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Epidemic Influenza

With special reference to the epidemic of 1889-1892.

Being a thesis composed and written by Isaac Thompson M.B. C.M. for the M.D. Degree.
April 1892.
Introductory Remarks.

It is, I think, hardly necessary to offer an apology for the choice of Epidemic Influenza as the subject on which to write a thesis, for although the attention of both the profession and the public has been most forcibly and persistently directed to this widespread malady for the last three years, and although almost every conceivable quarter of medical literature has recently been searched through for information on the subject, it must be confessed that we are still deplorably ignorant of the disease in many of its aspects.

An epidemic affection, which when at its height is capable of swelling the death rate of a place to over 80 per thousand, as was the case with Influenza at Colchester in the present year, (and this, be it remembered, in spite of the greatly improved sanitation of modern times, which has had such a marked effect in mitigating the severity...
of most ordinary epidemic affections, demands our serious attention. It is not merely the great rise in the total number of deaths, which is produced by influenza, that causes an epidemic of the disease to be so much dreaded, but the serious interference with public works & institutions, the great amount of suffering of which it is the cause (when one considers the immense numbers who are attacked), and the great monetary loss to a country which it produces. (It was estimated that the epidemic wave of 1890 alone, cost this country two millions sterling), are consequences of the gravest kind, which constitute an additional claim on our attention.

The sudden and unexpected outbreak of the disease in 1889, after a long period of almost total freedom from it in anything like a severe epidemic form (the last severe epidemic having occurred in 1847-48), is calculated to enhance one's interest in the disease. It is certainly by far the most remarkable & most widespread epidemic
that has occurred since I became a member of the profession, & its consequences are perhaps of a more far-reaching character than those of any other disease with which we are acquainted. The disorder might indeed be designated a "Pandemic" rather than an Epidemic, seeing that it involves whole continents in a few weeks or months.

When the present broke out in 1889, it was confidently expected by the more enthusiastic Bacteriologists and others, that with the greatly improved methods of investigation of the present day, many hitherto obscure points connected with the disease, would quickly be cleared up; such for instance as its precise cause & mode of spread. And it was hoped that, having determined these points, a means would soon be found either of stamping out the disease or of preventing its wide diffusion. It is to be feared, however, that it has as yet eluded all attempts to discover its primary cause; and the fact that it has attacked
vast masses of the population for three years in succession, & during the last of these years, more severely, if anything, than during the first two, is strongly suggestive of our ignorance of any effectual method of preventing its spread. The importance of determining these two points, can, I think, hardly be overestimated; at all events it has been by an accurate determination of the primary source & the mode of spread, that, in recent years, we have been to a great extent successful, in either preventing the outbreak of, or at all events in rapidly stamping out, many of the epidemic affections which were formerly so common & so widely diffused, and which only died out when their viruses was exhausted. Still, much new matter has been added to the literature of the subject, more especially in regard to symptomatology and sequelae; and advances of considerable value have been made with regard to the treatment of the disease. In my description of the malady, in the following pages, I do not lay
claim to having made original observations of importance, but simply attempt to review its more salient features and the most approved mode of treating it, after having seen and treated it very number of cases of it in general practice & after reading much of the modern literature concerning it.

Brief description of the course of the present epidemic.
The first rumours of the commencement of this epidemic began to be heard towards the close of the year 1889; rumours which, for a time, at all events, were received in this country with incredulity but which were very quickly verified by the appearance of the epidemic on our own shores in deadly earnest.
The exact place of its origin does not seem to have been satisfactorily determined, both Russia and China having been singled out for that unenviable distinction. It seems tolerably certain, however, that Bokhara in central Asia was one of the first places affected by the disease, if it were not the actual
starting point of the epidemic. It was prevalent here as early as the month of May 1889, but it did not begin to spread to any great extent until five months later. Towards the latter part of October 1889, it was present both in St. Petersburg and Tomsk; and by the beginning of November of the same year, it was general throughout Russia. It then spread westwards through Europe, as it has so often done in previous epidemics, reaching Paris about the middle of November, and Berlin and Vienna about the end of that month. In England, it first manifested itself in London about the middle of December 1889, at first in isolated instances, and did not assume epidemic proportions until the end of December 1889, and the beginning of January 1890. Most of the south-eastern and midland counties were involved by the middle of January; but many parts of the north and north-west of England were not attacked until February. The general
course of its spread over England was thus from South-East to North-West. In Scotland, some cases were observed during the last few days of December 1889 at Edinburgh and Aberdeen, but it did not become generally prevalent until January 1890. Whilst in Ireland cases were observed in Dublin in the last week of December 1889, but it did not become epidemic until January 4th February 1890. In America it appeared almost simultaneously at Boston and New York about December 14th 1889. It rapidly became general and reached its height in the United States about the middle of January 1890.

In Africa it appeared at Cape Town at the beginning of January 1890. And in Australasia it made its appearance in the month of March 1890.

A very striking feature of the spread of the epidemic, as it first made its appearance in 1889 (that is to say of the primary epidemic wave), was its tendency to first single out the principal towns of a country (very
often attacking first the capitals
and next the smaller towns,
and lastly villages, hamlets and
remote country districts, with but
very infrequent communication with
more populous parts. On its first
appearance in a centre of population
the number of people attacked du-
during the first week or two, and the
cases scattered and as a rule of a
wild type; but in the course of two
or three weeks it began to assume
a widely epidemic character, and
became at the same time, more viru-
ulent in type. It usually remained
at its height in such a given centre
for about three or four weeks, but
not infrequently for double this
time, and then it almost suddenly
began to decline, but did not entirely
disappear, being still present in
the form of scattered cases for several
weeks or even months after the epidemic
wave had subsided. In fact it may
be doubted whether we have ever yet
been completely clear of the malady
even in the summer months, in this
isolated form, since the disease first reached our shores in 1889.

**Epidemic Wave of 1891.**

The primary wave subsided before the approach of the summer of 1890, but only to be followed by a more or less similar one in the following year. This second wave of the disease began towards the end of February 1891; and on this occasion it seemed in this country to start from Hull, where it was said to have been imported by a ship's crew, but it is not at all improbable that there was also a multiplication of already existing mild and scattered cases, that had remained over from the primary wave. On this occasion the epidemic was especially severe in Lancashire and Yorkshire, but on the whole it was not so widespread as the primary wave. The disease also recurred this year on the continent of Europe and in America, but it seemed to spring up in a most irregular fashion and not to exhibit that tendency to attack country after country, in
more or less regular succession which characterised the primary wave. Like the primary wave, it subsided in this country before summer approached.

**Epidemic Wave of 1891-92.**

In October 1891, the disease again began to assume serious proportions; but in contrast with the primary wave, it seemed in this country to arise in two distinct centres, in sparsely populated districts; the one in the South-West corner of England and the other in Scotland. For a few weeks it exhibited but little tendency to become general, although severely epidemic at these particular centres; but ultimately it spread very rapidly, until by the month of March 1892 it had invaded almost the entire country and begun to die out. Other countries appear to have suffered quite as severely as our own, the last of the three epidemic waves having been almost as widely diffused as the primary one, and of an even more virulent character. Complications
of the respiratory tract were of very frequent occurrence in this epidemic wave, owing, perhaps, to the great severity of the weather.

When one comes to survey the behaviour of the disease from 1889 to 1892, I think one may safely say that it has never as yet been entirely absent from amongst us since it first broke out; at least in the form of mild isolated cases; and that in all probability, the two secondary waves of 1891 and 1892 had their starting point, in part, at least, in such isolated instances left after the primary wave. The epidemic, having thus occurred in three waves, as it were, in each of three consecutive years, the question naturally arises "Shall we have a fourth or more of such epidemic waves?"

If one were to answer such a question from the behaviour of the disease in previous epidemics, we should be tolerably safe in answering decidedly in the negative; but then it has hardly ever been known before to occur
for "three" consecutive years, though frequently it has done so for two; so that I am trying to decide such a question, reasoning from precedent appears to be quite worthless; the question must remain an open one, which time alone can solve.

Nomenclature.
When the present epidemic (I say "present" advisedly, for it has not yet disappeared even in its epidemic form) first broke out in 1889, it was said that the word "Influenza" (which was originally derived from the Italian, the word signifying "Influence," and this influence being that of the stars in producing the very rapid spread of the disease), did not express what was required, and was in fact a perfectly meaningless term. In consequence of this, a whole host of synonyms have been made use of, with the object of displacing the original term; in fact almost every dissentient from the latter seems to have a pet term of his own. It will suffice merely to name those that have been most in vogue—they
include. Russian Influenza, epidemic catarhal fever, nervous fever, gripppe, epidemic catarhal, epidemic cerebrospinal fever &c. The old term Influenza, however, bids fair to outlive them all, and as it is now so very widely known and implies no theory as to origin or characteristics of the disease, I can see no reason why it should not still be generally used; unless indeed it be that under ordinary circumstances, in the absence of the epidemic affection under consideration, the term is occasionally used in popular speech, to designate an acute febrile catarhal affection, involving the respiratory tract, a disorder which never takes on a widely epidemic character. If this distinction be borne in mind, the term Epidemic Influenza seems to me a sufficiently significant one.

Definition.

