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Influenza.

In the following paper I propose to give some account of the recent Epidemic of Influenza as it came under my personal observation, & to consider some of the chief points connected with the disease. From the stress of work occasioned by it, together with the great amount of sickness occurring at the same time, many details chiefly with respect to statistics of the total numbers affected, & the occurrence of anomalies in the disease have been omitted, while personal observations of such symptoms as the temperature, pulse &c. as they varied at the different periods of the day, could not be made. Special attention was paid to the points of interest bearing on the etiology & symptomatology of the disease.

The parish of Walthamstow lies seven miles to the East of the centre of the city of London. It comprises, in a population of fifty thousand, all classes of society, so that there was ample opportunity of observing the various characteristics of the disease as they occurred. Between three & four hundred cases came under direct observation.

During the month of December ordinary catarrh

catarrh was of very frequent occurrence, & was put down to the weather, which was particularly mild for the season & very changeable. The first characteristic case was seen on the 27th December 1889, but it was not until the 13th of January 1890 that many cases occurred. All the first cases were in those whose occupation took them into the city. The next in point of time were in those employed in the open air. This was specially well seen in the men belonging to the Great Eastern Railway provident Society, & to the Post office. In both 25 per cent; - 28 Great Eastern & 26 postmen, were so severely affected as to be obliged to stop work, while many others had the disease in a slighter form. The Great Eastern employees, whose work took them to the city were the first affected. On December 27th one case occurred. On January 2nd several men were affected & they continued to occur up to the 22nd, the later cases being chiefly in men employed at the local stations. The disease appeared among the postmen on January 6th & continued until the 21st. Those whose duties exposed them most to the weather had the disease in its severest form, while those who worked under cover were affected later

later, & not so severely. The average duration of the illness was 6 1/2 days, but many returned to work before the weakness, cough, & other symptoms had passed off. Apart from the postmen, the first distinctly local outbreak occurred on the 9th inst. During the following week the cases were very numerous, after that they were less frequent, & gradually diminished till the end of the month. Accounts differ as to the first appearance of the disease in London. Some cases are reported to have occurred as early as October, but there is no doubt the disease was present during the last week of December in an epidemic form. This was fully a week before any case was observed in Walthamstow, & between two & three weeks before it assumed a local character.

The death rate was appreciably increased, but not nearly to the extent observed in London & Continental towns. Four deaths only were attributed directly to influenza, but a safer guide is the total death rate, & that due to diseases of the chest. In many cases medical advice is sought only on the onset of complications, & the primary disease is either forgotten or overlooked.

The

The annual deathrate for Walthamstow (1889) was 13·5; & the increase for January & February of this year was 1·6. The following tables, furnished by Dr Shadwell, the Medical officer of health, give the increase as compared with the same months in recent years.

Total deathrate	1888	1889	1890
January	17·6	13·2	16·2
February	15·9	13·8	14·1
March	16·	11·8	12·3

The deaths due to diseases of the Chest were,-

	1889		1890	
January & February	Bronchitis	8	Bronchitis	8
	Pneumonia	4	Pneumonia	8
			Influenza	3
		12		19
March	Bronchitis	8	Bronchitis	4
	Pneumonia	3	Pneumonia	0
			Influenza	1
		11		5

The comparatively high deathrate in 1888 was due to a severe epidemic of diphtheria.

In London the deathrate rose as high as 32·4 for the week ending January 11th, & the following weeks it was 32·1, 26·3, & 21·8, an increase of 10·6 over the average, & due to the great number of deaths from respiratory disease. The deaths directly

directly due to influenza were 67, 127, 105, & 75 for the same periods. In Paris the deathrate rose to 61·7, nearly three times as high as the average, & New York 46·5, Vienna 45·9, St Petersburg 45·4, & Berlin 36·5 all had a great increase, & in all it was chiefly due to respiratory diseases.

The average duration of the disease was about ten days. The acute symptoms lasted four or five days, & the lassitude & cough about ten. In many they persisted in a slight degree for a fortnight, or even longer, while in others they were of shorter duration. The period of incubation, when it resulted from contagion, seemed in many cases to be three and four days, but, from the general distribution of the disease, the actual source could not be determined. As a rule, when the disease broke out in a family the other members became affected at later periods, & often consecutively, & in these the interval was very generally from three to four days. Invalids confined to the house were rarely affected, unless others in the house suffered first. In the North of London Imbecile School, where the boys are not allowed beyond the grounds, no case occurred until the officials became affected. The boys first affected were

were those who worked in the laundry along with a servant who had the disease, & all the cases were confined to the dormitory where these boys slept. The disease, however, took a very mild form, & the actual dates of its occurrence could not be ascertained.

