Acute lobar pneumonia : a pathological and clinical study of 120 consecutive cases subjected to port-mortem examination / by John Lindsay Steven, M.D., Physician and Lecturer on Clinical Medicine, Glasgow Royal Infirmary.

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ACUTE LOBAR PNEUMONIA; A PATHOLOGICAL AND CLINICAL STUDY OF 120 CONSECUTIVE CASES SUBJECTED TO POST-MORTEM EXAMINATION.

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In the following paper I propose to give an analysis of the records of 120 cases of acute lobar or croupous pneumonia in which I made and recorded the post-mortem examinations. The paper will be mainly pathological in its bearings, though not entirely so, as I have examined the clinical summaries of all the cases so far as these were available to me. At present my personal observations have only to do with the facts revealed on post-mortem examination; the clinical facts which are here analysed were supplied to me by my colleagues under whose care the cases were during life. Although acute lobar pneumonia is one of the most familiar diseases with which the practical physician is called upon to deal, the facts revealed in the post-mortem room are always of interest and frequently of great importance, as conducing to that accuracy of diagnosis and prognosis upon which all rational treatment of the disease is based. From this point of view I think the record of the personally observed facts contained in this paper may not be without interest to the readers of the present volume of the *Glasgow Hospital Reports*. I hope also that the paper may not be without value as a contribution to the already voluminous literature of acute lobar pneumonia.

For the purposes of this analysis I have, with the assistance of my house-physicians, exhaustively tabulated the information contained in all the post-mortem records of cases of acute croupous pneumonia occurring between November 1889 and November 1895, the period during which I acted as Pathologist to the Glasgow Royal Infirmary. The cases tabulated were consecutive and in no sense selected, except in so far that only cases presenting the typical morbid appearances of acute lobar or croupous pneumonia in any of its stages were included in the scrutiny of facts. Bronchopneumonia or lobular pneumonia is not included in the present enquiry. The results of this study of 120 cases of acute pneumonia I shall endeavour to formulate in a series of abbreviated tables and commentaries.

Sex.

Of the 120 cases, 94 occurred in males and 26 in females. It is unnecessary to dwell upon these figures, especially as the question of sex will also be considered in dealing with that of age. The numbers are small, but they indicate a greater prevalence of the disease in the male sex.

Age.

The age was ascertained in 112 out of the 120 cases, and the following table shows the numbers of males and females in whom the age was ascertained:

Age, known,	Males,	88	Females,	24
,, unknown,	,,	6	,,	2
		94		26

The lowest age recorded in the series was 12 and the highest 80 years. As in only six cases was the age below 20, it can at once be seen that the present series of cases gives no information as to the prevalence and characters of croupous pneumonia in children. The following tables give the details of the age incidence in 88 males and 24 females, in terms of the exact age and of quinquennial periods:

TABLE SHOWING AGES OF 88 MALES WHO DIED OF ACUTE LOBAR PNEUMONIA.

Age in Years.	Number of Cases.	Number in quinquennial periods.	Age in Years.	Number of Cases.	Number in quinquennial periods.
12	1		46	1	
16	1		47	2	
17	1	6	48	2	9
18	1		49	2	
19	2		50	2	
23	1		51	3	
25	1	2	52	4	
			53	2	14
26	2		54	2	
27	3	9	55	3	
29	4				
31	1		56	1	
32	1	6	57	1	
34	1		59	1	5
35	3		60	2	
36	2		61	2	
37	2		62	1	6
38	4	14	63	2	
39	3		65	1	
40	3				
41	1		66	1	2
42	4	15	68	1	
43	5				
44	3		Total, 88		88
45	2				

TABLE SHOWING AGES OF 24 FEMALES WHO DIED OF ACUTE LOBAR PNEUMONIA

Age in Years.	Number of Cases.	Number in quinquennial periods.	Age in Years.	Number of Cases.	Number in quinquennial periods.
20	2	2	50	1	1
26	2	2	52	2	2
32	1	3	56	1	2
34	2		60	1	
37	1	3	65	1	1
38	2				
			68	1	2
41	1		70	1	
42	2	5			
44	1		80	1	1
45	1				
			Total, 24		24

