PFEIFFER'S BACILLUS AND INFLUENZA.

BY S. W. PATTERSON, M.D. MELB.,

AND

F. E. WILLIAMS.

(From the Walter and Eliza Hall Research Institute, Melbourne.)

DURING the epidemic of "pneumonic influenza" in 1918 we obtained *B. influenzae* (Pfeiffer) in 98·4 per cent. of a series of cases examined post mortem at Rouen. In the course of a study of the acute infections of the respiratory tract in Southern Australia we have investigated the bacterial flora of the lungs at 390 autopsies in the Melbourne Hospital during 12 months of 1920-21. We expected that we should thus obtain a control of the incidence of *B. influenzae* at a time when influenza was not prevalent. During the winter and spring months, however, an epidemic was prevalent in Melbourne with especial incidence in May, July, and September-October. This, we believe, would have been called influenza in the years before the "pneumonic influenza" of 1918.

Methods of Investigation.

Portions of lung obtained post mortem were taken, and cultures on unhaemolysed blood-agar plates were made both from the mucous membrane of a medium-sized bronchus, and, after searing the surface with a hot iron, from the lung substance. Direct films were made at the same time and the findings recorded. The plates were examined next day, and films and cultures made from different colonies. The presence of pneumococci, streptococci, staphylococci, Gram-

negative cocci, *B. influenzae* (Pfeiffer), *B. friedländer*, and *B. tuberculosis* was noted. For the purposes of this investigation small Gram-negative pleomorphic bacilli, growing in tiny dewdrop colonies on blood media without change of the blood, and failing to grow in subcultures on ordinary agar and media, were taken to be Pfeiffer's bacilli. No serological tests were made.

Results.

Soon after the series was commenced, with the onset of cold weather (May, 1920), a considerable rise occurred in the positive findings of *B. influenzae* up to nearly 50 per cent. (see Table I., Pfeiffer percentage in all cases). During June the percentage fell slightly, only to rise again to over the 50 per cent. level in July. In August the percentage fell to 15·6, but the spring months, September and October, again showed a slight but definite rise. After October the percentages fell to minimal figures. How are these fluctuations of the Pfeiffer percentage reflected in the various pulmonary conditions discovered post mortem? The 390 cases are grouped thus according to the lung condition revealed post mortem:—

Pulmonary condition.		No.
1. Inflammation	Acute lobar pneumonia ..	46
	" broncho-pneumonia ..	132
	" purulent bronchitis ..	3
	Chronic tuberculosis ..	37
2. Tumours	" bronchiectasis ..	4
	Malignant ..	6
3. Circulatory disturbances	Hydatid ..	1
	Congestion and cedema ..	95
4. Normal..	Infarcts from emboli ..	9
		57
		390

TABLE I.—SHOWING PFEIFFER PERCENTAGES IN GROUPS OF NORMAL AND DISEASED LUNGS.

Month.	All cases.				Inflammations.								Tumours.				Circulatory disturbances.				Normal.			
					Acute— Lobar & broncho- pneumonia, and bronchitis.				Chronic— Tubercle and bronchiectasis.				Malignant and hydatid.				Congestion, œdema, and infarcts.							
	Total.	Pneum.	Pf.	Pf. %	Total.	Pneum.	Pf.	Pf. %	Total.	Pneum.	Pf.	Pf. %	Total.	Pneum.	Pf.	Pf. %	Total.	Pneum.	Pf.	Pf. %	Total.	Pneum.	Pf.	Pf. %
Apr., 1920	22	21	2	9·0	12	12	0	—	2	2	1	50·0	2	2	1	50·0	5	5	0	—	1	0	0	—
May ..	51	48	25	49·0	24	23	14	58·3	8	7	5	62·5	0	—	—	—	11	10	5	45·5	8	8	1	12·5
June ..	35	33	12	34·2	20	19	9	45·0	1	1	1	100·0	1	1	0	—	8	8	5	12·5	5	4	1	20·0
July ..	45	44	23	51·1	30	29	14	46·8	3	3	1	33·3	0	—	—	—	6	6	5	83·0	6	6	3	50·0
Aug. ..	32	29	5	15·6	18	18	2	11·1	6	5	1	16·7	0	—	—	—	3	2	2	66·6	5	4	0	—
Sept. ..	30	26	8	26·6	13	11	4	30·7	3	3	1	33·3	1	0	0	—	8	7	2	25·0	5	5	1	20·0
Oct. ..	41	26	9	21·9	19	16	5	26·3	3	3	0	—	0	—	—	—	16	7	3	18·8	3	0	1	33·3
Nov. ..	37	23	7	18·9	13	7	2	15·3	6	5	1	16·7	3	2	1	33·3	8	6	2	25·0	7	3	1	14·3
Dec. ..	31	22	1	3·2	11	9	1	9·1	3	2	0	—	0	—	—	—	8	4	0	—	9	7	0	—
Jan., 1921	32	25	1	3·1	11	9	1	9·1	4	3	0	—	0	—	—	—	12	10	0	—	5	3	0	—
Feb. ..	21	14	1	4·7	6	5	0	—	0	—	—	—	0	—	—	—	12	7	0	—	3	2	1	33·3
Mar. ..	13	9	3	23·0	4	3	1	25·0	2	2	0	—	0	—	—	—	7	4	2	28·6	0	—	—	—
Totals ..	390	320	97	24·9	181	161	53	29·3	41	36	11	26·8	7	5	2	28·6	104	76	22	21·1	57	42	9	15·8

