all cases by direct examination of the nasopharynx. This was found to be more reliable than radiological examination. However the sinuses were only examined radiologically in 15 cases and in only one of these which had been reported free from pathological involvement was pus found, the amount of pus being small. Eight patients who were known to have pus discharging from the sinuses at a time when the lungs were entirely normal, within a few days developed pneumonia. "It is well known nasal secretions are frequently inhaled to a greater or less extent and if infected material from the sinuses is/

is inhaled direct transmission to the lung is easily possible". Campbell believed that it was the ability of the older child to remove excess nasal secretions to some extent which had much to do with their lower incidence of pneumonia in sinusitis.

In the present series the relationship of sinusitis and pneumonia was appreciated and studied. The sinuses were X rayed in 71 out of the 163 cases of pneumonia and there was evidence of sinusitis in 53 (74.6%). At first sinus X rays were only taken in cases with a past history of repeated upper respiratory infection. Latterly, accounting for about 59 of the 71 sinus X rays taken, the sinuses were X rayed as a routine irrespective of history or of the type of pneumonia. In 10 cases which were X rayed routinely, and with no evidence of upper respiratory disease clinically, there was evidence of sinusitis radiologically. In the majority of the abnormal sinus X rays the abnormality was a loss of translucency of varying degree, without evidence of a fluid level or total opacity. Such an appearance was due to mucosal oedema. Several of these cases were seen by an Ear, Nose and throat specialist and had proof-puncture performed without mucopus being found. That some infection was present was shown by the inflammation, oedema and excessive mucus. In a minority pus was obtained.

In these cases with upper respiratory infection, with or without evidence of sinusitis, the heavy post nasal discharge was the most striking feature. A considerable proportion of this must have been inhaled and it is felt that probably, largely by mechanical effect, this would predispose to pneumonia, by interference with expectoration of bronchial secretions, and by causing/

atelectasis. Although frank pus was absent from most sinus washings, they were pathologically involved and would tend to augment and foster upper respiratory catarrh.

Mollison (1933) investigating pneumococcal infections of the nasopharynx found pneumococci in 21% of normals and 36% with colds. Though normally non-pathogenic, he believed that if local resistance is low enough the pneumococci could become active.

Arnold (1928) demonstrated the auto-sterilizing power of nasal mucus membrane by the application of viable bacteria. Subsequently he also showed that with subjects in warm rooms there was a retardation in the disappearance of the bacteria from the nasal mucosa.

The role that fitness plays in relation to capacity to resist attack by pneumococci and "common-cold" has been studied by Locke (1937), in rabbits and human subjects respectively. By estimating a "fitness-rating" in rabbits and by observing human subjects, he studied the conditions which impaired the fitness.

In rabbits he found lowering of the "fitness-rating" was followed by a parallel decrease in the ability to survive pneumococcal infection, pneumococci being injected intravenously. In human subjects, he produced data which suggested the frequency of colds bears a distinct relation to the degree of fitness.

PART V. CONCLUSIONS

The types of pneumonia most common to the Young Adult are acute "lobular" pneumonia, "atypical" pneumonia, acute lobar pneumonia and bronchopneumonia, in order of frequency. Pneumonia is unlikely to occur in the Young Adult unless there is a marked lowering of resistance. In acute pneumonia the symptoms readily draw attention to the lung condition but in many others the onset is insidious and the lung lesion is readily missed. Too frequently these patients are diagnosed as suffering from influenza, bronchitis or "common-cold", without qualification.

On clinical grounds alone it is often hard to be sure what the exact etiology is in individual cases of pneumonia. Investigations such as sputum culture, the demonstration of specific antibodies and a complete radiological examination of the chest, are seldom practical. Even if carried out, in doubtful cases the results are often inconclusive. However clinical types can be recognised, particular treatment can be started and an accurate prognosis given.

Acute lobar pneumonia presents no special features at this age. In the Young Adult, as in general, there has been in the last decade some change in the course of the illness, largely as a result of early radiological diagnosis and specific treatment. In even the severest illness, lobar pneumonia in the Young Adult carries a good prognosis to-day. When necessary intravenous sulphonamide administration allows the infection to be attacked rapidly. Combined sulphonamide and penicillin therapy usually/

usually overcomes the most virulent organisms. The natural high resistance at this age, aided by these drugs, ensures a low morbidity and mortality rate.

Although all types of pneumonia tend to follow an acute upper respiratory infection, this was most noticeable with acute "lobular" pneumonia. It is thought that these are "aspiration pneumonias" with lobular atelectasis and secondary infection of the parenchyma of the lung. The clinical course is that of an acute pneumococcal lobar pneumonia. A definite response to sulphonamide is obtained and resolution is complete.

Bronchopneumonia is rare at this age. Again an upper respiratory infection is often present and possibly this type differs only in degree and in the causal organism from lobular pneumonia. There is a greater amount of lung involved, the illness is of greater severity and response is slower.