These tables are interesting as showing that, in the present series of consecutive cases of acute lobar pneumonia subjected to post-mortem examination over a continuous period of six years, the greatest fatality occurred between the ages of 35 and 55. In the males 23 and in the females 7 deaths occurred up to the age of 35 years; 52 males and 11 females died between 36 and 55; in the males 13 and in the females 6 deaths occurred after the age of 55. The figures also show that at these three different age periods the mortality is much the same in males and in females. On the whole, however, the mortality in males between 36 and 55 is greater than in females; comparing the two sets of figures the number of female deaths should be 14 instead of 11 if an exact proportion had been maintained. In the earlier and later periods the death rate is slightly greater in the females than in the males; to maintain an exact proportion the number of female deaths in these periods should only have been 6·2 and 3·5 instead of 7 and 6 as seen in the tables.

This examination of sex and age shows that males are more liable to acute lobar pneumonia than females, and that in the middle period of life the mortality is greater in the male sex.

Occupation.

Of the 120 cases the occupation was recorded in 108—viz., in 86 males and 22 females. The tables on page 338 show the details of the occupations of the males and females respectively, and the classification of the occupations into indoor, outdoor, and combined indoor and outdoor occupations.

A scrutiny of these tables gives us some interesting information. While they show us that acute lobar pneumonia is in no sense an occupation disease, *i.e.* it may attack all classes of workers, they also show that the disease is very decidedly more prone to attack those whose work exposes them to the vicissitudes of the weather. Thus we find in the case of 86 males exactly 50 per cent. were engaged in work which could be classed as outdoor, and if to this we add those whose labour was partly outdoor we get nearly 75 per cent. who were exposed to the influence of the weather. If we examine the

TABLE SHOWING OCCUPATIONS OF 108 PATIENTS WHO DIED OF ACUTE LOBAR PNEUMONIA.

MALES—86 Cases.

Baker, - - - 2	Fireman, - - 1	Plumber, - - 1
Blacksmith, - - 1	French-polisher, - 1	Potter, - - 1
Boilermaker, - - 1	Fruiterer, - - 1	Quarryman, - - 1
Brassfinisher, - - 2	Glasscutter, - - 1	Railway porter, - 2
Bricklayer, - - 1	Hawker, - - 1	Sailmaker, - - 1
Canvasser, - - 1	Horseshoer, - 1	Sailor, - - 1
Carrier, 1	Ironworker, - - 1	Sawyer, - - 1
Chemical-worker, - 2	Joiner, - - 1	Schoolboy, - - 1
Clerk, - - - 2	Labourer, - - 19	Shipwright, - - 1
Coachman, - - 1	Lapidary, - - 1	Shoemaker, - - 1
Contractor, - - 1	Mechanic, - - 3	Slater, - - 1
Carrier, - - - 1	Miner, - - 5	Tailor, - - 1
Dealer, - - - 1	Mirror-finisher, - 1	Traveller, - - 1
Dock labourer, - 1	Moulder, - - 2	Van driver, - 4
Draper, - - 2	Packer, - - 1	Warehouseman, - 1
Dyer, - - - 2	Painter, - - 1	—
Engineer, - - 2	Plasterer, - - 1	Total, 86
Engraver, - - 1		

FEMALES—22 Cases.

Dealer, - - 1	Millworker, - - 1	Weaver, - - 2
Dressmaker, - - 1	Washerwoman, - 3	—
Housewife, - - 14		Total, 22

TABLE SHOWING OCCUPATIONS OF MALE PATIENTS, CLASSIFIED AS INDOOR, OUTDOOR, AND COMBINED INDOOR AND OUTDOOR, AND ALSO NUMBER OF PATIENTS IN EACH CLASS.