It would, I think, be almost impossible to give a definition of influenza in a single sentence, to which exception could not be taken. The reason for this has been the hitherto contentious...
nature of several points in connection with the disorder, such for instance, as its contagiousness; and the variable character of the symptoms, not only as observed in different epidemics, but in different cases during one and the same epidemic. These, too, would seem to be the reasons why there are almost as many definitions as writers on the subject, and why some authors try to evade the difficulty by ignoring the question entirely. Most of the writers on former epidemics have regarded cataract of the respiratory tract as an essential part of the disease. Certain modern writers on the present epidemic, on the other hand, have defined the affection as a true nervous fever, and would have us believe that nervous symptoms, such as headache, muscular and neuralgic pains constitute a "sine qua non" of the malady. Another class of writers, notably Dr. Fitgeral, allege that influenza is not a disease "per se," but a profound modification by some unknown influence, of any ordinary disease which may be present.
(Lancet, 1890, Vol IV, pp. 841). The reason given for this statement is that the symptoms and sequelae are so variable and contradictory in character. It seems to me to be quite unnecessary to have recourse to such a vague definition; certainly not on the ground alleged, at all events, for such a disease as typhoid fever, to give only one example, would run influenza very close in the matter of variability and contradictory character of symptoms and yet it is admitted to be a definite disease per se. In typical cases of influenza, too, which constitute the majority of instances of it, the symptoms are quite as distinctive in their own way, as are those of typhoid. Practically all who have seen much of influenza, admit that the disease is of sudden onset, & is accompanied by intense prostration, and we all know that it tends to have a widespread epidemic character. It will suffice our purpose, I think, to define the disease as follows—

"The term Epidemic Influenza"
signifies a specific, contagious and widely-spread epidemic affection, characterised by a sudden onset, usually with febrile symptoms and marked prostration of strength, and by a short duration; generally accompanied by intense pain in the head, back, muscular parts of the limbs, occasionally in the joints, having a marked tendency to produce catarhal affections of the respiratory and alimentary tract, and often great depression of cardiac action and amp, both during and after convalescence, to be followed by a train of troublesome sequelae, especially involving the nervous system.

Pathology.
There is perhaps no disease in which there has been so much speculation as to the cause, with such unsatisfactory results, as is the case with influenza. A venerable old medical gentleman of my acquaintance, when closely questioned by an inquisitive patient as to the cause of an illness, for which he could not satisfactorily account, used to point up to the
ceiling in a most impressive manner, & exclaim "Digitus Dei" (the hand of God), and this generally, both satisfied & effectually silenced them. It is very doubtful whether we can yet explain the cause of influenza in any more satisfactory manner.

An epidemic of influenza differs from all other epidemics with which we are acquainted, in its almost simultaneous diffusion throughout the whole world. It attacks, apparently with absolute impartiality, the inhabitants of the torrid, the temperate and the frigid zones; it becomes epidemic in marshy plains, equally with mountainous districts; it attacks the rich quite as often as [in proportion] the poor, and those who live in the midst of the most approved sanitary arrangements, just as readily, apparently as the dwellers in the filthiest of slums. The theory that the disease is caused by unusually cold weather is therefore scarcely tenable, although it seems to be upheld by the fact that it is generally more widely diffused and
more virulent during the winter months than during the warm season of the year; and also by the fact that it is generally more widely epidemic in cold countries than in hot ones during this cold season; this was certainly the case with the primary wave of the present epidemic. The fact too that influenza so often appears to have its origin in a cold country such as Russia, also seems in favour of this theory. On the other hand, epidemics have occurred, following closely on unusually hot summers, of the epidemic of 1837 was very widely prevalent at The Cape at midsummer, which seems effectually to dispose of the theory that the disease is in any way due to the prevalence of extreme cold. Others have referred it to excessive dampness of the atmosphere & to fogs. One or other of these conditions seem very frequently to have preceded its outbreak in this country, but not by any means invariably so; and when one considers how very commonly one or other of these states of atmosphere
is prevalent in this country, especially
towards the fall of the year (which is
a very common time for influenza to
break out), one can hardly resist
the conclusion that these conditions
are merely concomitant of that the
cause does not lie in the state of
the weather. Another is even more
improbable theory is that the disease
is due to an "excess of ozone" in the
atmosphere. For although ozone is
certainly an irritant of the bronchial
mucous membrane, bronchitic symptoms
are very often entirely absent in this
disease. The fact that the disease
first singles out large towns, where ozone
is usually scarcest, is also strongly
opposed to this theory. And one would
expect everyone to suffer almost equally
severely, seeing that all would be
inhaling (proportionately) equal quan-
tities of such a toxic ingredient.
Again, although it has been shown
that ozone was present in somewhat
larger quantity than usual when the
first wave of the present epidemic
spread over this country, it has
frequently been observed in even larger quantity without a single case of influenzos occurring.
Stagnation of the atmosphere has also been alleged to be the cause, by favouring the retention of impurities in the lower layers of the air. Had this condition any share in the causation, we should expect such epidemics to be of very much more frequent occurrence than they are.
Another rather far-fetched theory has recently been suggested viz. that the recent hadits origin in the overflowing of the river Hoang-He in China, which took place in January, 1888. This resulted in great destruction of life & the deposition of an immense quantity of mud on the inundated region. During the heat of summer, this mud became dried into a powder & scattered by the winds. It has been suggested that this dust, or microbes contained in it, was scattered over the globe by the wind & gave rise to the epidemic. One would have expected, however,
that if this were the case, the
disease would have made its appear-
ance in 1888 & most probably at or near
this very spot, instead of a year later
and in a distant locality. Moreover,
similar floods & resultant loss of life,
have previously occurred without a
vestige of influenza following.
The influence of comets, stars and
sun spots has also been suggested as
being concerned in the causation;
such notions are, to say the least of
them very far fetched ones and rest on
no proven basis of fact. The same
might be said of such notions as that
influenza is caused by swarms of locusts,
blood spots, electricity in the air, and
such like.

"The microbe theory," seems at present
to be most in fashion, and it certainly
has a good deal to be said in its favor.
Some of the more important facts
pointing in this direction have been
well stated by Prof. Klein & I make
no apology for quoting them in full:

"That a microbe must be the primary cause of
the disease is suggested by the epidemic
character and by the infectiousness of the disorder. No other theory, as for instance that of peculiar atmospheric conditions, can for a moment be considered as compatible with the fundamental and well-ascertained fact that the disease is in a high degree an infectious disease. The course of the epidemic in the various continental cities and in London leaves no doubt about this point. In all epidemic diseases, the spread from person to person cannot be explained by any but a living and self-multiplying essence. The particular specific microbes find entrance into the system of one or more susceptible bodies, wherein they multiply and set up the particular disease. The infected body becomes, as it were, the soil on which the new crops of the microbes are raised, and thereby the character and power of focus or centres, from which infective matter, i.e., the new crop of microbes, becomes disseminated, and ready and capable of further infection or invasion of new bodies. A non-living material cannot fulfill this condition, so characteristic
of infectious diseases, viz. to spread the disease from individual to individual, although a particular state of the atmosphere might, considered from a purely theoretical point of view, produce simultaneously in a number of persons a diseased condition, but these persons themselves could never become foci of infection. Now this is precisely the fundamental fact which obtains in this as in other epidemic diseases. It has been observed in all Continental cities - I have had myself excellent opportunities of observing it recently in London - that in a particular establishment, a household or a school, some individual becomes smitten with the disease, then day by day numbers of new victims are gradually added to the sick list. What makes the present epidemic remarkable is its extreme infectiveness, the rapidity with which it spreads, of the susceptibility of a vast number of people towards it. These facts suggest that the microbe is one which multiplies very rapidly, that it is conveyed, and that it enters
by the breath (i.e. that it spreads by
the air), and lastly, that it finds in
most persons a suitable nidus for living and
thriving” (Epidem. influenzae by Dr. Sidney, pp. 14-16).

Reasoning from analogy, therefore,
the probabilities are very strongly
in favour of the complaint being
due to some micro-organism; but
in the absence of positive proof, the
point must still be considered a
hypothetical one. It may be men
tioned in this connection, that Pfeiffer
of Berlin claims to have discovered
the organism, which, he asserts, is
a bacillus present in the bronchial
secretion of influenza patients. We
cannot, however, take his statement
as finally settling the question
without further corroboration; especially
seeing that previous to him, some
half dozen bacteriologists claimed to
have discovered the micro-organism
of each of these, it is hardly necessary
to say, a different one.
Admitting, however, for the sake of
argument, that the malady be of
microbic origin, we have still to
determine the ultimate source, or circumstances which favour the development of such micro-organisms. Just as, for instance, in an epidemic of typhoid fever or diphtheria, it is no doubt very interesting, and it may even be of some importance as regards the treatment of individual cases of it, to know that the disease is caused by a micro-organism; but it is of far more practical value to know, that the ultimate source of such microbes (i.e., therefore of the disease itself) is generally to be found in some defect of the sanitary condition of the locality; for then we have it in our power, by removing the cause or favouring conditions, to altogether prevent such an epidemic. It must be confessed, therefore, that for practical purposes, our knowledge of the ultimate source of influenza, or of the conditions which favour its outbreak, has scarcely been advanced a single step during the present epidemic, notwithstanding the most careful investigation. Circumstances
which exert such a marked tendency to increase the spread of most ordinary epidemics, such as overcrowding, defective sanitation seem to have no influence in causing an epidemic of influenza. Personally, I am inclined to attach importance to some particular state of the ground being essential, before the disease can assume the proportions of an epidemic. At all events, this conclusion seems to be pointed to by the following facts. One has frequently noticed that although the disease be very severely epidemic in one place, another centre quite close to this, in spite of the fact that frequent communication takes place with the infected district, and that perhaps several isolated cases of the disease are present in it, remains free from the epidemic for several weeks or may even escape it altogether even although its community be a susceptible one. This phenomenon may often be observed too in different districts of the same town, one locality
will almost escape it altogether, except perhaps the occurrence of a few stray cases, in spite of the fact that its inhabitants are in daily communication with infected districts; another part of the town, on the other hand, suffers most severely from the very commencement of the epidemic in the place. And this, be it understood, although the two localities be under precisely similar circumstances as regards sanitation, water supply &c.

