A REPORT ON THE "INFLUENZA" EPIDEMIC OF 1918.

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THE present outbreak of influenza in epidemic form is claiming considerable attention from a medical as well as from an economic and even military standpoint. Though clinically very similar to other epidemics in former years, it is nevertheless sufficiently distinct to merit a detailed description. The following notes are based on the study of the first fifty cases which occurred amongst members of the Royal Air Force in this hospital.

Etiology.

The average age incidence in these cases was 24.

A Gram-negative micrococcus, similar in most respects to *Micrococcus catarrhalis*, was grown (in all cases) from nasopharyngeal swabs and sputum. This was the predominating organism. In some instances an almost pure culture was obtained. Pfeiffer's influenza bacillus was only cultured in 8 per cent. of the cases, though influenza-like bacilli were observed by direct smears in 62 per cent. of the cases. A Gram-negative micrococcus resembling meningococcus was isolated in 10 per cent. of the cases, and Hoffmann's bacillus in 4 per cent. *Streptococcus brevis* and the pneumococcus were present in several cases, but not in large numbers. Experimental inocula-

FIG. 1.—Influenza, three-day type (Captain B.). Note the relatively slow pulse.

FIG. 2.—Influenza, 5-6 day type (Lieut. L.). Note relatively slow pulse; bowels confined. A, Tepid sponged. B, Soap and water enema; aspirin 10 grains.

tion of the Gram-negative micrococcus on the mucous membrane of the nasopharynx in two healthy persons produced the disease in typical form. The micrococcus was recovered from the throat and sputum of these cases during the disease. It seems, therefore, that the micrococcus is probably the specific organism, either alone or in conjunction with the *B. influenzae*.

Symptoms.

The incubation period is short, about one to two days.

In a typical case the onset is strikingly sudden. A patient may go to bed apparently well and wake up complaining of body pains, headache, malaise, etc.; or he may be at his work, when he suddenly feels violently giddy, and in a few seconds may fall to the ground in a state of collapse. The two commonest initial symptoms are a slight feeling of chilliness and malaise, quickly becoming worse for each minute the patient is up and about. A diffuse headache soon follows, and an uncomfortable feeling of tightness and soreness in the throat and nose with a slight dry cough. The second day of the disease finds the patient a good deal worse, with, in addition, painful photophobia. There is a great desire to sleep the whole day (in some cases the somnolence has been the only symptom from first to last). The appetite is quickly and completely lost; the bowels are confined, but marked gastro-intestinal symptoms are rare, though violent vomiting has been an initial symptom. Diarrhoea was not observed. Colicky abdominal pain without other symptoms and signs, except the fever, occurred in one case. The third day will, as a rule, see an improvement in the general feeling of discomfort, though the physical signs are usually more marked and the cough troublesome. Backache may be severe. By the fifth day the patient feels very much better; appetite returns and headache and photophobia are absent or slight. The morning of the fifth day marks the beginning of convalescence. The patient feels quite well and the appetite is keen. A good deal of weakness, however, is

present, and if the patient is allowed up before the sixth day he may feel extremely giddy, faint, and sick. Convalescence is rather slow, and the majority of patients do not recover their strength for a week to ten days after getting up.

Physical Signs.

The second or third day will present the most characteristic physical signs, which are:

1. A toxic appearance.
2. Heavily-coated tongue.
3. Injection of the conjunctivae, and signs of acute inflammation of the whole mucous membrane of the mouth, including gums and tongue, and of the nasopharynx. A milky mycelial growth is spread all over the inside of the mouth, and is usually most abundant opposite the last molar teeth. The gums are generally tender and may bleed slightly, either spontaneously or on touch. The breath is heavy and foul.
4. The temperature rises rapidly, and usually is highest on the second or third day. High temperatures of 103° F. and over are common. The highest temperature recorded was 106° F. There are two distinct types of fever, a three-day and a five-day. Of our cases 66 per cent. belonged to the three-day type and 34 per cent. to the five-day type. In the latter type there is often somnolence from the onset, and lasting three to four days. Defervescence is in all cases by lysis. In some the temperature may remain between 102° F. and 104° F. for three or four days before yielding. The fifth day usually finds the temperature normal or subnormal (see Figs. 1 and 2).
5. The pulse is slow (76-110), even when the temperature is continuously high.
6. Death may occur on the fourth or fifth day in the pneumonic form.