Indoor—17.	Outdoor—17.	Combined—16.
Baker, - - - 2	Bricklayer, - - 1	Blacksmith, - - 1
Brassfinisher, - - 2	Canvasser, - - 1	Boilermaker, - 1
Clerk, - - - 2	Carrier, - - 1	Chemical-worker, 2
Draper, - - - 2	Coachman, - - 1	Carrier, - - 1
Dyer, - - - 2	Contractor, - - 1	Dealer, - - 1
Engraver, - - 1	Dock labourer, - 1	Engineer, - - 2
French-polisher, - 1	Hawker, - - 1	Fireman, - - 1
Fruiterer, - - 1	Labourer, - - 19	Horseshoer, - - 1
Glasscutter, - - 1	Miner, - - 5	Ironworker, - - 1
Lapidary, - - 1	Quarryman, - - 1	Joiner, - - 1
Mirror-finisher, - 1	Railway porter, - 2	Mechanic, - - 3
Potter, - - - 1	Sailor, - - 1	Moulder, - - 2
Sailmaker, - - 1	Sawyer, - - 1	Plumber, - - 1
Schoolboy, - 1	Shipwright, - - 1	Packer, - - 1
Shoemaker, - - 1	Slater, - - 1	Painter, - - 1
Tailor, - - - 1	Traveller, - - 1	Plasterer, - - 1
Warehouseman, - 1	Van driver, - - 4	—
—	—	21
22	43	

table showing the occupation of the females attacked, we find that none of them were engaged in work which could be described as outdoor. While, therefore, it must be admitted that exposure is a frequent factor in the etiology of acute lobar pneumonia, it is at the same time clearly evident that exposure is not the only or even the most important element in the causation of the disease.

Season.

The season of the year is naturally regarded as an important etiological factor in the case of acute lobar pneumonia, and the following table gives the number of cases subjected to post-mortem examination in each month of the six years over which the present enquiry extends.

TABLE SHOWING THE NUMBER OF CASES OCCURRING IN EACH MONTH FROM NOVEMBER 1889 TO NOVEMBER 1895.

	1889	1890	1891	1892	1893	1894	1895	Total.
January, - -		4	1	2	1	6	2	16
February, - -			2	1	1		2	6
March, - -		2	2	4	4	2	4	18
April, - -			2		2	1	4	9
May, - -		3	3	3	2		2	13
June, - -		1	3	1	4	2	3	14
July, - -			3	1		2		6
August, - -		1	1		1		1	4
September, -		2	1					3
October, - -				1	3	2		6
November, -	1		4	1	1			7
December, -	4	3	3	3	4	1		18
	5	16	25	17	23	16	18	120

This table shows that over the period of six years with which this paper deals, the greatest number of cases occurred in the months of January, March, and December, and that the months of May and June come next as regards the frequency of pneumonia. Pneumonia, as judged by these post-mortem

records, is not a disease which by any means confines itself to the winter months, but occurs at all periods of the year. The months of August and September are those in which in the present series the fewest cases occurred, viz., 4 and 3 respectively for the whole period of six years. Acute lobar pneumonia may occur at any period of the year. The influence of season, like that of occupation, is an important, but evidently not the specific or determining factor in the causation of the disease.

Site of the Lesion in the Lungs and Lobes of the Lungs.

The records were carefully scrutinized with the object of ascertaining the frequency with which the local lesion of acute lobar pneumonia manifested itself in one or other lung, and in the different lobes of the lungs. The following tables show at a glance the results of this part of the enquiry:

TABLE SHOWING THE LUNG AFFECTED IN 120 CASES.

Right Lung alone involved,	62 cases.
Left Lung alone involved,	42 „
Both Lungs involved,	16 „
Total,	120

TABLE SHOWING LOBE OR LOBES AFFECTED IN 120 CASES.

Right Lung (62 *cases*).		
Upper Lobe,	affected 14	times.
Middle Lobe,	„ 3	„
Lower Lobe,	„ 18	„
Upper and Middle Lobes,	„ 3	„
Middle and Lower Lobes,	„ 6	„
Upper and Lower Lobes,	„ 4	„
All the Lobes,	„ 14	„
Left Lung (42 *cases*).		
Upper Lobe,	„ 11	„
Lower Lobe,	„ 23	„
Both Lobes,	„ 8	„
Both Lungs (16 *cases*).		
Right Lung.		
Upper Lobe,	„ 6	„
Middle Lobe,	„ 1	„
Lower Lobe,	„ 6	„
All the Lobes,	„ 3	„

Left Lung.