By far the greater number of cases occurred among men. Women were affected more frequently than children. The disease, also, was as a rule, more severe in men, & least so in children, but in many women the cough & weakness persisted for a longer time.

The symptoms of the disease, as it was observed here, varied little from those reported from other parts of the country. There was no sudden outbreak, such as would have been expected had it been due to aerial infection, & although lying eastward of London, the first cases occurred after the metropolis was affected. All the evidence seems to prove that the infection was carried down from London, the first cases met with being invariably in those whose occupation was in town.

The chief types of the disease, rheumatic catarrhal, & stomachic, were all frequent. The severe & persistent frontal, & lumbar pain

was

was a very marked symptom, & in the majority of cases, the most pronounced & distressing feature to the patient, & one in which the present, in this country at least, has differed from former epidemics. The characteristic sign is indeed always mentioned as occurring, but in most of the accounts little stress is laid upon it. Peacock, however, in his account of the epidemic of 1847, describes the rheumatic pains as being very severe, especially in the forehead, & says that there was a great increase in the deaths from "rheumatism", which probably referred to cases of this kind. Of the other symptoms, the depression & lassitude were always present. The tongue as a rule was coated with a thick creamy fur; in some it was dry & glazed, & patients complained of dryness & bad taste in the mouth. Very frequently there was almost complete loss of taste. The appetite was always poor at first, & in the stomachic form this persisted for several days, & was accompanied by nausea & vomiting. The bowels were generally costive, & diarrhoea never occurred at the crisis, as has been observed in former epidemics.
The pulse was usually soft & rapid in the feverish stage, sometimes jerky, & rarely full.
The

The breathing was also increased in frequency, & in the catarrhal form this was very marked, & persisted after the fever had subsided. Cough was one of the most common symptoms, & very frequently came on after the first two or three days. It was always dry, & rasping, & in the catarrhal type was the most persistent symptom. It was unaccompanied by expectoration for the first day or two, then some pale glairy fluid was coughed up, & this gradually changed to more copious opaque mucus or muco-pus. Catarrh of the nose, as evidenced by stuffiness, sneezing, & discharge, was never present in a marked form, & bore no relation to the frontal headache. The acrid discharge frequently described did not occur, & there was never excoriation of the skin. The eyes were frequently suffused & watery.

On the skin no marked or uniform eruption was found. In some a transient mottling, resembling that of measles, was noticed but it was always very indistinct, & could not be designated a rash. In numerous cases herpes on the lips, & about the nose was present. The skin itself was hot & burning during the fever, afterwards it became moist, but no profuse sweating

was

was observed at the crisis. Occasionally a peculiar musty smell was noticed, but this was not invariably present.
In the urinary system nothing of note was observed. The urine was scanty, & high colored at first, & in the cases tested nothing abnormal was found.
The general debility always showed itself markedly on the brain. There was always a disinclination for, & inability to perform mental work, with diminished attentiveness, & frequently, a degree of drowsiness.
Sleeplessness at first, however, was the rule, & there was marked restlessness, & often slight delirium persisting for several nights.
The temperature varied considerably in the different cases. Frequently it rose to 103° or 104°, & then as rapidly fell, & the next morning was normal. In other cases it came down gradually, & frequently in uncomplicated cases, remained at about 99° for several days. The onset was very generally accompanied by shivering, but, in a few cases, the lumbar & frontal pain, with some languor, persisted for a couple of days, without any other symptoms, after which the temperature rose slowly, & the dry cough came on.
Nothing

Nothing of the nature of a true relapse occurred. Frequently, by exposure to draught or cold air, the symptoms became aggravated, the cough increased, & the temperature rose. In others an attack of pleurisy, bronchitis, or rheumatism came on, but there was always some complication present, to account for the fresh symptoms. Complications however were not very frequent. In several cases capillary bronchitis occurred, & in one of these, complicated by cardiac disease, it proved fatal. No case of true pneumonia occurred. In one there was acute jaundice, associated with rheumatism. The most frequent was dry pleurisy, which proved very resistent to treatment.