TABLE II.—SHOWING MONTHLY VARIATION OF PFEIFFER PERCENTAGE CORRESPONDING WITH INCIDENTS OF DISEASE OF LUNG AND BRONCHUS.

Month.	Total 390.	All cases.				Total 181.	Lobar & broncho-pneumonia, and acute bronchitis.				Total 161.	Circulatory disturbances and normal lung.			
		<i>B. influenzae</i> found in—					<i>B. influenzae</i> found in—					<i>B. influenzae</i> found in—			
		Lung.		Bronchus.			Lung.		Bronchus.			Lung.		Bronchus.	
		Total.	%	Total.	%		Total.	%	Total.	%		Total.	%	Total.	%
April, 1920 ..	22	1	4·5	2	9·1	12	0	—	0	—	6	0	—	0	—
May	51	16	31·4	25	49·0	24	9	37·5	13	54·0	19	4	21·0	7	37·0
June	35	7	20·0	10	28·5	20	6	30·0	8	40·0	13	0	—	2	15·4
July	45	13	29·0	21	46·5	30	9	30·0	13	43·4	12	3	25·0	8	66·6
August	32	3	9·4	4	12·5	18	1	5·5	2	11·1	8	1	12·5	0	—
September ..	30	4	13·3	7	23·4	13	3	23·0	4	30·8	13	1	7·7	2	15·4
October	41	3	7·3	8	19·5	19	1	5·25	5	26·3	19	2	10·5	3	16·6
November.. ..	37	1	2·7	7	19·0	13	0	—	2	15·3	15	0	—	3	20·0
December ..	31	1	3·2	1	3·2	11	1	9·1	1	9·1	17	0	—	0	—
January, 1921	32	1	3·1	0	—	11	1	9·1	0	—	17	0	—	0	—
February	21	0	—	1	4·75	6	0	—	0	—	15	0	—	1	6·65
March	13	2	15·4	2	15·4	4	1	25·0	1	25·0	7	1	14·3	0	—

Thus the cases of definite pneumonia furnish somewhat less than half of the total (45.6 per cent.). Of the other lung conditions, those showing circulatory disturbances (congestion and oedema) without lung consolidation furnish the great majority, while tuberculosis contributes a fair quota. Table I. shows the Pfeiffer percentage in these groups of cases, and it is apparent that when the acute inflammations are set beside the other lung conditions, the fluctuations in the Pfeiffer percentage are in the same direction and of the same order. The group of "normal" lungs is too small for statistical purposes, but it is conceivable that, had a larger series of normal lungs been available, these would, just as truthfully as the diseased lungs, have reflected the general incidence of *B. influenzae* as a human parasite. Moreover, Table II. shows that the Pfeiffer percentage, whether in lung or in medium-sized bronchus, shows corresponding monthly variations both in the cases grouped as acutely inflammatory and in the cases without inflammatory lesions (congestion, oedema, and normal lungs) with the incidence in total cases observed month by month.

The pneumococcal percentage, high at all times in lungs investigated post mortem, shows little fluctuation throughout the period.

Conclusion.

Bacteriological examination of lungs at autopsies over a period of 12 months, during which three distinct prevalences of influenzal attack were noted, yielded information which supports the view that the incidence-fluctuations of *B. influenzae* as a lung parasite are independent of the particular pulmonary condition associated with it.

Reference.—Patterson, S. W., Little, E. M., and Williams, F. E.: Medical Research Council Report, No. 36, 1918, p. 88.

CYSTS OF THE EPIDIDYMISS.

BY R. OGIER WARD, M.CH. OXF.,
F.R.C.S. ENG.,

FIRST ASSISTANT, SURGICAL PROFESSORIAL UNIT, ST. BARTHOLOMEW'S HOSPITAL; ASSISTANT SURGEON, ST. PETER'S HOSPITAL FOR STONE, LONDON.