Upper Lobe,	„	1 times.
Lower Lobe,	„	14 „
Both Lobes,	„	1 „

Perhaps the most striking feature revealed in these tables is the fact that in the present series of 120 cases the right lung alone was involved in more than half of the cases, exactly about 51 per cent., and the left lung alone in a little over one-third of the cases, or about 33 per cent. These figures correspond very closely with the results obtained in 144 consecutive post-mortem examinations at the Middlesex Hospital (*Pneumonia*, Sturges & Coupland, 1890, p. 86) and in 100 cases recorded by Osler (*Canadian Medical and Surgical Journal*, May 1885). As regards the lobe affected, the table shows that the lesion was situated in one lobe in 69 cases, in two or more lobes of the same lung in 35 cases, in both lungs in 16 cases. These figures, again, correspond very closely with those already quoted.

Stage of the Pneumonia.

In post-mortem examination of cases of pneumonia it is generally possible to record the precise stage of the pneumonic process, a condition which clinically it is frequently impossible to determine with exactitude. In all my records except one a definite statement as to this point is contained in the report, and the following table gives the result of this part of the present inquiry:

TABLE SHOWING THE STAGE OF THE PNEUMONIA AT THE TIME OF DEATH.

Splenization,	1 case.
Splenization and red hepatization,	1 „
Red hepatization,	23 cases.
Red and grey hepatization,	16 „
Grey hepatization,	61 „
Purulent infiltration,	8 „
Abscess,	2 „
Gangrene,	6 „
Resolution,	1 case.
Not stated,	1 „
Total.	120 cases.

It is thus seen that in rather more than 50 per cent. of the present series of cases grey hepatization was the condition found at the post-mortem examination, and if we add the 16 cases in which red and grey hepatization were found together the percentage is considerably increased. It is also interesting to note that death may occur during the very earliest stage of the pneumonic process.

The Day of Death.

From an examination of the clinical records which were accessible to me it was possible to fix the day of death with tolerable accuracy in 74 of the 120 cases at present under review. The details are given in the subjoined table:

TABLE SHOWING DAY OF DEATH IN 74 CASES.

3rd day of disease,	- - - - - -	1	case.
4th	„ „ - - - - - -	6	cases.
5th	„ „ - - - - - -	7	„
6th	„ „ - - - - - -	7	„
7th	„ „ - - - - - -	14	„
8th	„ „ - - - - - -	9	„
9th	„ „ - - - - - -	8	„
10th	„ „ - - - - - -	9	„
11th	„ „ - - - - - -	4	„
12th	„ „ - - - - - -	4	„
13th	„ „ - - - - - -	0	„
14th	„ „ - - - - - -	2	„
15th	„ „ - - - - - -	0	„
16th	„ „ - - - - - -	0	„
17th	„ „ - - - - - -	0	„
18th	„ „ - - - - - -	1	„
19th	„ „ - - - - - -	2	„
	Total,	74	„

The greatest number of cases p. diem died on the seventh day, which is generally accepted as the most frequent day for the crisis in pneumonia.

Day of Death and Stage of Disease.

The following table shows the stage of the pneumonic process at the time of death in the 74 cases in which it was possible from the clinical records to fix with accuracy the day of death. In one or two cases the result of this inquiry is not

such as would *prima facie* be expected, but after giving the table I think such cases may be reasonably accounted for:

TABLE SHOWING THE STAGE OF THE PNEUMONIA AT THE TIME OF DEATH IN 74 CASES.

Stage of Disease.	Day of Death.	Number of Cases.
Splenization, - - -	9th day.	1 case.
Red hepatization, - -	3rd „	1 „
	4th „	2 cases.
	5th „	4 „
	7th „	3 „
	8th „	1 case.
	10th „	2 cases.
	14th „	1 case.
Grey hepatization, - -	4th „	4 cases.
	5th „	3 „
	6th „	6 „
	7th „	10 „
	8th „	5 „
	9th „	3 „
	10th „	5 „
	11th „	2 „
	12th „	2 „
Red and grey hepatization, -	6th „	1 case.
	7th „	1 „
	8th „	2 cases.
	9th „	2 „
	10th „	2 „
	11th „	1 case.
	12th „	2 cases.
Purulent infiltration, -	8th „	1 case.
	9th „	2 cases.
	11th „	1 case.
	19th „	1 „
Abscess, - - - -	14th „	1 „
	19th „	1 „
Resolution, - - -	18th „	1 „
Total,	- -	74 cases.