The cases, in which the rheumatic type predominated, were the most frequent, & the symptoms most complained of were frontal headache, & lumbar pains. In many however, this was accompanied or followed by catarrhal symptoms. Pain about the legs, associated with muscular weakness, was common, & frequently there was a general feeling of soreness, the patient complaining that he felt as if he had been beaten all over. In about

75 per cent, a dull pain referred to the region of the sciatic nerve, & sometimes shooting in character, was noticed, & very frequently this occurred on one side only. Another common site was about the false ribs, & rarely it was referred to the bones & joints. In some the pain was persistent, in others recurrent, & frequently it was very intense in character. All pains were greatly increased in rheumatic subjects, when they always predominated, & were very persistent.

A very frequent type of the disease was that observed in Mr. L- solicitor aged 30. He shivered on January 18th, when the temperature in the evening was 103·4°. He complained of great pain in the lumbar region, some pain in the legs, & a dull constant pain in the right hip, with occasional paroxysms running along the course of the sciatic nerve. There was severe frontal headache, but no catarrhal symptoms, either in the nose or chest. The chief symptoms complained of were the pains in the back & frontal region, & the great lassitude, & feeling of weakness. There was loss of appetite, some nausea, & considerable thirst. The skin was

dry

dry, & the pulse rapid, 120 per minute, & soft. The following morning the temp-erature was quite normal, & the skin moist, but there had been no sweating. During the night patient had slept little, had been slightly delirious, & very restless. The pains in the back & legs were not so severe, but the frontal headache was much increased, & the want of appetite, the languor, & the depression continued. The pains persisted in a milder form, until the 22nd, the fourth day, when they disappeared, & a slight cough was then noticed, hard & dry in character, & unaccompanied by expectoration. The patient was still very weak & languid, but the appetite was improved, & the sense of well being greater. For the next two days the cough continued very troublesome, disturbing the sleep at night, & while irritating the throat & racking the chest, it gave no relief to the patient. On the 26th the cough, tho' still troublesome, was not so constant & was accompanied by the expectoration of small pieces of inspissated mucus, which were white, tough, & irregular in shape. The patient was now much stronger, but still languid, & unequal to exertion either of the body or mind. The eyes were reddened

reddened & painful, but there was still no discharge from the nose. By the 29th he was able to take outdoor exercise, his cough was much better, & the langnor had almost passed off, & on February 1st, or 16 days from the commencement of the attack, he was practically well, all he complained of being a little weakness.
The treatment consisted of salines, & Spiritus etheris nitrosi, with a mild purgative at the commencement, followed by expectorants, such as ammonia & Squills, & later tonics - acids & gentian.

In other cases the catarrhal symptoms predominated throughout, but in the great majority the lumbar & frontal pains were the symptoms most distressing to the patient, & the most resistent to treatment.

In the catarrhal type, the symptoms of oppression of the chest & cough were invariably most pronounced on the third or fourth day of the disease. The cough was always of a peculiarly hard, dry, & distressing nature, & unaccompanied by expectoration for the first few days. Towards the fourth or fifth day small quantities of phlegm were coughed up, & these portions frequently resembled the bilious fragments, described by Peacock, as

occurring in the epidemic of 1847. More commonly the expectoration was viscid, white, & frothy at first, becoming muco-purulent & looser later on. There was nothing specially characteristic to be observed in the physical signs in uncomplicated cases, the majority showing some rhonchi & coarse crepitations, but these as a rule were seldom prominent, & not proportionate to the amount of bronchial irritation. In a few cases an impaired note was observed on percussion, but in none was there actual consolidation.

The Stomachic form was that chiefly observed in children, & in domestic servants, & was much less severe than the catarrhal & rheumatic types. Comparatively few children suffered from the disease, & when it did occur, the symptoms were very vague & slight in their character, so that few required medical treatment. In schools children under 10 years of age usually escaped altogether, & there are few published accounts of the epidemic occurring in them. In the cases I met with, the disease was invariably previously present in the house, some of the older members of the family being afflicted with it. In some few cases there were

were slight pains about the back & legs complained of, some debility, & no other symptoms. In others, the children were struck down suddenly, seized with vomiting, shivering, & fever, & in a couple of days were quite well again. In no case was the catarrhal form, such as occurs in adults, observed, tho' there was occasionally slight cough present for the few days succeeding the attack. In one family the father, a postman, was attacked on the 16th January, by the catarrhal variety of the disease, in a typical form. On the evening of the 20th, three children, aged three, four, & seven respectively, were prostrated, the symptoms being great depression, nausea, vomiting, & some pain in the back, with feverishness & constipation. Purgatives & salines were ordered, & next day the feverishness & sickness had passed off. One of the children, a girl aged four, had a slight cough for a few days, but apart from this, they were all in their usual health on the third day, there being none of the lassitude & weakness so characteristic of the disease as it occurs in adults. On the 24th, the remaining child, aged five & a half, took ill with exactly the same symptoms, and

and the disease here ran the same course, & left no ill effects.