CYSTIC swellings in the scrotum are very common. They are usually due to the collection of fluid in the tunica vaginalis, but cysts of the epididymis are by no means rare, and these, when well developed, may produce swellings as large as an ordinary hydrocele. A study of 17 cases recently collected in the clinic of the surgical professorial unit at St. Bartholomew's Hospital and in the out-patient department of St. Peter's Hospital for Stone, has emphasised the fact that the disease not infrequently affects both epididymes simultaneously, and consideration of the available methods of treatment suggests that excision of the cysts should be more often practised. Monod and Terrillon have classified cysts arising in connexion with the epididymis in two groups: (1) Small cysts which lie above the globus major, and (2) larger cysts, in this country commonly called spermatoceles, which are more closely related to the testicle. The small cysts first mentioned are of little importance. They are not uncommon in old men, and if looked for during post-mortem examinations will usually be found on the convex surface of the globus major; they are commonly sessile and subserous, often only the size of a pin's head, and rarely larger than a pea. The pathogenesis of these cysts is uncertain. It has been suggested that they arise in vestigial remains, and that they may result from injury or from inflammation. They give rise to no symptoms and call for no treatment.

Form and Position of Larger Cysts.

The cases which form the subject of this article all belong to the second group of larger cysts. They are of more importance clinically, since they often grow to a large size and may cause great inconvenience. Their pathology has often been discussed, but still

remains uncertain. They are by no means rare, though not so common as the small cysts just described. It has been definitely stated (Monod and Terrillon) that they originate between the under surface of the globus major of the epididymis and the upper surface of the testis, and that as the cyst increases in size the epididymis itself becomes flattened out and may be recognised only with difficulty. Other writers have suggested that these cysts take origin in remains of the wolffian duct. Another theory supposes that they are due to partial dilatations of some part of the excretory ducts of the testis, and this is supported by the fact that communication between the cyst and the seminal ducts has often been demonstrated, and also that spermatozoa are always present in the fluid. They are certainly more common in the region of the globus major, and usually the remains of the body of the epididymis and globus minor can be seen on the wall of the cyst. In some cases, however, the cyst, instead of lying between the globus major and the testis, seems rather to be a cystic degeneration of the greater part of the epididymis itself, the shape of which is preserved though very little of it is left unaltered. A specimen kindly given me by Mr. F. J. F. Barrington shows a change of this kind in the testicle of a bull; the epididymis is not flattened out by a cyst lying between it and the testis, but is itself the site of development of a multilocular cyst. In the same way the cysts of the human epididymis are often multilocular, particularly when of large size, and usually there is then some communication between the various loculi so that if one is opened the others are emptied. As they become larger they always bulge into the tunica vaginalis.

Ætiology and Age Incidence.

The condition appears to be a form of retention cyst, but the causes are unknown. Previous gonorrhoeal inflammation of the epididymis has often been suggested, and also injury, but it is difficult to prove either to be responsible, or, indeed, to establish any cause, from an investigation of the patient's history, for he is usually quite unable to state with accuracy for how long any enlargement has existed. Again, these cysts are probably of much commoner occurrence in later life than is generally suspected, for minor swellings pass quite unnoticed, and since there is neither functional disorder nor any pain, except perhaps an occasional aching, it is only when they are big enough to cause inconvenience that the patient presents himself for treatment.

In Cabot's "Modern Urology" it is stated that the commonest period of life during which this occurs is between 20 and 40 years. The present series, however, shows it to be chiefly a disease of advancing years, the average age being 55, though some swelling had usually been noticed for one or two years previously. This agrees with the opinion of most writers. The youngest subject, under the care of Mr. Grey Turner—to whom I am grateful for permission to publish this case—was aged 41, and had noticed the swelling for about a year. The condition has been described in patients as young as 25 years. Most of the patients were married, and were fathers of families now grown up. In only one patient was there any definite history of injury, which had occurred five months previously, and he was fairly sure that the swelling was the direct result of it. Two patients had acquired gonorrhoea many years before, but did not remember having had epididymitis at the time. In one case there was a history of syphilis 30 years previously.

When examination is made of the frequency with which either testicle is affected, it is interesting to find that in 5 of the 17 cases the cystic enlargement was on the right side, and in 4 it was on the left, but that in the remaining 8 both epididymes were affected, one usually being larger than the other. The common occurrence of cystic degeneration of both epididymes is not generally realised. The distension was usually not very great, the largest amount of fluid obtained being 13 oz., which was withdrawn