On the whole, it may be admitted that this table shows a remarkably close agreement between the clinical history and the anatomical development of the disease. Red hepatization alone is rare after the seventh day of the disease, the greatest number of cases occurring before this day, viz., three on the seventh day and seven before it. Four cases of red hepatization are noted as having been present after the seventh day, but

this is probably to be explained by the difficulty often experienced of fixing the precise duration of the disease. On referring to the detailed records of the four cases of late red hepatization, I find that the case, in which this stage was present on the eighth day, was associated with acute pericarditis and acute pleurisy with effusion on the left side, and that the pneumonia was probably of later development than these accompanying conditions. As regards the two cases with red hepatization present on the tenth day, one had commenced as an acute bronchitis complicating chronic Bright's disease, and the other had supervened in the course of an attack of erysipelas of the leg. (In this case the opinion based on the naked-eye appearance of the lung was verified by microscopical examination.) The case of red hepatization noted as being present on the fourteenth day had occurred as a complication in the course of acute capillary bronchitis. It may, therefore, be admitted that these four cases do not seriously disturb the general belief that red hepatization is essentially an early phenomenon. Grey hepatization was not noted as having occurred before the fourth day of the disease, and by far the largest number of cases were found on and after the seventh day, viz., twenty-seven cases, as compared with thirteen before this day. Purulent infiltration is seen to be a decidedly late phenomenon, no case having occurred before the eighth day of illness. Abscess is a later development still. The one case of splenization in the series is noted as having been present on the ninth day of illness; on referring to the details of the case it is found that the pneumonia had complicated an acute bronchitis. In the case (a man aged 59), in which a resolved pneumonia was found, death occurred on the eighteenth day of illness from phlegmasia dolens with extensive thrombosis of the femoral veins as a complication of the original disease.

Other Lesions of the Lungs.

In every case in which the presence of pulmonary lesions, other than those characteristic of acute lobar pneumonia, was recorded in the account of the post-mortem examination, a note of such lesions was entered in a column of the detailed

analytical table necessary for the writing of this paper, and I propose now very shortly, in tabular form, to show how frequently such lesions were noted:

TABLE SHOWING FREQUENCY OF OTHER LESIONS IN THE LUNGS.

Acute pleurisy, on same side only,	28 times.
„ on opposite side only,	3 „
„ on both sides,	17 „
Pleural adhesions (fibrous), on same side,	6 „
„ „ on opposite side,	9 „
Empyema,	Once.
Hypostatic congestion and oedema, on same side,	4 „
„ „ on opposite side,	15 „
Acute bronchial and tracheal catarrh,	6 „
Chronic bronchitis and emphysema,	26 „
Bronchiectasis,	Once.
Tuberculosis (recent),	4 „
Healed tuberculosis, on same side,	7 „
„ „ on opposite side,	5 „
„ „ on both sides,	Once.
Anthracosis,	4 „
Opposite lung stated to be healthy,	27 „

This table is not without interest as showing that acute lobar pneumonia is very frequently associated with other morbid conditions of the lungs. As regards the presence of pleurisy, it must be remembered that there is always more or less inflammatory change in the pleura covering the affected portion of the lung. The figures demonstrate, however, that not unfrequently acute pleurisy is present on the opposite side from the pneumonia. On examining the cases of double pleurisy to find whether they were also associated with double pneumonia, I find that in no less than nine of these cases the pleurisy described in the report was double and the pneumonia single. If these nine cases be added then to the three in which the pleurisy was on the opposite side from the pneumonia, we have twelve cases in our 120 where the acute fibrinous pleurisy, frequently associated with fluid, could not be accounted for by direct extension from a pneumonic lesion in the lung of the same side. I think that this is one pathological observation which might be advanced in favour of

the view that acute lobar pneumonia is more likely to be a general or constitutional disease than a local affection of the lung itself. The frequency with which the presence of healed tuberculosis was recorded either in the same or the opposite lung is another point of great interest in this part of our inquiry: the condition was noted thirteen times in all. It is certainly of interest for the physician to bear in mind the possibility of the presence of chronic lesions in the lungs in dealing with cases of acute lobar pneumonia, as their presence cannot fail to have an important bearing both upon prognosis and treatment. The table given above shows that in fatal cases old fibrous pleural adhesions, chronic bronchitis and emphysema, and old tubercular scars are very frequent.