7. Slight bronchitis was present in several cases, and we have seen four of the pneumonic form, two of which died, but these latter were not studied in this hospital.

8. The urine is decidedly scantier in amount than normal. It is high coloured, and contains albumin in 90 per cent. of the cases. The amount of albumin present varies from a faint trace to 0.5 part per 1,000 (Esbach). Hyaline and granular casts were present in 50 per cent. of all cases on the third and fourth days. In the five-day fever type of the disease casts were present in 85 per cent. of the cases, but only in 36 per cent. of the three-day fever type. Blood casts were observed in 4 per cent. of the cases. The view that this urinary condition is something more than mere febrile albuminuria is borne out by the fact that two cases presented typical renal oedema—that is, swelling of the subcutaneous tissues of eyelids, back, and ankles. The kidneys were not palpable in any case.

TABLE I.—Presence of Albumin and Casts in the Urine of Patients Suffering from Influenza—1918 Epidemic.

Day of Disease.	No. of Cases Examined.	Percentage with Albumin.	Percentage with Casts.	Day of Disease.	No. of Cases Examined.	Percentage with Albumin.	Percentage with Casts.
1	18	55	0	9	15	60	0
2	21	85	19	10	13	46	0
3	32	90	47	11	13	38	0
4	32	84	50	12	12	41	0
5	24	75	12½	13	11	9	0
6	24	50	12½	14	8	12½	0
7	22	68	9	15	8	0	0
8	20	65	10	16	8	0	0

but slight tenderness in both loins was commonly elicited. The casts usually disappeared by the fifth or sixth day, but in some cases not till the ninth; the albumin continued down to the eighth or ninth and even to the fifteenth day.

FIG. 3.—Graph showing percentage of cases of influenza with albumin and casts in the urine (1918 epidemic). Continuous line = casts; broken line = albumin. Note rise in percentage of cases with albumin on the seventh day, due probably to patients getting up on the sixth day.

The opinion that this albuminuria is part of the disease is established by its absence on the first day in 50 per cent. of the cases and its disappearance as convalescence progresses (see Fig. 3 and Table I).

9. *Enlargement of the spleen* was not found clinically in any of the cases. This

is a point of difference with cases of influenza in former epidemics, especially that of 1889-1890, where the lower pole of the spleen usually became palpable.

Examination of the Blood.

Total white counts were done daily between 10 and 10.30 a.m. They showed a distinct leucopenia at the

TABLE III.—Daily Differential Counts in the Influenzal Epidemic of 1918.

Day of Disease.	Capt. R.		Lieut. I.		Lieut. G.	
	P.	L.	P.	L.	P.	L.
1	83½	16½	84½	15½	87½	12½
2	81	19	86	14	88	12
3	63½	36½	69½	30½	68½	31½
4	75	25	70½	29½	68½	31½
5	78½	21½	84½	15½	79½	20½
6	66½	33½	73½	26½	60	40
7	—	—	—	—	46	54
8	—	—	—	—	66	34
9	—	—	—	—	55	45
10	—	—	—	—	53	47

P. = Polymorphs (that is, transitionals, neutrophil, eosinophil, and basophil polymorphonuclear leucocytes).

L. = Lymphocytes (that is, large and small lymphocytes and hyaline leucocytes).

Daily differential leucocyte counts showed a marked relative neutrophilia during the leucopenia, followed by a slight increase of the small lymphocytes when the leucocytosis set in. We have found in previous cases of influenza (Pfeiffer's bacillary type) that there was leuco-

FIG. 4.—Total leucocyte count in influenza. Composite curve of six cases showing the average daily number of leucocytes per cubic millimetre of blood. Continuous line = temperature; broken line = number of leucocytes per c.c.m. The curves were obtained by striking an average of the daily temperatures and leucocyte counts of six cases.