The theory that the disorder is caused by some state of the air is totally inadequate to explain such a phenomenon; and it would seem that some abnormal condition, most probably of the ground, is essential before the disease can become epidemic.

Circumstances which predispose persons to an attack.

“Influence of age and sex.” One very striking feature about the first epidemic wave, and to a smaller degree of the secondary one, was that children under about twelve years of age suffered in very much smaller
proportion indeed, and much less severely than did adults. This however has not been the case with the wave that is now subsiding, for children under twelve took the disease in very large numbers, often severely. I never saw a single instance in which an infant at the breast escaped the disease if the mother or nurse took the complaint. Taking the epidemic as a whole, children certainly suffered in considerably smaller proportion than adults. Old people were very susceptible to the disease and suffered more severely than younger persons. Whilst of young adults and persons in the prime of life, I have seen no other disease incapacitate, for a time, such a large number in so short a time. Sex probably has little or no influence, for although women have suffered in slightly smaller proportion than men, this is no doubt in part due to their keeping more indoors, & thus not being so much exposed to contagion. "Influence of preexisting disease". Chronic
pulmonary and cardiac affections, and chronic exhausting diseases of any kind, such as diabetes predispose to an attack, and it is very fatal in such instances; in fact the mortality of the disease is very largely due to cases of this description. "Fatigue and depressing bodily conditions" predispose to the disease. This is probably the reason why medical men suffered in such abnormally large proportion from it.

"People who are in the open air" during a great part of the day, are much more apt to take the disease than those who remain indoors; this is probably not due to any influence of the air itself, but to the fact that such people come more in contact with others, and are thus more exposed to contagion.

Relation to epidemics amongst lower animals.
There appears to be some mysterious connection between epidemics of influenza in man and in the lower animals, especially horses. When one reads the
accounts of previous epidemics, one of the most frequent of preceding or concomitant phenomena one notices, is the occurrence of a widespread epidemic of influenza among horses. Most often such epidemics have occurred a few weeks previously to the epidemic in man, but not infrequently the two are concomitant. The present epidemic has been no exception in this respect, for the instances are very numerous indeed, in which the horses in a district suffered from an epidemic of influenza, a few weeks before the disease affected human beings in such district. Sometimes the two were concomitant. More rarely than horses, cats & dogs were similarly affected. The interesting question connected with such outbreaks is of course the possibility of the disorder being communicated from animals to man. It may be mentioned that epidemics of influenza in times past, have frequently occurred in horses without anything of the kind attacking man; whilst epidemics
of it have frequently occurred in man whilst horses have completely escaped. Evidence of direct infection from horses to the men who have much to do with them is of the most meagre and unsubstantial kind, and it has been ascertained in some of the largest establishments, during the present epidemic, that the number of men who were affected with the complaint, whilst tending infected horses, was certainly not larger but in some establishments actually smaller, in proportion, than was the case with other bodies of men not coming into contact with horses. When one considers too, that men who tend affected horses, have as a rule abundant opportunities of acquiring the disease in the ordinary way from their fellows, one is inclined to come to the conclusion that if such infected animals are capable of setting up the disease in man at all, they do so to but a very small & practically unimportant extent. At the same time it must be
admitted that the epidemic in both man and animals may possibly have a common cause; and it seems possible that animals are affected by a less virulent form of the poison than is required to set up the disorder in man; at all events this idea would appear to be supported by the fact that the epidemic usually attacks animals a little earlier than it does human beings.

Relation of Influenza to Cholera.

It has been asserted from time to time that cholera is very liable to follow closely on an epidemic of influenza and vice versa. This would appear at first sight to be borne out by the fact that the influenza epidemics of 1803 and 1849 were preceded a short time by an epidemic of cholera, whilst the influenza epidemics of 1831 and 1836 were followed by an outbreak of cholera. Most probably, however, such a relation is simply a coincidence, since an epidemic of each disease has often occurred without a sign of the other ensuing.
Mode of Spread.

This has for long been one of the most vexed questions connected with the disease; and although the point has not yet been finally settled, there can be no doubt that facts of considerable importance have been learned concerning it from observation of the present epidemic.

It has been alleged from time to time that the disease spreads with the rapidity of lightning, and that it is capable of attacking many thousands of people in a center of population, within a few hours.

Whatever may have been the rapidity with which it spread in previous epidemics, there was certainly nothing in the mode of spread of the present epidemic to lead one to compare it to anything that travels swifter than the ordinary means of transport as now in use. For the epidemic wave of 1889-90 took from six to eight weeks to spread over Europe and to reach America; over two months to reach the Cape, and about five
months to reach Australia, distances which in these days of steam, might easily be travelled over by a person within the above mentioned times. 
The behaviour of the disease when it first reached a country & broke out in a susceptible community, was during the present epidemic somewhat as follows—

During the first few days, or it might be, for a couple of weeks or so, after the presence of the disease had been undoubtedly ascertained, instead of at once proceeding to attack every susceptible person (as it did when the epidemic was about at its height), it occurred only in the shape of a few isolated cases, which for some time exhibited little or no tendency to become widely epidemic. And this too in spite of the fact that such early cases are often mild and it may be unrecognized, so that most likely the patient is going about as usual during the whole time that the disease is presumed to be contagious thus giving increased facility for its
spreading as compared with what holds when the epidemic is at its height; for then the cases are recognised and more severe in type and usually keep within doors from the beginning. In the course of about a couple of weeks, however, after thus having as it were, felt its way for a short time, the disease seemed fairly to gain its feet — if one may use the expression — and rapidly began to spread and involve a very large number of people in a short time (in a much shorter time than do any of the ordinary epidemic disorders). It now daily involved large numbers of people and thus almost suddenly reached the height of its epidemic prevalence, and there remained for 2-4 weeks or even longer; and then it declined in epidemic proportions almost as suddenly as it had previously risen. There still, however, remained behind, a number of scattered cases for weeks or even months after the real epidemic itself had subsided.

It is remarkable why these isolated
cases (often only of a mild type) should persist long after the disease has disappeared in an epidemic form, and why, too, such cases should be able from time to time, as apparently they are, to rekindle the epidemic form of the disease. For it can hardly be doubted, I think, that the epidemics of 1891 and 1892 were but secondary waves, as it were, of the primary epidemic of 1889-90, and that they owed their origin to stray instances remaining after the epidemic itself had subsided.

Another curious fact in connection with influenza is that when it does ultimately subside, it apparently disappears completely from off the face of the earth in both its isolated and epidemic form, and continues in complete abeyance generally for a series of years, 10, 20, 30 or more. The behaviour of the disease is somewhat different in the primary, from what it is in the secondary waves. At all events this was the case during the present epidemic, for
the primary wave having arisen, spread with more or less regularity through country after country, attacking as a rule, those countries first which were nearest the point where it appeared to break out, and ultimately visiting almost every country on the surface of the earth. As a rule, too, it visited large towns first, and remote rural districts last. The secondary waves, on the contrary, did not appear to proceed from a common centre of origin, but the malady appeared to spring up in several centres, and often at the commencement was confined to rural districts for a time, and exhibited for some weeks, very little of that tendency, which characterised the primary wave, to become swiftly and widely epidemic. This was especially the case with the wave that is only now subsiding. It seemed in fact for a few weeks at its commencement to concentrate its attack more on a certain centre, and to have done with it instead of from its very outset, making those gigantic strides onwards, which
was so marked a feature in the primary wave.  
With regard to the more immediate question as to how the disease is spread, there are still, as has been the case in former epidemics, two chief views held—viz—
I. "The miasmatic theory," according to which the disease is supposed to spread only by means of the air, in which its virtues is contained, is air-borne in fact in the same way as malaria.
II. "The contagion theory," (in what follows, I shall use the word "contagious" in its wider sense to denote communicability by actual contact, and also for short-distances through the air from person to person).

Previous to the present epidemic, most of the leading authorities on the subject (Sir J. Watson, Prof. Hirschel) inclined decidedly to the miasmatic theory of spread, and even yet there seems to be a certain amount of evidence in their favour. But recently a marked change of opinion had
taken place in the profession in regard to this point, for it has now become considered an established fact, that the disease is certainly contagious. This admission, however, does not entirely dispose of the difficulty, for it does not by any means follow that this is the only, or even the chief way in which the disease spreads. The question in fact, is still an open one, and admits of arguments from both points of view.