Condition of the Heart.

The state of the heart is a matter of the greatest importance to the physician in dealing with cases of acute lobar pneumonia, and in the following table I give the information which our 120 cases yielded on this important point:

TABLE SHOWING FREQUENCY OF ASSOCIATED CARDIAC LESIONS.

1.	Normal,	43 times.
2.	Dilatation of right side,	37 „
3.	General hypertrophy and dilatation,	15 „
4.	Simple hypertrophy of left ventricle,	3 „
5.	Fatty degeneration or infiltration,	8 „
6.	Fibrous transformation,	2 „
7.	Aortic valve disease,	14 „
8.	Aortic and mitral valve disease,	2 „
9.	Mitral valve disease,	4 „
10.	Pericarditis,	13 „
11.	Adherent pericardium,	Once.

It is certainly noteworthy that in no less than 43 cases the condition of the heart at the post-mortem examination could be described as normal. The dilated and engorged condition of the chambers of the right side comes next in frequency, having been described 37 times in the reports. Aortic valve disease occurred 16 times, general hypertrophy and dilatation 15 times, and pericarditis 13 times. The influence of a

chronic lesion of the heart, either myocardial or endocardial, on the progress of a pneumonia is too well known and dreaded to require further remark in this place.

Weight of the Heart.

The weight of the organ was recorded in 62 of the 120 cases. The average weight in these 62 cases was just under 13 ounces, the maximum weight being 25 ounces, occurring once, and the minimum 7, occurring once. Weights of 20 ounces or over were recorded five times in all, and weights of 9 ounces and under six times in all. It would thus seem that acute pneumonia is not infrequently associated with enlargement of the heart, and anything like confirmed general hypertrophy of the organ must add gravely to the prognosis.

Acute Pericarditis.

Pericarditis was observed in 13 cases, and must always be regarded as a grave complication of the original disease. In some cases, no doubt, acute pericarditis occurring in the course of acute lobar pneumonia must be attributed to direct extension of the inflammatory process to the pericardial membrane, and that being so one would naturally expect that this complication would be most frequently associated with a left-sided pneumonia. With regard to the present series of cases this proves not to be the case, as the following table shows:

TABLE SHOWING RELATION OF ACUTE PERICARDITIS TO THE LUNG AND LOBE AFFECTED, AND TO THE STAGE OF THE DISEASE.

Right Lung (8 *cases*).

Lobe affected,	Upper lobe,	3 cases.
	Middle,	1 case.
	Lower,	1 „
	Middle and lower,	2 cases.
	All lobes,	1 case.
		8 cases.
Stage,	Red hepatization,	4 cases.
	Grey hepatization,	4 „
		8 „

Left Lung (3 *cases*).

Lobe affected,	Upper lobe,	1 case.
	Lower,	1 „
	Both lobes,	1 „
		3 cases.
Stage,	Grey hepatization,	2 cases.
	Purulent infiltration,	1 case.
		3 cases.

Both Lungs (2 *cases*).

Stage,	Grey and red hepatization,	1 case.
	Purulent infiltration,	1 „
		2 cases.

Condition of the other Organs.

It is impossible within the limits of a paper like the present to enumerate the various conditions which were met with in all the other organs in our investigation of cases of acute lobar pneumonia. The state of the spleen, the liver, the kidneys, and the brain may be shortly adverted to. As regards the brain, however, it must be stated that this organ was not very frequently examined.

The Spleen.—Cloudy swelling of the spleen, with enlargement and softness of the organ was described 58 times, or in nearly 50 per cent. of the cases. The weight of the organ was ascertained and recorded 30 times, the average weight being found to be $7\frac{3}{4}$ ounces, indicating a considerable enlargement of the organ. The maximum weight was 15 ounces, the minimum 4 ounces, each occurring once. This very constant enlargement of the spleen is not without significance, and may be regarded as another anatomical evidence of the constitutional nature of the disease. The spleen was described as healthy in 15 cases.

The Liver.—The liver was the seat of cloudy swelling in 27, and of fatty infiltration in 20 cases; the parenchyma of the organ being thus affected in 47 cases. In 15 cases the organ was described as healthy.