The disease, as it occurred in servant girls, resembled closely in its effects the form it took in children. With them, however, there was more langnor, & less reoperative power. The first symptoms noticeable were sickness, vomiting, great prostration, & headache. The following day, there was still loss of appetite, but no sickness, & except in those cases when catarrhal symptoms were present, the patients were usually well in three or four days, the weakness persisting in a slighter form for a few days longer.

In no case where the stomachic symptoms were present was there much pain in the back, & in most the catarrhal symptoms were entirely absent, or if present, only so in a modified form, while the prostration, tho' severe at the beginning, was not persistent.

With regard to the treatment of the disease most good was obtained by keeping the patient in bed for the first three or four days, giving him light liquid nourishment, & saline medicines such as the nitrate, or acetate of potash, & liquor ammoniae acetatis. After the feverishness had subsided & the pains diminished, a more generous diet was given.

was given, but the patient was still confined to a warm room. No drug was found to have any great effect on the disease. For the pains, sodium salicylate in ten to twenty grain doses was found most useful in diminishing them. Antipyrin did good in some cases, but never entirely cured, while in the majority it had no effect. Quinine acted very similarly, but was found most useful as a tonic during convalescence. Local applications, such as mustard & turpentine to the back, relieved the pain to some extent for a time. Sulphocarbolate of sodium had no appreciable effect on the symptoms or duration.

For the feverishness, antipyrin, quinine, & aconite were tried, & were variable in their effects. In the majority the temperature fell as quickly when no medicine was given. For the cough, the ordinary expectorants had not so much effect as in common catarrh or bronchitis. Most relief was obtained from opium, or tinctura camphorae composita, combined with ammonia & squills. In the primary dry stage nothing relieved so well as inhalations of steam, either simple, or combined with opium or ipecacuan. For the resulting

debility

debility, alcohol, quinine, iron, & acids were found of most service.

In the very numerous epidemics which have occurred since the thirteenth century, & of which authentic records have been kept, the disease has maintained most, if not all, of its characteristic symptoms. Various anomalies have been met with in some, & the types have to some extent varied, at times the catarrhal, & at times the Stomachic or Rheumatic, predominating, while in numbers the inflammatory symptoms have been most pronounced.

Numerous epidemics of catarrhal fever are recorded previous to the 13th century, & some of these seem undoubtedly to have been true influenza, but it was not till 1239, & more especially in the 14th century, when five epidemics occurred, that the true & specific nature of the disease was recognised. In 1387 the disease appeared in Italy, France, & other places, & is described by Valesco of Tarentum as affecting nine tenths of the population, & occasioning severe rheumatic affections. In the 15th & 16th centuries numerous epidemics prevailed, notably those of 1510, the first of which we have a description by a medical

man

many.[1] & of 1557, & 1580, which appear to have been very prevalent throughout Europe, & to have caused symptoms similar to those of late years. In the following epidemics the disease, tho' always in the main the same, showed various new phenomena, & these differed not only in the several epidemics, but in the several countries in which they occurred. Thus in some the inflammatory symptoms, always more or less asthenic in character, were very marked, as in 1733, while in others the adynamic form was prevalent. The mortality also varied greatly in the ~~in the~~ various epidemics, in some this was very small, tho' the proportion of the population affected was large, & in others, chiefly through complications, the death rate was heavy, as in 1557, 1729 & 1782. This variation in the intensity of the disease, not only was apparent in the different epidemics, but was frequently very marked in the various districts affected, one country suffering severely, while another & adjacent one, where the disease appeared a few weeks later, escaped with a much less virulent form, altho' the proportion of the population affected was nearly the same. This variation has indeed been well marked in the present epidemic, the accounts from France, Austria, & Russia showing

1. Dr Short's Chron. Hist of the Weather Vol I p 351

showing that the disease took a much more intense & virulent form, in these countries, than was the case in England, & that the complications & sequelae there, were also more frequent & severe. Nor have the variations in this disease been more marked than those seen in all the other great epidemic disorders, such as cholera, smallpox, plague &c. The nature of the locality, the season of the year, & perhaps the intensity of the poison, as it attacks a country towards the beginning or end of an epidemic, together with the racial, or individual constitution, all appear to have an effect on the symptoms, in modifying & altering them to some extent.