FIG. 5.—Graph showing the temperature and leucocyte curves in influenza and trench fever. Continuous line = temperature; broken line = daily total white blood cell count. The straight broken line (Z) indicates the normal temperature and white cell count. Note the leucopenia in the febrile stage of influenza, whilst in trench fever the fever is accompanied by a leucocytosis.

FIG. 6.—Influenza, three-day type (Lieut. W.). Note the leucopenia during the febrile period, followed by a leucocytosis on the eighth day. Continuous line = temperature; broken line = number of leucocytes per c.c.m.

height of the fever (3,000 to 4,500 per c.mm. being a common figure), followed on the third or fourth day by a moderate leucocytosis (14,000 to 18,000 per c.mm.). (See Figs. 4 to 10 and Table II.)

TABLE II.—Daily Total Leucocyte Counts in the Influenzal Epidemic of 1918.

Day of Disease.	Lieut. G.	Lieut. I.	Lieut. W.	Capt. F.	Capt. R.	Cadet V.
1	4,062	7,500	3,750	—	5,000	4,062
2	8,750	5,000	5,625	6,875	6,250	7,500
3	6,875	9,062	5,937	5,312	18,750	16,250
4	7,500	6,875	3,125	9,375	14,062	13,125
5	20,000	11,875	7,500	14,375	16,562	8,750
6	4,062	5,000	5,000	4,687	7,500	5,937
7	4,375	13,750	4,375	10,620	16,250	3,125
8	12,500	11,250	9,375	8,125	7,500	5,937
9	13,750	12,187	16,250	12,500	—	10,000
10	15,625	13,750	8,750	13,125	—	—
11	7,500	7,500	11,250	15,000	—	—
12	11,250	10,000	—	—	—	—

Counts = No. of leucocytes per c.mm. of blood.

penia followed by leucocytosis, but, unlike this epidemic, the leucopenia is accompanied by lymphocytosis, and the leucocytosis by neutrophilia. Such a picture as the present epidemic gives strongly suggests a micrococcal in contradistinction to a bacillary infection. The only other point of interest is a marked fall, almost absence, of eosinophil cells during the fever.

Of special interest is the chart reproduced in Fig. 10. The blood of this patient was examined daily for fifteen days before he developed influenza. A glance at his chart shows the distinct leucocytosis accompanying his pyorrhoea, but with the onset of influenza the rise in his temperature coincided with a marked leucopenia, followed on the fifth day by a leucocytosis. A distinct relative increase in the polymorph leucocytes appeared with this leucopenia, followed later by a relative and absolute lymphocytosis.

FIG. 7.—Influenza, three-day type (Lieut. I.). Note the leucocytosis following the fever. Continuous line = temperature; broken line = number of leucocytes per c.c.m.

Blood Cultures.

So far no organisms have been isolated.

Comparison of Blood Picture with that of other Diseases.

The blood picture of the disease differs considerably from that of trench fever, pyorrhoea alveolaris, malaria, and bacillary influenza.

Trench Fever.—Here the leucocytosis is distinct, being highest when the temperature is highest and lowest when the temperature is on the fall. Moreover there are definite curves in the daily total white counts corresponding to the fever waves (Fig. 5).

Pyorrhoea Alveolaris.—This condition is mentioned because of the acute gingivitis which accompanied nearly all the cases of influenza observed by us. The blood picture in well-established pyorrhoea shows a marked swinging leucocytosis unaccompanied by pyrexia and resembling very closely chronic trench fever (see Fig. 10).