The Kidneys.—The condition of the kidneys is certainly a most important factor in the natural history of acute lobar

pneumonia. The following table gives at a glance the condition in 62 cases in which a record was kept:

Kidneys, healthy,	16 cases.
Cloudy swelling,	24 „
Tubular nephritis,	9 „
Interstitial nephritis,	12 „
Calculus,	1 case.
	62 cases.

The occurrence of acute lobar pneumonia in the course of chronic Bright's disease is well known, and in our present series of cases we find that this association was noted to have been present at least 21 times.

The Brain.—Unfortunately the head was only examined 12 times, with the following results:

Brain, healthy,	5 cases.
Cerebral softening,	2 „
Fracture of skull,	1 case.
Acute meningitis,	4 cases.
	12 „

It is interesting to note that in this relatively small number of head examinations acute meningitis was discovered four times, as it is well known, both clinically and pathologically, to be a common complication of acute lobar pneumonia.

It is unnecessary further to discuss the condition of the organs in general in the present series of cases, except just to add that acute peritonitis was described three times, marked atheroma of the aorta seven times, and aneurism of the aorta twice.

The Nature of Acute Lobar Pneumonia.

Acute lobar pneumonia, both from the clinical and the pathological point of view, may be classified as primary and secondary. By primary pneumonia we mean that variety of the disease which begins acutely in the midst of ordinary health and runs the characteristic clinical course. As secondary pneumonia we class those cases in which the pulmonary lesion may be looked upon as the direct result either of some old-standing primary lesion elsewhere or of septic

absorption or insufflation. As regards the actual structural change in the pulmonary tissue, the condition, both macroscopically and microscopically, may be practically the same in each form, and I do not believe that a study of the morbid anatomy of the lung alone would enable us to make the distinction. Neither do I think it possible at present by the ordinary bacteriological methods to differentiate the primary and secondary forms of the disease, for the same germs, as Weichselbaum has, I think, conclusively shown, may be found in each. As regards the 120 cases which have now been analysed, I have no bacteriological observations to submit which would be of service in the elucidation of this point, although in several of the cases bacteriological investigations were carried out, chiefly for class and demonstration purposes. Any views I may therefore have to express on this aspect of the nature of pneumonia must be based on purely clinical and anatomical grounds.

On examining the records I find that there are only 18 cases in all, of which it could be affirmed that they were truly examples of acute secondary lobar pneumonia: 9 were septic cases, secondary to wounds or to erysipelas; 8 were insufflation pneumonias, secondary to cancerous disease of the gullet or trachea; and 1 was secondary to opium poisoning. Of course, as may be seen in the tables, there were 21 cases which were associated with Bright's disease, and these might be regarded by some as raising the total number of secondary cases to 39, but I think the lobar pneumonia intercurrent in the course of Bright's disease may fairly enough be classed as primary pneumonia. If this be admitted, then of our 120 cases 102 may legitimately be regarded as examples of acute primary lobar pneumonia.

As regards the nature of secondary pneumonia little need be said. It may be looked upon as a purely local inflammation of the lung dependent upon the action of definite morbid agents, and in no sense differing from similar inflammations similarly produced in other regions of the body. Although I have said that morbid anatomy is not capable of absolutely differentiating secondary from primary pneumonia by the naked-eye appearances of the inflamed lung alone, yet I must

modify this statement in so far as to admit that to the eye of a trained pathologist there is something about the appearance of an insufflation or a septic pneumonia which might in itself raise a suspicion as to its true nature. The inflammatory lesion has on the whole a somewhat coarse character, with here and there areas suggestive of localized pus-formation, which is different from the homogeneous and uniform appearance of the red or grey hepatization of a primary lobar pneumonia. But even the skilled pathologist might not care to base his diagnosis on the naked-eye appearances alone without taking into consideration the information to be obtained from a careful investigation of the other features of the case.