The causation of the disease, partly on account of its great obscurity, & partly from the importance of its bearing on the question of prevention & cure, is of the utmost consequence, & from time immemorial, theories have been proposed concerning it, & attempts made to discover the starting point of the various epidemics as they have occurred. A vast mass of literature has been written on the subject, & from it one can gather numerous hints & suggestions as to the probabilities, but the actual cause is still undiscovered.

In endeavouring to come to a conclusion, various

things

things must be taken into consideration, the principal being the nature, course, & progress of the disease; the influence of surroundings, of weather &c. upon it; & its analogy to other & similar diseases.

With regard to the disease itself, the chief question, in this connection, is whether ~~the~~ it is infectious or contagious. Up to the present century, & thro' all the numerous epidemics that have occurred, since the disease, as a specific disease, was recognised, the theory of infectiousness has been maintained, & this theory was based chiefly on the grounds that have been characteristic of its most recent occurrence, namely the suddeness with which the population of large tracts of country became affected, & the well-defined course it pursued. In the epidemics of 1843 & 1847, this generally accepted theory was renounced by some observers, who held that the disease was not infectious, & that personal intercourse was quite sufficient to account for its occurrence, that in fact the disease was merely contagious. This latter theory has again been prominently brought forward during the present year. In support of the first, numberless arguments & facts have been adduced. The great-

<u>suddeness</u>

suddeness of its attack, & that not only in cities, but extending over large areas & even countries, has been much commented on, & seems to have occurred in all the great epidemics. In 1015 Dr. Short, in his history, says that "it attacked at once & raged all over Europe not missing a family & scarce a person". According to Mercatus, in 1557 "it attacked all parts of Spain at once, so that the greater part of the population in that Kingdom were seized with it almost on the same day."[1] In 1782, Macleans says 40,000 inhabitants of St Petersburgh were seized in one night, & in 1803 Dr. Woodford[2] describes its appearance in England as very sudden, & its attack extremely general, "so that it is difficult to say in what, or in how many parts of the kingdom it prevailed first". Watson[3] in 1833 says that all London was smitten on April 3rd & the following day, giving that as one of his reasons against the contagious theory. In that of 1847, Dr. Southwood Smith[4] says it spread over the whole metropolis in a single day, affecting 500,000. Numerous other instances are on record, all showing the extreme rapidity of its onset, & the improbability of its conveyance by transmission.

1 Lettsons memoirs Vol I p 625. 3. Watson Pract. Phys. Vol II

2 Mem. Med Soc London Vol III 4. Tanner's Pract. Med Vol I

The

The proof on which much dependence has been placed, is that afforded by many apparently well authenticated cases, where ship's crews have become affected, yet where there has been no intercourse with land. In the case of the Atlas, in 1780, as described by Hancock & Watson[1], sailing between Malacca & Canton, the disease appeared while in the china seas, & at the very time it appeared in Canton. Hancock[2] also gives an account of the outbreak on board the English fleets in 1782, in which the "Goliah", one of the ships off the coast of France, was attacked at the same time as the "Ripon", one of the fleet cruizing off the Dutch coasts. Both fleets had left England four weeks previously, no disease was then present in England, & no communication had taken place with the shore. In both the remaining ships were attacked in succession. Watson describes how the Stag, on April 3rd 1833, the same day that London was stricken, while off the Devonshire coast, & with all well on board encountered a breeze off the land, & half an hour later forty men were down with influenza. According to Clemow[3] similar

1. Trans. Col. Phys. Vol III
2. Cyclopaedia of Pract Med Vol II
3 "Public Health" April 1890

Cases

cases have been observed, notably those of the S.S. "Alphei" & "Umbria", during the present year, but no particulars of them are yet forthcoming. The medical officers however, stationed at the various ports, have not encountered any such cases, after a strict enquiry & outlook.