I. The Miasmatic Theory.

It is still maintained by many observers that the disease is, to all intents and purposes, air borne (miasma signifying a fouling of the air). In the recent report issued by the Local Government Board in the epidemiology of 1890 as it occurred in Ireland, there is a general concensus of opinion among the profession in that country, that the disease is miasmatic and not contagious. In times past this has been almost the universal opinion, owing in part no doubt to the teaching of Watson and Hirsch. The former authority, however,
though clinging decidedly to the
measlesmatory theory, admitted the
possibility of its being spread in
certain cases by contagion. It will
not be out of place, therefore, for us
to attempt to summarise and sift some
of the more important evidence in
favour of the measmatic view:

1. The rapidity with which the disease
spreads; the suddenness with which
it breaks out in a place and involves
a vast number of its population; and
the suddenness with which it disappears,
are favourite arguments of those who
would have us believe that the malady
is essentially measmatic.

With regard to the rapidity with
which it spreads over a continent or
a country, there can be no doubt
that this has been very considerably
exaggerated in past epidemics, when
communication between distant parts
was not so readily effected as is now
the case. Its course from country to
country and from town to town, could
not then be so readily traced, as it
would in these days of steamer and
electricity.
and consequently its first appearance in a place would appear to be far more abrupt than it really was. The panic, too, that is so often caused by such visitations, would doubtless also tend still further to exaggerate the rapidity. Speaking of the present epidemic, and the greatly increased facilities of the present day, for accurately noting its spread, it may safely be said that it did not spread more rapidly than human intercourse could account for, seeing that, as before mentioned, the primary wave took over six weeks to spread over Europe. It has been alleged, too, that the disease has broken out (primarily) at places thousands of miles distant from each other, almost simultaneously, and that therefore it must of necessity spread faster than human agency can travel. This is said to have occurred in N. America when the present epidemic first made its appearance there. Such instances, however, are very easily explained on the hypothesis that infection may have been
carried by two distinct agents, from one or more preexisting sources, particularly when, as in the case just mentioned, the disease is known to be already prevalent in other parts. Then, too, with regard to suddenness of outbreak, it has been recorded in past epidemics, that the disease has attacked many thousands of people in a single city, on its very first day of outbreak there. Here, again, the advantage of the rapid communication of modern times in studying its outbreak is apparent; for knowing beforehand, by this means, that the disease was already prevalent on the Continent of Europe, the profession in this country was on the alert for its appearance there; and scattered instances of it were observed some time before it became widely epidemic. In former epidemics, the occurrence of such cases would no doubt often be overlooked, when no warning note of its outbreak or approach had been sounded. Admitting, however, for fallacies of this description, it must still be
confessed that its swiftness of spread is quite phenomenal, and far out of proportion to what holds in any other of the contagious epidemic affections with which we are acquainted. If this is to be explained by the theory of contagion, it can only be by supposing that the incubation period of the disease is exceedingly short, and that its virus is immediately effective when given off by an affected individual.

It might of course be suggested that the infection of influenza is capable of being carried for great distances through the air; but the behaviour of infectious diseases believed to be air borne does not resemble that of influenza; for in the case of small-pox and diphtheria, which are the most notable in this respect, there is no satisfactory evidence that they can be conveyed in this manner to distances greater than a mile, even if so far, but it has not been imagined for one moment that these diseases could be carried by the air through the distance claimed for influenza.
continent to continent, across the ocean. Of non-infectious diseases that are air-borne, the malarious affections may be mentioned, but only to point out one striking difference between their mode of spread and the mode alleged, according to the miasmatic view, for influenza, for the virus of the malarial affections is only capable of being conveyed by the wind up to distances of three miles, whilst it is arrested by a zone of trees or a strip of water; whereas many upholders of the miasmatic theory maintain that the influenza virus is capable of being carried by the wind for thousands of miles across the ocean. It is, however, as a matter of fact, highly improbable that the wind has anything to do with the spread of influenza; for it has been noticed over and over again, that the disease has spread by very rapid strides in a direction exactly opposite to that in which the prevailing wind is blowing, quite as rapidly, in fact, as it spreads in the direction of the wind. In order to get over
this difficulty, Dr. Buchan of the Scottish Meteorological Society suggests that the virus is caught up by ascending currents into the upper regions of the air, where currents prevail in different directions from those at the surface of the earth, and is brought down again in other places where descending currents exist.

One would expect, if such were the case, that the mode of spread of the disease would be much more erratic than is really the case, and one could hardly expect it to visit with such certainty almost every country on the surface of the earth.

2. Instances in which ships, or rather the people on board them (who have not touched land for weeks, nor been otherwise exposed to contagion) have been suddenly attacked by the disease, have been recorded as occurring in previous epidemics. Could such cases as these be properly substantiated, they would go a long way towards proving the miasmatic nature of the complaint.

No reliable cases of this character
have been recorded during the present epidemic; and as in some of the instances recorded in past epidemics, as being cases of this character, it has been proved that chances of contagion occurred after leaving port, it would be well to let this matter remain "sub judice" until absolutely reliable evidence is forthcoming.

3. The behaviour of isolated instances of the disease at the commencement of an epidemic, occurring for it may be a fortnight or more before the outbreak tends to become general; and also of the secondary waves of the epidemic, such as that which is now subsiding, in which the disease in its epidemic form, remains confined, for a considerable time at the commencement, to some particular district, without becoming rapidly general, seems to be suggestive of the miasmatic rather than the contagious view. This not unfrequently takes place also during the height of the epidemic; for, as before mentioned, it has often been noticed that whilst one district is attacked, very severely
it may be, an adjacent community, not infrequently escapes for weeks, or it may be altogether, notwithstanding the fact that communication takes place daily with the affected district, and in spite of the fact that, may be a few isolated cases are imported into it, or break out there. It has been claimed by many writers that this tendency of the disease rather favours the contagious hypothesis. I must confess that I fail to see in what way it does so; for as a rule there are numerous opportunities for contagion to occur daily, either by communication between the two districts, or from scattered foci of the disease that may be present in the district which is as yet unaffected by an actual epidemic. And yet, even though such a district be afterwards proved to be inhabited by a susceptible community, perhaps by the occurrence in it, a few weeks later, of a widespread & virulent epidemic of the disease, for a considerable time it may discard all these opportunities for contagion to occur.
It seems to me, to be, on the contrary to be one of the most significant pieces of evidence that we possess in favour of the miasmatic theory (or at all events it points to some condition of the ground being essential before the disease can become epidemic).

4. People from a distance, on going into an infected district, seem to be decidedly more apt to take the disease than people resident in such district. It has been frequently noticed, for instance, that when a ship has newly arrived in an infected port, the sailors have taken the disease almost to a man; certainly in far greater proportion than the ordinary inhabitants of such port. In this respect, therefore, influenza bears a striking resemblance to ague, which is undoubtedly miasmatic in origin, and exceedingly apt to attack people newly arrived in a malarian district in preference to those who are native to such district.

5. The fact that flushes of heat are apt to alternate with chills at
the commencement of the disease, and of some of its more serious complications, such as pneumonia, has had considerable stress laid on it by Indian surgeons, as being very suggestive of the malarious nature of the complaint. Very often like ague too, the acute attack ends in a very profuse perspiration.

6. Another bond of similarity between influenza and malarious affections is that one attack does not by any means confer immunity from subsequent attack. Very numerous people have been attacked by influenza for the last three years in succession. In this respect, therefore influenza contrasts strongly with the common epidemic infectious disorders, such as scarlet fever.

7. In numerous cases, especially in remote and sparsely populated rural districts, the disease has seemed to arise under circumstances in which contagion has been rigidly excluded after most careful searching inquiry. A striking instance of this description is quoted by Dr. Parsons in his Report-
for the Local Government Board, of
the Influenza Epidemic of 1889-90.
The case is reported on page 44 of
this excellent report and originally
came under the notice of Dr. Thresh,
Medical Officer of Health for the Bexford
Rural District, who describes it as follows:

"Bradwell is one of the most remote
parishes in my district; it is on the
coast, and practically bounded on three
sides by the ocean. It is seven miles
from the nearest railway station, and
the highways all end in the village,
as only the marshes lie beyond. On
these marshes (which lie between the
villages and the sea) farmhouses are
dotted at intervals of ½ to 1 mile,
connected with the village by roads
which in winter are well nigh impass-
able. At each farm lives an overseer
or manager, and the farm labourers.
It was on one of these marsh farms
½ miles from the village, that the
first cases of influenza in the district
occurred. On the night of January 6th
1890, six labourers and a young girl
residing in the same house, were
attacked with violent headache, nausea. This caused a little sensation when reported in the village. On the day but one following, other similar cases occurred in the village itself, and a medical man was sent for. He, hearing of the similar cases on the marshes, went down to enquire, & then concluded rightly that he was dealing with a sharp & sudden invasion of the influenza. Cases now cropped up in rapid succession, but a large increase in the number of cases occurred on the 13th exactly a week after the first outbreak. During that week the epidemic had attached several neighbouring parishes. In such a thinly populated district as this, between the rivers Blackwater and Fennel, it is difficult to conceive how infection from person to person should cause so rapid a spread of the epidemic."

This, of course, is only one example; but numerous cases of a more or less similar kind might be quoted which are difficult to explain by the contagion theory.
II. Contagion Theory.