It is not so easy, however, to be so sure of the true nature of primary acute lobar pneumonia. Whether the disease is to be regarded as a local affection of the lung or as a general constitutional disorder of the nature of a specific fever is a problem not quite easy of solution. It is not my intention to enter upon an academic discussion of all the aspects of this difficult problem, which embraces the consideration of many points not included in the present investigation. My object is simply to inquire what light the 102 cases of primary acute lobar pneumonia dealt with in this paper throw upon this question. On the whole, I think that the facts demonstrated in this analysis support the view, now very generally accepted by physicians and pathologists, that primary acute lobar pneumonia is a general febrile disease, with a local lesion usually, but perhaps not quite invariably, in the lung. It may be urged that the results of the present inquiry do not carry us very far towards this solution of the problem, particularly with regard to that part of it which suggests that the local pulmonary lesion may, though I admit very rarely, be absent altogether, yet I think they do carry us a little way. The analysis shows us that no age or occupation is exempt from the disease, although no doubt, as regards occupation, a greater prevalence may be admitted in occupations which are to be classed as outdoor occupations. Such facts may perhaps be regarded as pointing to a general rather than a local disease, although it must at the same time be admitted that too great weight must not be attributed to them if we also take into

account the greater influence of outdoor work and the distinctly greater prevalence of the disease in the male sex.

The facts brought out with regard to the prevalence of acute lobar pneumonia at different seasons of the year are distinctly in favour of the view that the disease is general and not local. The figures in the table on page 339 suggest that the incidence of the disease is subject to epidemic influences, and the circumstance that, in a series of observations extending over 6 years, nearly as many cases occurred in May and June as in December and January is certainly indicative of a general rather than a local disease. Were the disease simply a local inflammation of the lung, we would expect a very much greater prevalance in the cold months of winter and early spring; in round numbers, however, we find that about 60 per cent. of the cases occurred in the winter months from October to March, and about 41 per cent. in the summer months from April to September inclusive. Such a difference, however, indicates something more than the mere effect of cold as producing a local pulmonary inflammation: the fact that 41 per cent. of the cases occurred during the summer months suggests not only epidemic influences, but also a general rather than a local morbid process.

The facts as to the morbid anatomy of acute lobar pneumonia, in so far as they have been elicited in the foregoing analysis, may also, I think, be taken as pointing in the same direction. The somewhat remarkable variation of the site of the lesion in the lung in different cases, the fact that all the lobes of a lung may be affected in some cases and both lungs in others are circumstances not without significance. Were the disease in its origin a purely local affection it might be expected to begin with more or less constancy in a particular area of the lung, for example in the apex or in the base. This, however, as a reference to the table on page 340 shows, is by no means the case, although no doubt the lesion is more frequent in the right lung and in the lower lobe. Further, the frequent association of lobar pneumonia with pleurisy of the opposite side and with pericarditis may be taken as indicative of a general rather than a local disease. The facts brought out with reference to the associated pericarditis are interesting in

this regard. We have seen that in our cases pericarditis was most frequent in right-sided pneumonias, in three of them the lesion being situated in the upper lobe, a circumstance which points to general infection rather than to mere local extension. The association of lobar pneumonia with acute peritonitis points to the same thing, particularly if, as sometimes happens, all the great serous cavities are more or less involved.

The condition of the other organs, as demonstrated in the course of this analysis, is such as is usually met with in the specific fevers. We have seen that cloudy swelling of the liver, kidneys, and spleen are very frequent associated conditions. The constancy with which enlargement of the spleen is met with is perhaps worthy of special mention in this regard. My friend, Dr. David M'Crorie, assistant physician and bacteriologist to the Glasgow Royal Infirmary, informs me that in a very large number of examinations he has never failed to obtain the pneumococcus in cultures from the spleen in cases of acute lobar pneumonia. On the whole, then, I think, it may be admitted that the facts as regards morbid anatomy brought together in this paper support the view that acute lobar pneumonia is a general and not a local disease.

One of the strongest clinical arguments in favour of this view as to the nature of acute lobar pneumonia is the constancy with which the crisis of the disease occurs on the 7th or 8th day. A reference to the table showing the day of death in 74 of our cases makes it clear that by far the greatest number of cases die on and after the seventh day of the disease. The actual figures are these: On the 6th day and before it 21 cases died; from the 7th to the 11th day inclusive 48 cases died. These figures confirm the clinical argument based on the constancy of the critical day in pneumonia, and form a fitting conclusion to the foregoing remarks, in which I have endeavoured to give expression to my opinion, based on six years' observation and study in the post-mortem room (supplemented, as regards my personal experience, by six additional years of clinical study in the wards), that acute lobar pneumonia is a general febrile disease.