On the other hand, many cases of apparent contagion are reported. Of the more recent ones, that recorded by Mr Barker[1] is worthy of notice. In this case a gentleman stayed one night, December 18th, in Paris, at a hotel where there were several cases of influenza. On his return to Churchinford on the 22nd, he was taken ill, & seven other cases resulted directly from this one, the last being three weeks later. During this period there were no other cases in the neighbourhood.
Dr Proust[2] mentions a case, where a passenger from Madrid, where the epidemic was raging, was taken on board the "St Germain", bound from St Nazaire to Vera Cruz. All on board had been in perfect health, but four days later the disease broke out, & ultimately 154 passengers out of 436 were attacked. Dr Guttman, at the Verein für Innere Medizin at Berlin, mentioned the case of the training ship "La Bretagne", where the disease appeared to have been introduced

1. Brit. Med Journ. 25/1/90 p. 202. 2. Ibid 15/2/90 p. 372

by

by a packet received from Paris, where the epidemic was present. Three days later the first case occurred, & 250, out of a crew of 850, became affected. Two other training ships lying near remained quite unaffected. In the large public institutions, the disease seems also to have attacked the officials, who were liable to external contagion in the first instance, & from them has spread to the inmates. That the disease attacked those exposed to the open air, in a more severe form, has been repeatedly noticed, & was the case in this parish. That it occurs primarily in such is, however, not proved, & naturally the more severe cases come first under notice, & are due to exposure to weather, rather than to a more virulent form of the poison.

The infectiousness in this, as in other diseases, is probably only a matter of degree. Some poisons are more virulent, that is take a shorter time to mature & develop them others, & this depends, either on the nature of the virus, or on the midus it develops in. Thus diphtheria & scarlet fever are rapidly developed, & spread quickly, while hooping cough, tho' distinctly infectious in the proper acceptation of the term, takes a longer time to

manifest

manifest its symptoms. New diseases also are more quickly developed, & spread to a greater extent, & this is well shown in the advance of civilisation to outlying countries, where disease is planted on a new nidus. Even common catarrhal affections become epidemic in such cases, as has frequently occurred after the visit of a ships' crew to the islands of the South Sea, or the unfrequented St-Kilda. The virus of influenza would seem to take some time to develop, probably taking the form of spores in the first instance, & maturing in the atmosphere, when they become disseminated. In this mature form they find a suitable nidus in the human tissues, & rapidly develop or produce a ptomaine there, having a period of incubation of from a few hours to four days. It is possible that by again forming spores, the disease is carried by contagion, & to some extent by the air, to fresh areas, again to undergo the same process. That the matured form is also carried from place to place is probable, & would account for the cases of direct infection which have been observed.

On the route taken by the disease, as a proof of its infectiousness, not much dependence

dependence can be placed. Indeed this argument seems to have been brought forward mainly to show the similarity of influenza & cholera, the latter being regarded as undoubtedly infectious. That influenza has to a great extent followed a course from east to west is undoubted, tho' there are exceptions to the rule. The epidemic of 1510 took a north westerly direction, starting from Malta. That of 1557 spread from Asia thro' Turkey to Europe, & thence to America. That of 1580 from east to west, & south to north, & so with the great majority. Some exceptions however have occurred. In that of 1761, America was attacked the preceding year, & in 1781 France, Spain, & later Italy were attacked after this country. The peculiarity of its spread, in spite of contrary winds, is still unexplained, both the infections & contagious theories failing to account for it.
The old idea that Influenza was the result of some peculiar influence of the atmosphere, & which idea resulted from the rapidity of its spread, & the number of people simultaneously struck down, has led to a careful record of all the anomalies of weather, in the different epidemics

epidemics. Nothing of a special or uniform nature, however, has been observed. Changeable weather, extremes of heat & cold, have in many instances preceded or accompanied the disease, & this, as everything of a specially rare nature, has been ascribed as the cause. A fact frequently noticed is, that in low humid localities the disease takes a more severe form, than in dry hilly districts. "Noisome fogs" as in 1557, 1733 & 75 have been frequently noticed, extreme heat following cold, or cold following heat, thunderstorms, blights of insects, have all been ascribed by Huxham & other observers, as leading factors in its production. Dr Hamilton[1], in speaking of the epidemic of 1782, says the season was "remarkable in all the meteorological annals of Europe, for its unusual degree of cold & humidity, with a gloomy & uncommonly disturbed state of the atmosphere", & it is worthy of note that in the present epidemic, exactly the reverse occurred, the winter having been exceptionally mild in all parts of Europe. Hancock[2] sums up his elaborate investigation by the sentence, "in fact extraordinary vicissitudes