There can now be no reasonable doubt that influenza is contagious; indeed the mass of evidence that has now accumulated in favour of this point is overwhelming. Even the late Sir Thos. Walton, although a strong upholder of the miasmatic mode of spread, admitted that there was strong evidence of the disease being contagious, as is seen from the following extract—taken from his Lectures on the Principles and Practice of Physic:—“There are points in the history of influenza which furnish a strong presumption that the exciting cause of the disorder is material, not a mere quality of the atmosphere, and that it is at least portable. The instances are very numerous, too numerous to be attributed to mere chance, in which the complaint has first broken out in those particularly houses of a town at which travellers have recently arrived from infected places.” Such an admission as this, coming
from such a renowned upholder of the miasmatic theory, points very significantly to the contagious nature of the malady; and indeed, the evidence on this point, seems as before mentioned, to be quite convincing, but as to whether this is the only, or even the principal, method in which the disease spreads, it is a very different question. Some of the more important evidence in favour of this mode of spread may here be briefly stated.

1. The first instances of the disease observed in a country during the primary epidemic wave, have almost always made their appearance in large towns (often in the capital of a country) which are in intimate communication with the countries where the disease is prevalent. In the primary wave of the present epidemic, this tendency was most strikingly manifested in almost every country in Europe. The primary outbreak having made its appearance in a country in this manner, it seemed generally to attack very soon afterwards
the towns next in order of size or of frequency of communication with the affected centre; and to attack last, the outlying agricultural districts, with which communication was least frequent.

2. One of the most significant circumstances bearing out the contagion theory is, that (as everyone who has seen much of the present epidemic must have observed) when the disease has attached one member of a household, it very generally in the course of a few days, attacks the other members of that household. In one instance, in particular, which came under my notice in the early days of the second epidemic wave, every member of a household, seven in number, was attacked within four days, and the outbreak was mistaken by a medical man for one of typhoid fever. Sometimes, however, only a single member of a large household suffers from the disease; but in my experience this is decidedly the exception rather than the rule. It must be borne in mind too, that such a virulently contagious disease as small-pox may fail to attack
all the individuals in a household,
when one case is present in it; and
this even though they may be unvaccinated. And in influenza, as in
smallpox, a person who has been
exposed, it may be repeatedly to con-
tagion & has for a long time escaped
the disease, may ultimately take it
in a very severe form.
I may further add, that such a multi-
pliety of cases in one household, is
apt to occur even though there may
not be a single other instance of the
disease amongst susceptible persons
in the near vicinity, which lends all
the more significance to the fact.
The very same thing holds true of
large establishments, schools &c, first
one individual as a rule is attacked,
then day by day, new cases, increasing
in number every day until a maximum
is reached, are added to the sick list.
A similar establishment in the
immediate vicinity & apparently under
precisely similar conditions, may
escape the disease completely.
3. Of equal importance with the last
mentioned evidence is the fact that when an infected person goes into a district whose population is as yet uninfected, it has been very frequently observed that he is extremely apt to set up the disease in people with whom he comes in contact, and in this way to be the starting point of an epidemic in such district.

Instances of this sort of an absolutely reliable character are now so very numerous, that it is, I think, almost needless to specify more particularly; but if I may be allowed to digress for a moment into the literature of past epidemics, I think one of the clearest and most remarkable instances of this character is one quoted by the late Dr. Gray. In his account of the epidemic of 1782 he says— "The island of St. Kilda on the West coast of Scotland is very remote from the rest of the islands there; and it is inhabited by 20-30 families. For very long periods these people are perfectly isolated, and they scarcely ever see a human being except once a year,
when they are visited by the steward. This year, influenza was very prevalent on the mainland, but before the visit of the steward, St Kilda was absolutely free from it. In the month of June, the steward paid his annual visit, with a retinue of 10-12 men; and naturally on his arrival, came into intimate contact with the great body of the inhabitants. The very next day after his arrival, the inhabitants were almost universally seized with influenza, and there was hardly a St Kilda man able to attend the steward's levee on that day (From Dr. E. Thompson's Historical Survey on Influenza pp. 134-135)

4. It has been repeatedly noticed that the inmates of institutions, who are allowed little or no intercourse with the outside world, suffer in very much smaller proportion from the disease than does the general bulk of the population. The officers of such institutions, who do have external communication, suffer (as is pointed out in Sir D. Macalpine's Report on the epidemic
as occurring in prisons (see Epidemic Influenza by Dr. Sidey pp. 100), in far greater proportion than do the inmates.

This fact certainly does not seem to fit in satisfactorily with the theory that the disease is purely miasmatic & spreads therefore by the air; for even prisoners are usually allowed to indulge in a free supply of air; and one can scarcely see how, if the fresh external air be contaminated with the influenza miasm, it can be purified of the latter by its passage within the walls of a prison. In numerous instances indeed, prisoners escaped the scourge entirely; even though it were raging violently in the immediate vicinity.

The same thing has been observed to hold true in the case of lunatic asylums, convents and similar institutions.

It has been frequently observed too, that whilst the inmates of one set of rooms may have suffered extensively from it, inmates existing under precisely similar conditions in a different part of the same building and with separate attendants, have escaped
the disease entirely. It may here be noted too, that careful inquiries have been made by Dr. Parsons as to the incidence of influenza on deep-sea fishermen and lighthouse keepers, (a set of men who have, for long periods, little or no communication with the general population); and he finds that they have very often escaped the disease entirely, & suffered on the whole in much smaller proportion than the rest of the population, but that if infection was carried to them, they just took the disease as readily as anyone else (Loc. Gov. 3d Rep. pp. 94-95).

3. Isolated cases precede an epidemic. The truth of this statement cannot be denied; it holds true of both the primary and secondary waves. Those who uphold the theory that the disease spreads mainly by contagion, attach considerable importance to this fact; for they allege that such isolated cases serve as so many separate foci, giving off the influenza virus, until ultimately they cause it to become epidemic. In very numerous
instances, this seems to hold perfectly true; a few isolated cases appear in a district, and in the course of perhaps a fortnight, a widespread epidemic appears, as though produced by the contagious virus exhaled by such isolated cases. But not infrequently as before pointed out, such scattered cases may occur among a susceptible community, giving abundant opportunities for contagion occurring, yet they may die out without causing an epidemic. It has been suggested by Dr. Parsons (Loc. Gov. Bull. Report pp. 100-101) "that a certain degree of concentration of the influenza poison is necessary in order for it to take on an epidemic form." He compares it to a fire kindled in a pile of green wood; if the fire be small, it will die out; but if a large fire be made to burn, it will propagate itself through the green wood, first drying and then consuming it. If the wood be dry, a small flame once kindled will spread rapidly through the pile, consuming every pile; and to this we may compare the progress
of the influenza epidemic under circumstances favourable to its extension. What all these circumstances are, we do not know; but an important one appears to be the assemblage of a large number of persons together, especially in a confined space of air, as in travelling ships; under such circumstances the epidemic spreads very rapidly, and is soon over."

It must be confessed however, that such concentration does not by any means explain the primary question, why at one time, isolated cases tend to light up an epidemic, and at another to gradually die out. Scattered cases too, may fail to light up an epidemic in a thickly populated district, whilst they may rapidly light up an epidemic in a thinly populated rural district, where there are no large bodies of people collected together within a small air space. In fact we have still to fall back on an indefinite "something" which is favourable to the spread of the disease, but which has evaded all attempts at discovery.
6. People who are brought a good deal in contact with others, such as business men in towns, are usually among the first to suffer, and take the complaint in largest proportions; whilst, on the contrary, people who have very little communion with their fellows or who remain within doors, either suffer later, or very often entirely escape. This has been a very notable feature both of this and of some previous epidemics; and, so far as it goes, certainly seems to favour the contagious theory of spread.

y. It has been asserted that the disease has been carried in several instances by means of parcels, clothes, etc., but the testimony with regard to this point is as yet not by any means convincing; and much more reliable evidence will be required before such assertions should have any importance attached to them.

"The duration of contagiousness" of influenza is probably not less than 8–10 days; it certainly seems to continue into the period of convalescence.
In concluding the subject of the mode of spread of influenza—

"We may say that the disease does not spread faster than human intercourse can account for; that it spreads most rapidly along the great lines of such intercourse; that the disease is certainly contagious and spreads in this manner in very numerous instances (if not in all) when the epidemic is at its height; but that some abnormal condition either of the atmosphere, or, more probably of the ground, is a sine qua non for the occurrence of such an epidemic. It seems that in the absence of such special condition, the virus of influenza is quite powerless to produce its epidemic spread. And it certainly looks as though the ground were the more important factor of the two; for when the disease is epidemic in one district, and fails to become so in another & susceptible district close by, in spite of repeated chances, the state of the air can hardly vary so greatly in the two adjacent districts; so
that one is driven to the conclusion that the state of the ground must be a factor in determining whether the disease shall become epidemic or not, at a given time.

Symptoms and Course.