FIG. 8.—Influenza, three-day type (Captain R.). Note the leucopenia during the fever and post-febrile leucocytosis. This case suffered from furunculosis, which perhaps accounts for a higher leucocytosis than usual. Continuous line = temperature; broken line = number of leucocytes per c.mm.

Malaria.—In tertian malaria the blood counts show a leucocytosis and leucopenia on alternate days, even when there is no pyrexia. Leucopenia accompanies the height of the fever, and is marked by a relative neutrophilia, followed in a few hours by a mononuclear increase. This is of importance in recognizing the onset of influenza in an old malarial case, as in such cases the mononuclear increase does not appear until about the fifth day or so after the height of the fever.

Bacillary influenza has been dealt with above.

Treatment.

Rest in bed on a milk diet is essential. Fluids in the form of imperial drink should be taken in abundance; not less than 4 to 5 pints daily.

Quinine appears to exert no influence on the disease, either one way or the other. It has no effect in reducing the temperature, nor is its use warranted as a prophylactic. This was strikingly shown by three patients with acute malaria in the wards, who were taking 30 grains daily for several days before they finally succumbed to the influenza. The drug has been given a thorough trial but is now abandoned.

Aspirin appears to have a decided, and in cases a very striking, effect, almost specific; 10 grains should be given thrice a day. In severe cases, accompanied by high temperatures with vomiting and collapse, the effect of aspirin 15 grains, swallowed with $\frac{1}{2}$ to 1 oz. of brandy in water, with 3 drachms liq. ammonii acetatis, is immediate.

No local treatment to the mouth or throat is necessary, but boroglyceride is very useful in cleaning the tongue and gums. Soreness is relieved by inhalations of friar's balsam, and by sucking potassium chlorate lozenges. Calomel is best avoided. Enemata (soap and water) gave quick relief to the temperature and depression on the fourth day in three cases.

During convalescence the best diet is eggs, fish, and chicken, with an ample allowance of fresh vegetables and fruit. On the other hand, meats, strong soups, mustard, pepper, and beverages such as coffee and strongly-made tea, are not to be taken. In view of the evidence of slight nephritis, this seems a reasonable and necessary precaution. Freedom from strenuous active duty for a week after convalescence has become established, is also a

wise measure. On that point mention may be made of a young lieutenant engaged in instructing cadets. He was sent back to duty after two days' semi-convalescence, and reported himself at the Mount Vernon Hospital two days later, complaining of weakness, headache and backache. His urine contained numerous typical hyaline casts. Patients cannot be considered cured while this abnormal urinary condition persists. As is mentioned above, the urine is not free from albumin until about the tenth day, or even as late as the twenty-first day.

Prophylaxis.

In default of isolation, which is wholly impracticable, no satisfactory prophylaxis is available. Swabbing the throat with a solution of mercury perchloride (1 in 1,000) in an equal quantity of glycerin, or repeated spraying of the nasopharynx with a solution containing free chlorine, seem as good preventives as any. The administration of quinine in any form is useless, and cannot be too strongly condemned in these days, as it is a waste of a valuable drug. One of our cases had been twice inoculated with a mixed *B. influenzae*, *M. catarrhalis* and *pneumococcus* vaccine, the last inoculation being, three months before his present illness. He had a typical attack of influenza (see Fig. 9).

Summary.

1. The specific cause of this epidemic of an influenza-like disease appears to be a Gram-negative micrococcus, perhaps in association with *B. influenzae*, the latter being only isolated in 8 per cent. of the cases.

2. Incubation period one to two days. Duration three to five days, the five-day fever type being more severe and the casts found in the urine more numerous.

3. The chief symptoms are: (a) Body pains, (b) malaise, (c) headache, (d) anorexia and constipation, (e) cough, (f) photophobia.

4. The chief physical signs are: (a) High

temperature with maximum reading on the second day, (b) tongue heavily coated, (c) acute pharyngitis, stomatitis, gingivitis, and conjunctivitis, (d) albuminuria with hyaline and granular casts.