1. Mem. Med. Soc. Vol II 2. Cycl. Pract Med. Vol II

vicissitudes have been more remarkable than anything else: in some places one peculiar sign of atmospheric intemperature has been observed & in other places a different sign; & the epidemic has frequently fallen capriciously or partially like a blight over a country or even a garden". Considering the large number of countries attacked & the different seasons of the year at which it has occurred, the great variety in the atmospheric accompaniments cannot be surprising, & whatever the effect it may have on the development of the disease, it has been sufficiently proved to have none on its progress. The great difficulty in determining the starting point of the disease, prevents our knowledge of the actual state of weather which favours the production of the poison, & in the old accounts but little notice is taken of this point, possibly from the same reasons, that have led to disputes concerning the commencement of the present, namely the difficulty in recognising the first cases, its rapid & almost simultaneous descent on different & widely distributed tracts of country; together with the delay & uncertainty, in former years, of obtaining particulars.

The relation of influenza to other diseases

diseases, its modifying effects upon some, the frequency of its occurrence before or after others, has long been noticed. It was the precursor of the plague in various places in 1580[1]; 1675 & 1743; of epidemic dysentery in 1762 & 1803; of cholera in 1733 & 1831. At other times, however, it has followed these diseases, & has very frequently been unaccompanied by any. Many of the older observers, as Webster, Hecker, & Hancock believed that there was a direct & distinct connection between the various diseases, & Dr. Bertram[2] even goes so far as to say, that influenza, cholera morbus, & epidemic cynanche tonsillaris, were in his opinion types of the same disorder, & occasioned by the same cause. Now it is generally believed, that as with its modifying effects upon other diseases, there is no true connection, & the concurrence when it has happened was solely a coincidence.

A much more important relationship, & one that, judging from recent investigations into typhoid, diphtheria, & other zymotic diseases, seems likely to have a direct bearing on the subject, is that between influenza & epizootic diseases. The connection has been very frequently noticed

1. Webster's Hist of Epidemics vol I 2. Mem Med Soc Vol VI, p332.

noticed, & invariably with the important peculiarity, that the disease in animals preceded the disease in man. It has also followed the same route, attacking countries in the same order, lasting about the same time, & resembling in its symptoms, progress, & relative mortality, the human epidemic. Of those where special note has been taken, may be mentioned that of 1580. Of it Belinus Salius Diversus, cited by Denning[1], says that birds & brute animals suffered. In 1688 the cavalry horses encamped at Curragh were affected several weeks before influenza appeared among the troops. In 1733 epidemic diseases were very common & fatal among horses, & about Edinburgh, coughs & running from the nose in horses, were universal in October & November, just before the disease attacked men[2]. In 1743 Huxham relates that "many horses were diseased & dee perished" In 1775 Dr Anthony Fothergill[3] says, the disease among dogs & horses was general over England, before the influenza broke out. In 1782 Dr Pain records, that horses were affected with a cold, near Exeter & in 1803 epizootic disease preceded the epidemic[4]. & Hancock

1. Med & Phys. Journ. Vol X
2. Huxham Med. essays II. 31
3. Mem. Med Soc III
4 Med & Phy Journ. X

mentions

mentions the same as occurring in 1831. In 1833, 37 & 48 numerous reports of the same have been given. In the last epidemic, extensive disease has undoubtedly occurred in ~~London~~ horses previous to, & greatly resembling in symptoms, the disease in man. In London it was noticed two months before it attacked man. From the description of the epizootic disease given by Dr. Lykes[1], it appears that the symptoms, especially that of absence of nasal catarrh, were very similar, & that in no case did the men attending on the horses become affected. The question of contagiousness was disputed, "some actual attempts at infecting other horses having failed on the one hand, whilst on the other, undoubted instances of infection are stated to have been observed".

Before the recognition of the germ theory, it was almost universally put down to some aerial influence, & even now it is ascribed by many to that cause. The name influenza was first given, for this reason by the Italians in 1775, when the epidemic was generally supposed to be due to a peculiar "aerial influence". Previous to this

1. "Public Health" April 1890.