The leading features of an attack of influenza are somewhat as follows:—the patient suddenly experiences a feeling of chilliness, quickly followed by intense headache, great prostration of strength, and pains in the back and limbs. Nausea, or actual vomiting may occur at the commencement, and complete anorexia is usually present. These acute symptoms usually last for a period of about three days; and are followed by a stage of convalescence during which the leading features are extreme debility and loss of appetite, lasting in ordinary cases about 7-10 days. I shall now discuss more minutely the individual symptoms as met with in a large series of cases; though each one may not be present in every individual instance.
Period of Incubation.
This is certainly a short one, as determined from cases in which there has been only one single definite exposure to contagion, it is most often probably between two and three days. It may however, be considerably shorter or longer than these periods. In many instances the attack has been said to take place within a few hours of the primary exposure to contagion; and in one or two instances it has appeared to come on almost immediately after such exposure. On the other hand this period may be as long as seven days and some say even longer.

Period of Invasion.
The onset, as a rule is quite sudden, and in severe cases not at all unlike that of typhus fever. In a typical case, the patient suddenly experiences a feeling of chilliness, perhaps with alternating flushes of heat. The chilliness is generally most marked along the spine and may be in the form of an actual shivering in that region. In some cases it amounts to an actual and general rigor. The general symptoms now
swiftly overtake the sufferer.

"Headache" may commence at the same
time as the shivering, or follow closely
upon it. This symptom is almost always
present; it is certainly far more
constant in its occurrence, than is any
other of the more pronounced symptoms.
Dr. H. C. Bristow, in a series of cases
found it present in over 98 per cent
(Brit. Med. Journal, Feb 22, 1890). It generally
begins with a dull aching at the back
of the eyeballs and in the region of the
frontal sinuses, gets gradually worse &
spreads over the greater part of the head,
though still remaining most intense
over the frontal region. In many cases
this headache is the most prominent
subject of complaint, and it causes
the patient the most intense suffering.
If unrelied by drugs, it usually
tasts till about the third day.
The eyes, in addition to being painful,
are in a great number of cases, distinctly
tender to touch. There is often a certain
degree of suffusion of the conjunctiva
and swelling of the eyelids in the early
stage of the disorder; & Dr. Boggel Stone
has pointed out that capillary congestion of the conjunctiva is the most constant objective symptom presented by the disease, and that it is also the primary one (Loc. Gov. Bk. Report pp. 62). At this stage the patient is apt to present a rather apathetic appearance, and will not uncommonly express himself as being quite indifferent as to whether he will recover or not.

"Intense prostration" manifests itself almost from the very outset. The rapidity of onset and intense character of this prostration, certainly constitute one of the most characteristic features of the disease. It is one of the first symptoms to appear, and it still lingers after all the others have subsided. It seems to involve the whole body and patient will hardly ever omit to mention it very prominently. It is particularly apt to persist in people who are already debilitated, and in those who neglect to put themselves under medical treatment during the first few days. It is, on the whole, too, more persistent in women than in men, but especially
in women advanced in pregnancy.

"Pain in the back" is also an almost universal complaint, being almost as often present as headache; but not infrequently quite as severe. It is generally more especially severe in the lumbar region of the spine, but in many instances extends along nearly its whole length. In many instances, too, the spine is distinctly tender to the touch. The pain usually comes on early, about the same time as headache, and it is apt to persist after most of the other acute symptoms have disappeared.

"Pain in the limbs" is very often present and is usually not quite so severe as the pain in the back. Most frequently it is situated in the muscles, but it is sometimes more severe in the joints. The disease is then apt to simulate rheumatism; but it is decidedly exceptional for the joints to swell, though this does occur in rare cases of influenza, especially in the knee. And even if a joint does swell, it does not become red. The pains in the limbs are usually better in two or three days, but swelling
of a point, when it occurs, is apt to persist for a week or two.

Pain in the chest is also frequently present, especially in children. Often it is indicative of some pleuritic trouble, but more often it is situated in the muscles of the chest wall.

"State of the tongue." During the secondary waves of the disease, this has not been at all constant in its appearance; but in the primary wave, its condition was so uniform as to be almost pathognomonic of the affection. In the great majority of cases it was covered by a rather thin, greyish-white fur, of almost silvery aspect, applied very closely to the surface of the tongue, and appearing in fact to be part and parcel of it. This condition contrasts with what holds in such affections as typhoid or scarlet fever, in which the fur is much thicker and looks more of the nature of a foreign substance lying on it. As a rule too, the tongue in influenza was moist and flabby and apt to show indentations by the teeth at its edges. This condition of tongue usually persisted.
until convalescence was fairly established, when it began to clear from the tip & margins. In the secondary waves, however, its condition has varied a good deal. In a certain (though small) proportion of cases, it resembled the condition above described. Another condition, which was very common during the most recent wave, was a thicker strip of greyish or whitish fur, than that above mentioned, down each side of the tongue, as a rule, quite moist, with a brown strip of fur running down the middle of the tongue to a point at its tip. In many instances there was no fur whatever. Occasionally, and usually in very severe cases, the whole upper surface was uniformly coated with a brown fur, which, in many instances, was moist; more rarely, the tongue was quite dry & brown, resembling that in the so-called typhoid state. In the latter instances, sordes were apt to collect about the teeth.

"Extreme Anorexia" is almost invariably a prominent feature of the attack. It is present from the very outset of the malady, and is apt to persist
long after all the more acute symptoms have subsided. In very many cases, the patient absolutely deters the very sight of solid food, and is with difficulty induced to take a sufficient supply of nutritive liquid foods.

"Thirst," though very generally present during the acute stage, is not so marked as in many other febrile affections.

"Condition of the bowels." As a rule they are somewhat inactive, but not obstinately constipated, as an evacuation is usually easily obtained by the mildest purgatives, if they fail to act naturally.

"Condition of the pulse." This is not by any means constant, but on the whole it tends to be more rapid than normal, often about 80–90 per minute and its tension as a rule is decidedly weak. Not at all infrequently it is abnormally slow and weak through-out the whole attack. After the pyrexia has subsided, it very generally becomes subnormal in rapidity and the tension is generally weak during convalescence. Even during the acute stage, the pulse is not accelerated in proportion to the
rise of temperature, as very often, although
the latter may be over 102° the pulse is
only about 80 or 90 to the minute.
The slow, weak pulse so commonly
present during convalescence, is often
many weeks in returning to normal.
"The temperature."
As a rule it rises rapidly from the
commencement and reaches its maximum
within the first 24 hours. It usually
does not rise higher than about 101°-102°
in uncomplicated cases. About the second
or third day it falls, often rather
rapidly and becomes normal or even
subnormal. This sudden fall of temper-
ature is often determined by the occur-
rence of copious diaphoresis. Sometimes
the temperature is normal throughout
and occasionally even subnormal.
It would seem that the state of the
temperature does not give us any means
of gauging the severity of the attack,
for the temperature may be high in
otherwise mild cases; and often in
the most severe cases, it is subnormal
throughout. The temperature is therefore
of little value from a prognostic view.
Hyperpyrexia sometimes occurs in uncomplicated cases, but far more often it points significantly to the onset of complications, such as pneumonia meningitis. Not infrequently, however, it has reached 103° in the absence of such complications and cases are reported in which it reached 104° and 105° (Dr. Gibson in Brit. Med. Journal 1891 Vol I pp 1193).

"State of the skin."
In most cases diaphoresis marks the commencement of defervescence. In some cases, it is very profuse & thoroughly soaks the clothes; in others it is simply a comfortable moisture of the skin. With the commencement of sweating, the temperature falls rapidly & soon comes down to normal. The other symptoms are also relieved, though marked prostration still remains. This usually takes place about the second or third day.

"Labial herpes" is present in a considerable number of cases, especially of the cataphal variety of the disease.

"Occurrence of a rash."
In many cases of influenza the occurrence of a distinct rash is to be noted.
In my experience it was of more frequent occurrence during the primary than the secondary epidemic waves. The frequency of its occurrence has been put down at from 1 to 20 per cent of the cases, at the first named figure by Dr. Hawkins at St. Thomas' Hospital (Cancer Vol I, 1840, pp 191); and at the latter figure by Dr. Bristowe at the Bethlem Royal Hospital. The latter percentage—20 per cent—is certainly a very much larger percentage than one sees in general practice; and 1 per cent would be much nearer the mark.

As regards the character of the rash, it generally seems to be of a papular character, most often resembling that of scarlet fever; but the papules are larger in the case of influenza and of a more dusky hue. Its distribution is not by any means constant; sometimes it is confined to the neck and face, whilst in others it affects the arms, shoulders, and chest. In other cases the rash is of a patchy erythematous character, affecting especially the arms. In others again, it has been observed of an urticaria-like type.
Occasionally the occurrence of a purpuric rash has been noticed (Jamct Vol I 1890 p. 45, & Locke). Herpes zoster also is apt to occur as a complication and as a sequel. The rash generally appears in 24-36 hours after the commencement of symptoms; it usually disappears in 2-3 days. It is often of a very itching character, and apt to be followed by desquamation. "Rapid loss of body weight" generally occurs during the attack; very often a patient will lose a stone or more in the course of a week. No doubt this is partly explained by the extreme anorexia that accompanies the disease; but in addition to this it is evident that there must be very rapid tissue waste during the attack, far out of proportion to what is accounted for by the anorexia existing during the acute stage. At the same time the blood becomes rapidly deteriorated, and a condition of more or less pronounced anemia results.

"State of the Urine."