The heterogeneous "atypical" pneumonias might be divided into two broad groups. These associated with coryza and these without obvious evidence of such. The former group may be a milder form of "aspiration pneumonia" varying in degree and causal organism from lobular pneumonia and bronchopneumonia. Here the predominant organism is probably one of low virulence, one common to the upper respiratory tract.

The other group of "atypical" pneumonia, not associated with coryza, may be caused by some more specific organism, though at present it is usually unrecognised. Many of the outbreaks of "primary atypical pneumonia" probably are caused by a definite organism which has been missed. This would account

for/

for some of the differences between the series reviewed. Otherwise it is difficult to e xplain an epidemic of pneumonias for the most part "atypical" in type yet with abrupt onset and severe headaches as predominant features (Stephens 1948). It is thought for instance such types seen in the Mediterranean area are really cases of "Q" fever.

The degree of illness may vary in "atypical" pneumonia from the mildest to the most acute (Commission 1945). Cases have been described which were so mild that asymptomatic patients were unable to appreciate they were ill at all (Karpel 1945), the pneumonia being discovered radiologically by accident. Similar occasions arose in the present series, especially in such cases detected by mass radiography.

A close relationship between upper respiratory tract infection and pneumonia is claimed. This was especially noted in acute lobular pneumonia, "atypical" pneumonia and broncho-pneumonia. In these types the lower lobes were the ones most frequently involved. There were often increased broncho-vascular markings and the lesion spread from the hilum to the periphery.

"Common-colds" occur commonly. While in most cases any secondary pulmonary lesion resolves rapidly without any obvious residual effects, it is assumed that repeated attacks, and these with incomplete cure of the lung lesion, will lead to chronic pulmonary disease. The upper respiratory tract should be investigated in every case of pneumonia and any focus of chronic infection removed. Patients with a mild pneumonia which is missed or neglected and have a protracted course, whether due to persistent upper/

upper or lower respiratory tract infection, will be potential candidates for subsequent bronchiectasis. However innocent the slight cough and sputum may appear at first after mild pneumonia, these cases must be energetically investigated, not treated palliatively.

To-day there are better facilities for X raying patients with persistent "common-colds", especially if accompanied by a cough, bronchitis or "influenza". In spite of indefinite localised chest findings unless a radiological investigation is made many patients with mild pneumonia will be missed and in a proportion of these cases the pneumonia will not resolve completely, without treatment. These are the patients who will later in life crowd the outpatient clinics or eventually will seek admission to hospital with "chronic bronchitis". The Young Adult with his repeated colds and coughs may have passed through several episodes of mild pneumonia unsuspectingly. A subsequent low grade bronchiectasis with chronic coughing has resulted in permanent widespread fibrosis in the lung.

Becker (1943) also firmly believed that the incidence of bronchiectasis,"which is ever so much more prevalent than is generally appreciated", will not be greatly changed until much more attention is paid to radiological examination of patients suffering from the common cold syndrome.

In recent years a greater awareness has arisen that measles and whooping-cough are precursors of bronchiectasis through missed bronchopneumonia and absorption collapse. A Young Adult will not readily contract measles or whooping cough for a second time but he will be subjected to repeated colds over many years. Missed pneumonias/

pneumonias will occur after "common colds" just as has been stressed in these other more commanding infections. The types of pneumonia seen in the Young Adult also are apparently largely associated with bronchial obstruction and local collapse.

The hypothesis is offered, evidence having been obtained from personal observation and review of other work, that upper respiratory infection, the different types of pneumonia and bronchiectasis as seen in the Young Adult, are different stages of the one syndrome bearing a direct relationship to each other.

Pneumonia in the Young Adult is the chief cause of morbidity (Lyght & Cole 1941). It is largely a preventable disease. Any factors tending to lower resistance should be avoided, especially conditions causing a fall in body temperature or overheating of the atmosphere. Measures taken to prevent upper respiratory tract infection will indirectly lower the numbers of pneumonia and reduce the incidence of bronchiectasis in later life.

In large communities head-colds are ever with us. They are a nuisance, and are seldom allowed to interfere with one's daily duties. They apparently clear in a few days. Resulting pneumonias occur, however, in a considerable proportion of cases. They are more commanding and at least result in the patient being absent from his work for about three weeks or more. The predisposing factors often remain unchanged and there is danger of relapse or re-infection. Repeated attacks of pneumonia, probably however mild, predispose to bronchiectasis and subsequent/

subsequent ill-health. While resistance is generally high in a Young Adult it may be lowered sufficiently to permit pneumonia. Upper respiratory infection is the main factor predisposing to pneumonia in the Young Adult.

"In the fields of observation chance only favours the mind which is prepared".

(Sir George Newman quotation from Pasteur).

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