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in 1675 Sydenham ascribed it, as resulting from the action of cold humid air upon the skin; the fluid excreted by this emunctory being thrown in upon the system, & exciting fever, cough, & disease of the lungs. Dr. Graves ascribed it to some "telluric influence", or "agency connected with variations in the physical conditions, which operate on the external surface of our planet" & Copeland to some general change in the usual conditions of electricity circulating on the surface of the earth". [1.] Dunning [2.] followed by Watson [3.] & Theophilus Thompson [4.] attributed its presence to "universal minute substances endowed with animal or vegetable life, & developed in immense abundance, under specific states of the atmosphere, in which they float, & by which they are carried hither & thither" This theory, first enunciated at the beginning of the present century, is in all probability the true one. Recent bacteriological researches have so far however failed to demonstrate the actual germ. Various investigators have ascribed the primary cause to various microbes, which have been found in the sputum & blood of infected

1. Copelands Med Dict. vol II
2. Med & Phys Journ. vol X
3. Pract. of Phys. II
4. Annals of Influenza.

cases

cases. Jolles[1] ascribed it to Friedlander's pneumonia bacillus, which Weichselbaum[2] failed to meet with in a single case. The latter observer found the blood in two cases of influenza quite free from microbes, while in the bronchial sputum there was constantly, & in considerable numbers, the capsulated diplococcus pneumoniae present, but this he does not consider as the microbe of influenza. Professor Klebs[3] of Zürich discovered, that in the febrile stage of influenza, the blood contains "in very large numbers flagellate protozoa". The streptococcus pyogenes was found to be present by Professors Ribbert & Finkler, & by the former is ascribed as the cause of the disease[4]. Others have found numerous microbes present, but Bessen[5] discovered nearly the whole of these, including the diplococcus pneumoniae, Staphylococcus aureus, Bacillus of Friedlander, & the Streptococcus pyogenes, in the secretions of perfectly healthy people, & in those suffering from other disorders

What then do we know of the actual cause of the disease?

That the disease is really due to some unknown

1. Wiener Med. Blätter No 4 X III
2. Ibid 6 X III
3. Centralblatt für Bact und Parasit. No 5 VII
4. Deutsche Med. Wochenschrift 4
5. Ziglers Beitrage VI 4

microbe

microbe, there seems no reason to doubt.
That the disease is contagious there are numerous instances to prove, but from the present evidence, its chief mode of transmission, within a limited area, is by infection the poison as germs or spores being diffused in the air. This infectiousness however would seem to occur only over limited areas, & the chief cause of transmission to a distance, to be by personal contact, by merchandise, & by letters. The occurrence of sporadic cases, as has been noticed in every epidemic to appear some weeks before the actual outbreak, must otherwise remain quite unexplained. Once the disease is established, & the germs have developed, & become diffused thro' the atmosphere, the sudden & frequently almost simultaneous outbreak occurs in a city or district, & of necessity there is then some degree of spread by the margins & by the prevailing winds.
The generally entertained theory, that the poison is carried solely by the wind, is not tenable. The course of the epidemic from east to west is in a contrary direction to the prevailing winds, & the disease does not attack places consecutively.
Sir Arthur Mitchell's proposition, in a communication

communication to the Scottish Meteorological Society[1], that the distribution may take place thro' the upper strata, & by cyclones is quite inadequate to account for its well defined course, as the germs would then be carried to countries far beyond the unaffected areas, & thence by the prevailing wind, backwards to meet the original advancing disease.

That other causes are at work, there can be no doubt, & what is now known as the epidemic constitution, & the various conditions which favour the development & growth of the microbe, will, in all probability, prove to be the chief factors in regulating the particular route of its spread, both in animals & man. The relationship between the two, if there be two diseases, as they occur in the animal creation & in man, seems also likely to have a most important bearing on the etiology. The fact of its occurrence in animals in the first instance, together with what we know of analogous diseases being developed in, or at all events transmitted from them to man, leads to the supposition that the same occurs in influenza, & if so

1. Brit. Med. Journ April 12th 1890

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the probability is, that the disease undergoes some modification, that the germs find a proper nidus for their development in the lower creation, as is the case with some of the parasitic diseases, & are then in a state, when disseminated by the atmosphere, to attack the human organism.

We are here however met with the same difficulties in accounting for its occurrence, its infectiousness, & its dissemination in animals, as in the human disease; & until we can demonstrate the particular germ, & work out its development & life history, no positive opinion can be expressed, & our knowledge of the subject must remain imperfect.

C. J. Morton