This exhibits nothing out of the ordinary for a febrile affection; that is to say,
it is scanty, high coloured and is very apt to deposit urates. Haematuria is said to be of occasional occurrence. "Symptoms of less frequent occurrence" are "Delirium" in a variable degree. It may simply be dependent on the severity of the headache, or be only of a slight character, being usually worse at night. In rare instances it is the most prominent feature of the attack, and in such cases results not from mere intensity of headache, but commencing meningitis. "Somnolence" is not at all an infrequent symptom of influenza, and in some cases it has been said to pass into actual coma. "Insomnia" on the other hand, is also apt to occur, and it often persists after the acute symptoms have subsided. "Convulsions". An attack is occasionally ushered in by a fit in young children. Paralysis, too, is said sometimes to occur in the acute stage. Noises in the head, subjective flashes of light, loss of taste, loss of smell, deafness & vertigo are all of occasional occurrence. Epistaxis is not unfrequently observed.
at the beginning of an attack.

"Sore throat" is very often present; most frequently, perhaps, it takes the shape of a mild tonsillitis; but not unusually there is also present a condition of general cataract of the pharynx. Enlargement of the glands at the angle of the lower jaw, not infrequently accompanies the sore throat especially in children.

"Nasal cataract and lacrymation" are present only in a minority of cases— in the variety of the disorder named "catarrhal". They occur at the commencement of the attack, and usually last only for a short time. They are in no way an essential part of an influenza attack, as the majority of patients never suffer in this manner at all.

"Occurrence of Haemorrhages."

Haemorrhages are apt to occur in many different situations, during an attack of influenza. The most common by far, is from the nose—Epistaxis—during the acute stage. More rarely such haemorrhage takes place from the gums, the external and middle ear,
the stomach and bowels, the womb 
and kidneys. Sometimes as before said, 
it occurs beneath the skin-purpura.

Duration of attack.
In the absence of complications, the 
stage of acute suffering is usually over 
in about three days; and in ordinary 
case the patient is well in about ten 
days or a fortnight from the commencement of the attack. Very often, however, convalescence is extremely tardy, 
debility, loss of appetite and great depression being especially marked 
and very obstinate, frequently taking 
three or four weeks to overcome. Not at all unusually patients remain 
in a debilitated state and destitute of 
their accustomed energy for many weeks 
and even months after the attack.

Rapidly fatal cases.
Instances have been reported in which 
the disease was rapidly fatal, within 
a few hours of the initial symptoms, 
simply it is said from the virulence of the influenza virus, probably attack-
ing a markedly susceptible subject. 
Cases of this kind must certainly be
very rare; and there is reason to believe
that in some cases alleged to be of
this description, death was really caused
by some of the more serious complications
such as meningitis.

Varieties of Influenza.
The symptoms vary a good deal in
different cases, even when occurring
in the same house and at the same
time. They may be grouped into three
chief varieties.

I. The Nervous Form.
This includes by far the greater pro-
portion of cases, and may be regarded
as the typical form of the disease.
Its leading symptoms are the intense
headache, pain in the back and limbs,
with great prostration as already described.

II. Catarrhal Form.
The distinguishing feature of this variety
is the occurrence of coughs and tendency
to catarrh of the respiratory tract.
This may involve the Schneiderian mem-
brane, conjunctivae, frontal sinuses,
Eustachian tubes, middle ear, naso-
pharynx, larynx, trachea, bronchi, or
pulmonary substance. It is not nearly
of such frequent occurrence as the nervous variety.

III. Gastric Form.

In this variety, gastro-intestinal symptoms are most prominent. Vomiting is usually a pronounced feature, and apt to be stubborn for 2-3 days. Intense pain, which usually radiates from the epigastrium all over the abdomen very often accompanies this variety.

Diarrhea also very frequently occurs, the evacuations being often of a watery character. Cramp of the muscles of the limbs is very apt to be associated with it. "Alarming Collapse" is apt to occur in this variety, and it is not uncommon for the patient to faint at the onset of abdominal pain and diarrhea. In such cases the temperature is apt to be subnormal, the surface cold, and the pulse scarcely perceptible; almost all the symptoms in fact, to which the term "shock" is applied.

Influenza in Children.

Children have suffered in much larger proportion in the epidemic wave of the present year than they did in the first
two waves. As a rule, they have the disease in a milder form than adults, though the temperature not unfrequently reaches 103°. A much larger proportion of them exhibit throat symptoms than is the case with adults. Very rarely the disease is ushered in with a fit; but most often it begins with vomiting, headache, prostration, and febrile phenomena. If in addition there be sore throat and swelling at the angles of the jaw, it is exceedingly difficult to distinguish it for 24 hours or so, from scarlet fever. Pain in the chest is a frequent subject of complaint, and in most cases no pleuritis can be detected to account for it. Cough very frequently accompanies the malady, and it is very apt to be complicated by bronchitis. As a rule they fall off rapidly in flesh, but recover more quickly than adults. Infants at the breast as before mentioned are exceedingly apt to take the complaint if the mother or nurse suffers from it. As a rule, though they have it rather severely, they recover. They are more apt to suffer in the gastric form, than
is the case with older children.

"Relapses."

These are of rather frequent occurrence, in the statistics compiled by Dr. Elkins and Robertson at Morningside Asylum, Edinburgh, (Brit. Med. Journal. 1890, Vol I p. 229) the number of relapses is put down at 9.2 per cent of the cases. In some cases it is said there has been a second relapse. The time at which a relapse occurs is most often between a week and a fortnight from the commencement. The possibility of some of these cases of alleged relapse being really due to re-infection must be borne in mind; for there is reason to believe that the period of immunity given by the first attack is in some cases exceedingly short.

"Question of Immunity."

The immunity produced by one attack against the occurrence of another, must certainly be only very slight or operative for only a very short time, for one saw a very large number of persons who were attacked by each of the three recent epidemic waves. One has seen instances too, where the same person has had
two distinct attacks of the malady, during one and the same epidemic wave; and these within a few weeks of each other and not of the nature of relapses.

Prognosis of Influenza.
In uncomplicated cases, this is almost always favourable as regards the immediate issue. It is decidedly more grave in persons over 55-60 years of age than in younger people; and next to old age, it is more fatal in early infancy.
It is very serious in people who already suffer from pulmonary affections of any kind, but especially asthma and bronchitis; in those who have any grave cardiac lesion; and in those who suffer from chronic exhausting disease, such as phthisis, diabetes.

The circumstance which probably conduces most of all to a fatal termination is neglect of the disease in its early stage, especially if the patient attempt to fight against the disease by going about his usual occupation. The onset of serious complications of important organs, such as pneumonia, adds most seriously
to the gravity of the case; and it is
the increased susceptibility to such
complications, under the conditions
above mentioned, that increases the
gravity of the prognosis. It stands to
reason, too, that such complications
are more fatal to a system that has
just been shattered by an acute attack
of influenza, than is the case when
such complication occurs as the prime
and sole malady.

Mortality.
It is quite impossible to form a correct
idea on this point from statistics on
the subject, such as the Registrar-General's
report. In innumerable instances, where
the primary cause of death is influenza,
it is put down as due to some of its
complications or sequelae, simply. On
the other hand, during the epidemic,
there is a tendency to make it the
scape-goat of almost all the illness
that may happen to be present at the
time; so that these statistics, quite
unreliable in my opinion, at the very
best, now become thoroughly vitiated.

The only way in which to get even an
approximate idea of it as a whole, seems to be to observe how much the death rate is increased above the average for the last few years, and it is easily seen that this method is liable to many fallacies. The most striking feature under such circumstances is the great rise in the number of deaths due to diseases of the respiratory organs, especially bronchitis and pneumonia, and to a less extent from diseases of the circulatory system and chronic wasting diseases, i.e. from the complications & sequelae of influenza. In the army it has been ascertained that the mortality during the first epidemic wave was 1.1 per thousand; but it must be remembered that this is a body of men who should be better able to resist such an attack, than a similar number of civil population taken indiscriminately without regard to age, and often placed under very unfavourable conditions for recovery. In the London hospitals for the same year, the proportion of deaths in those attacked by influenza was 1.6 per 1000. (Dr. Parsons loc. cit. Gov. Bd. Report pp. 114.)
Another element which should be kept in view in connection with this question is that there are numerous mild cases of the complaint which are entirely overlooked, so that the last-named statistics will be likely to err on the side of excess rather than otherwise.

"Proportion of population attacked."

The very best calculation of this question must of necessity be unreliable in the extreme, when one considers what a large proportion of cases are never diagnosed or never go under treatment. In statistics drawn from certain large establishments in London, during the primary epidemic wave, Dr. Parsons (loc. cit. vol. 3. p. 310) estimates that 2-5 per cent of the population are attacked; & this is probably as reliable an estimate as has been made for this country. In many continental towns, the proportion affected would appear to be very much larger than this; but allowance must be made for a little exaggeration which is always liable to creep in at such a time of panic. In the most recent wave, the proportion attacked would hardly be less than this.
Differential Diagnosis.

1. From catarh or ordinary cold.
   Early in the course of an epidemic case of influenza are very often put down simply to the patient having taken cold; an ordinary catarh. As a rule, however, the headache is much more severe, prostration is far more intense, and convalescence much more protracted in the case of influenza. The number of people attacked by the latter will also probably soon assist in settling any doubt.