5. Blood counts show leucopenia with relative neutrophilia at the height of the fever.

6. **Treatment.**—Rest in bed. Free movement of bowels. Aspirin 10 grains thrice a day, until the temperature is

FIG. 10.—Pyorrhoea and influenza (Lieut. G.). Note the onset of influenza (June 21st), corresponding with a distinct leucopenia. The leucocytosis of pyorrhoea alveolaris without pyrexia is well shown. Continuous line = temperature; broken line = number of leucocytes per c.mm.

FIG. 9.—Influenza, three-day type (Captain F.). Note the post-febrile leucocytosis. This patient was inoculated with mixed influenza vaccine three months previously. Continuous line = temperature; broken line = number of leucocytes per c.mm.

FIG. 11.—Daily differential leucocyte counts in the influenza epidemic of 1918. These curves show distinctly a polymorphonuclear increase in the first five days of disease, and a lymphocytic increase after the fifth day. This is the reverse to true bacillary influenza. A = Percentage of polymorphonuclear leucocytes; B = percentage of lymphocytes and hyalines; Z = normal percentage of polymorphs, that is, 70 per cent.; is, 30 per cent.

normal. Light diet and avoidance of bodily and mental exertion until the albumin has disappeared from the urine.

We here take the opportunity of thanking Lieut.-Colonel Muecke, R.A.F., for his kindness in granting us every facility for conducting this work. Most grateful thanks are also due to Dr. Carrie Sims and Miss Maud Samuel, B.Sc., for much valuable help.

[Since going to press a Gram-negative diplococcus (fairly large) has been isolated from the blood of two patients during the height of the fever. Attempts at subculturing failed in both cases.—H. E. Whittingham.]

THE DOCTORS' PROBLEM.

BEING THE PRESIDENTIAL ADDRESS TO THE SOUTH WALES AND MONMOUTHSHIRE BRANCH OF THE BRITISH MEDICAL ASSOCIATION.

BY

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MANY questions of vital interest are not unlikely to arise during the coming twelve months. The time was, not so very many years ago, when doctors met to discuss the scientific aspects of their work, but of late years men's thoughts have been absorbed in questions of a living wage, and cognate subjects; and there is a spirit of unrest abroad. The general practitioner feels some one has stolen a march on him, and, as if in a nightmare, feels his helplessness to make good his lost opportunity. Any large public body, with law at its back, can still pounce down upon him, and say, "Here, do this work for us, and take so much pittance for doing it." To any other man, or body of men, in this land of freedom such action would be intolerable, and would be unanimously and strenuously opposed, but the doctor tamely submits. What else, poor fellow, can he do? He has no organization that has legal power to take a stand and protect him.

The working man, for instance, is not asked by Government or by National Labour Commissioners to do everyday work for the country and accept what the authorities like to give him. No, it is exactly the other way round; it is he who dictates the terms, and, what's more, gets them! The working man has gone through the mill for ages; and, however much he may be belittled by the professional man, he at least has the intelligence to know that in union is strength, and that his strength is in his trade union.

The analogy may not be very complimentary to the profession, but it clearly suggests that we might learn wisdom from this industrial ant. It may sound "low down" to have to join a "trade union" in order to have and to hold our just rights. We may call it a "professional" union, but its powers must come through the Trades Union Acts, which have forestalled us.

There is one body over us that could come to our rescue, were it but expressive of the life and soul of our profession, and that is the General Medical Council. Our old crafts and guilds, and our modern universities and colleges, obtained charters and privileges which were merged into a General Medical Council, on which these bodies alone were represented till of late years. The general practitioner was practically ignored, and might have been non-existent as far as his representation on this august body was concerned. The result has been that the General Medical Council has never been in touch or sympathy with the bulk of its registered members, which embrace the whole profession. Its deliberations are restricted to its statutory powers—namely, overhauling education, collecting registration fees, and exercising discipline over common-law offenders, all of which powers could be easily performed by a couple of the existing committees of the British Medical Association. This General Medical Council is so firmly established in and satisfied with its legal powers that it has never shown any disposition to enter into the daily life and concerns of the medical profession at large by giving them adequate representation for its taxation; and as far as its further efforts to aid and guide the general medical practitioner are apparent it might be a majestic sphinx, and nothing more.

We feel the birthright and destinies of our struggling profession are in its hands; the public and Parliament know it only too well, and laugh at us; and we, as an awakening body politic, are just beginning to realize our ignoble and painful position. So with such a terrible dead-weight against us we are driven to seek some other constitutional means of consolidating our forces for a more advantageous stand in vindication of our very existence.

The one body that nearly the whole profession, at home and abroad, looks up to for help and guidance in its hourly trouble is the British Medical Association. There is no other powerful organization in being and working so representative of its members and so democratic; and there is none so alive with the aspirations and activities of our daily life as is that stalwart tree, of which we are a branch here to-day. It has grown through much labour and patience and many vicissitudes, and pulsates as much to-day as of yore with the sincerest desire to represent the highest ambitions of our lot.

It cannot be expected to do everything for us; it is but a voluntary agency, and volunteers are out of date and no good in a fight. It has no statutory powers, and consequently has no compulsion over its members. To obtain these all-important powers it must petition Parliament, and it must proceed through Acts on the Statute Book. With such a legislative lever it could move mountains of inertia. This step may again sound *infra dig.* to professional units who have been nurtured on individualism; but Parliament itself submits to this law of majorities and to the ruling of democracy, which has come to stay, whether we like it or not.

With this much accomplished, our Association, reinforced with law and authority, can organize its ranks for any emergency; and it can then, with the deliberate and mature judgement of its members, dispute any encroachment on our just rights. To obtain this we must contribute to its funds liberally, as the lawyer does to his incorporated society and the working man to his union; we must not expect work for nothing, or the 9d. for 4d. business.

There is, as you all know, a new scheme in the wind which threatens to obscure most of those that in the past have exploited our brains and sinews—I mean the Ministry of Health. Whether this Ministry be an expansion of the so-called National Health Insurance Commission, or of the Local Government Board, or a combination of both, I know not, but in either case we have to be prepared for some revolutionary change, for better or for worse as regards ourselves. If we are united in professional solidarity, we can view the matter with equanimity and see that justice is done; if not—well, the devil help the hindmost!

We have had a brush with the Commissioners, which has left a stain of the conflict that has not yet been wiped out; still we must not grumble now at not having had our armour on at that time. The Local Government Board we have known as not an over-lenient taskmaster, with its ever-increasing duties and its never-increased pay, and its never-to-be-forgotten acquiescence in the universal reduction of the doctors' notification fee whilst every other worker had his fees raised. The Poor Law authorities have alone been conspicuous for their compassion to their officers, as well as to their poor; but alas! their days are doomed; and a glorified pauper attendance is being hatched to supplant it, called "state service."

Whatever the functions of this Ministry may be, and whichever of these bodies may predominate in its administration, the experience of the past decade has taught us to be wary, and not to be caught napping. If, however, we do not as a medical body benefit by experience, and protect ourselves, as others do, as one voice, a similar fiasco must be expected again; and our professional status must sink in the eyes of our sister professions into hopeless mire.

The admission of women into the medical profession will ultimately prove our emancipation from such as cheap contract practice, with its counter prescribing and dispensing, certificate scribbling, and the rest of that mechanical clerical drudgery into which we are gradually being dragged down with each state innovation. For contract practice can only be properly and honestly undertaken after liberal actuarial calculations of remuneration, holidays, emergencies, and like considerations have been duly taken into account. Woman's constitution will scarcely permit of her continuously performing the physical labour of man; and she will necessarily specialize