2. Acute Rheumatism.
   For the first day or two influenza is liable to be mistaken for rheumatic fever, especially if it be a case in which pain in the joints is a marked feature. As a rule, however, the joints do not swell in influenza, except in rare instances, and in these they do not become red nor exhibit the shifting lihbits of acute rheuma-
   -tism. Perspiration is not so marked nor so continuous in influenza as in not the characteristic odour of rheumatism, whilst prostration is more intense in influenza. The occurrence of influenza in other mem-
   bers of the family or its epidemic prev-
lence, will also assist in solving the question as will the much shorter duration of influenza.

3. Typhus Fever.

Influenza is occasionally mistaken for typhus fever at the onset. I saw one well marked instance of this, where seven members of a family were attacked almost simultaneously with severe influenza early in the course of the second epidemic wave, and in which the medical attendant reported them all to the sanitary authorities as cases of typhus fever. The sudden onset, with pain in the head, drowsy aspect, and great prostration are all suggestive of typhus. But, on the other hand, the cardinal point of distinction is the absence of the characteristic typhus rash in influenza; by the time the rash should come out in typhus, the patient is getting well with influenza. Moreover, the cerebral symptoms do not become so pronounced, nor the fever so high in the case of influenza. The presence or absence of one or other disease in epidemic form will also help us.
4. Dengue.
A great deal of attention has been given to the differential diagnosis between influenza and dengue; and some authorities have maintained that they are one and the same disease. It will suffice here to say that dengue only occurs in hot countries and in the hot season, whilst influenza is not specially partial to any particular season, climate or country. As regards symptoms, in the case of dengue, the presence of a rash is the rule; in influenza it is decidedly exceptional. The pain in dengue seems more particularly confined to the joints, and the fever is higher than in influenza. There is no special tendency to respiratory complications in dengue.

5. Scarlet Fever.
This is the affection with which I have most often found a true difficulty in the diagnosis, and more especially in children. In children especially, we often meet with rather severe sore-throat and glandular swelling behind the angles of the lower jaw, in cases of influenza; and this at precisely the
same stage in the two disorders. In their mode of onset they are very
much alike, being characterized often by vomiting, sudden prostration and
febrile symptoms. The chief distinctions are (a) the characteristic rash of scarlet-
fever, and until this appears, or until the time in which it ought to appear
has been passed, it is best not to commit oneself in favour of either if
the other symptoms are compatible with those of scarlet-fever, but to pursue
an expectant plan for 24 hours or so. (b) As a rule the fever is very much
higher in the case of scarlet-fever. (c) The presence or absence of one or other
of the diseases in epidemic form in the locality must be considered, but not un-
frequently the two are coincident. (d) In cases of influenza with a rash re-
ssembling that of scarlet-fever, the papules are larger than those of scarlet-fever; they
are not so uniformly distributed, but are of a more patchy character and have a
more dusky hue.
6. Measles, small pox & other eruptive fevers have much the same distinctions
as held in scarlet fever; but whenever there is any doubt, it is best in these also, to wait until such time as under ordinary circumstances the characteristic eruption of these diseases ought to make its appearance.

Complications and Sequelae.

1. Of the nervous system.
   During the acute stage of the disease the symptoms referable to the nervous system are by far the most frequent and most severe of any; during and after recovery from the acute attack, sequelae affecting the nervous system are of very frequent occurrence indeed. It has been suggested by some authorities, that the disease should on this account be known not as Influenza but as "Nervous Fever." Although this nomenclature may be advantageous in bringing into special prominence the fact that the nervous system is specially apt to suffer from the effects of the disease, it does not express all that could be desired; and as regards its being an original mode
of regarding the disease, this is not by any means the case; for the markedly nervous character of the malady was noted by the late Dr. Graves during the epidemic of 1836-37, speaking of which he says "The poison of influenza acts on the nervous system in general, and on the pulmonary nerves in particular in such a way as to produce bronchial irritation and dyspnea to which bronchial congestion and inflammation are often superadded." (Dr. S. Thompson, Epidem. Influenza, pp. 328-329). It is probable that nervous phenomena have been even more marked in connection with the present epidemic than in previous ones. But whether this is to be put down to a less stable condition of the nervous system induced by the high pressure of modern civilized life (to which it seems fashionable to assign the cause of nervous disorders which cannot otherwise be satisfactorily explained), or whether it be due to a modification of the virus itself would seem difficult to determine. The virus of influenza has a profoundly depressing influence on the nervous system in general, and has a most marked tendency
to produce disease of this system, or to greatly aggravate preexisting disease, whether of brain, spinal cord, or nerves. It would appear to weaken, or for a time at all events, to annihilate the bonds (if one might use the expression) that normally hold in check any tendency to diseased action on the part of the nervous system that may be lurking in it; or which restrain already existing disease of that system from pursuing a more rapid course. It maybe that in this way influenza serves to revive an old complaint from which the patient had long been free. I recently saw a well marked instance of this sort. The patient, a man of 34 years of age, had suffered from true spasmodic asthma in his childhood and up to the time he was twenty years of age; but from that time until the epidemic wave of the present year, he had been completely free from the disorder. Immediately after an attack of influenza in March of the present year, his old malady was revived, or let loose, as it were, in a most severe form, and it proved fatal within ten days.
If the patient be already suffering from disease of the nervous system, the most usual effect of an attack of influenza is to cause it to advance more rapidly than it had hitherto been doing. Or it may, on the other hand, be the starting point of a nervous malady from which the patient had never previously suffered, e.g. epilepsy, insanity, and diabetes (if this be a nervous affection) have had their origin in this way. I have somewhere (I cannot remember by whom) seen influenza likened to a storm passing over the system, spending most of its violence on the nervous system and thus leaving it shattered, exhausted and it may be, maimed for ever. So far as the effects are concerned, the comparison seems to my mind not at all an unjust one; for in innumerable instances the nerve exhaustion left by it is of the most intense character, while only too often it is the starting point of nervous maladies which will handicap the sufferer for life.

1. Intense depression of spirits. This seems to be an almost invariable
characteristic during the acute stage; and even the strongest and most sanguine subjects become thoroughly down hearted at this period. Unfortunately too, but especially, I think, in those subjects who are the antithesis of the sanguine in normal health; this mental depression is exceedingly apt to persist for a considerable time after all the more acute symptoms of the disease have passed away. This depression is on the whole more intense in women than in men, and more especially in pregnant women, or women about the climacteric period. The most aggravated of all, that I have observed, have been in patients who have neglected to seek medical advice during the acute stage. (It certainly appears as though the administration of a little febrifuge medicine in the acute stage, has an undoubted effect in eliminating the virus and diminishing the subsequent depression.) Now it is a well known fact that a state of great mental depression is apt to be the starting point of very many disorders of the nervous system.
Hence one might be prepared to expect the appearance in its train of such disorders as melancholia, acute mania, hysteria and such like.

The great mass of these cases, even of the more exaggerated cases, of depression of spirits, sooner or later recover their normal elasticity of spirits; though in many instances this does not happen for several weeks or even months after the acute attack. The degree of depression does not always appear to be in proportion to the suffering in the acute stage. Considering this marked tendency of influenza to set up nerve depression and disease, it is somewhat remarkable that during the present epidemic, the disease seemed to attack in greater proportion the same, than the insane population of asylums, as shown by the statistics of Morningside Asylum.

It is perhaps more remarkable still that whilst many previously sane people, have, after an attack of influenza become confined lunatics, a certain number of insane patients improved whilst suffering under the disease, and some
completely recovered their faculties after it. Dr. Meta records an instance in which a man, aged thirty years, who had suffered from a violent form of mania for two years, became perfectly rational during an attack of the disease, and was discharged from the asylum in which he had previously been confined, for the time being, at all events, cured (Brit. med. journal 1890. Vol. I. pp. 1362).

There can be no doubt that this mental depression produced by influenza was the cause of the sudden rise in the number of suicides, which was observed to begin about the time of the first epidemic wave. It was estimated by Dr. Bertillon of Paris, that during and for some time subsequent to the primary epidemic wave, the number of suicides was increased by about 40 per cent.

"Melancholia" of the forms of insanity which are apt to follow influenza, melancholia is by far the most frequent, and this is only what one would anticipate when we bear in mind the intense depression caused by the malady. It seems to come on as a deepening
or intensification of this depression, very often in about a week or two after the acute attack. Dr. Clouston found in the Morningside Asylum, that whilst during ordinary periods, mania provides for more inmates of the asylum than melancholia; during 1890, i.e. during and for some time subsequent to the epidemic, cases of melancholia predominated. He attributed this to influenza having greatly lowered nerve tone.

As before said, it usually comes on within 2-3 weeks after the influenza attack. In many cases there is a strong suicidal tendency with it. The prognosis appears to be much more favourable than in melancholia from other causes, there being a larger percentage of recovery. In many instances it is not necessary to confine the patient within a lunatic asylum, as with the administration of nerve tonics, such as rauwolfia, combined with good feeding, they often recover quite readily at their homes in 2-3 weeks.

"Acute Mania" also frequently follows influenza, and may also come on during the acute stage of the malady. I saw...
an example of the latter description during the epidemic wave of 1890. The patient was a girl aged 14 years, and on the second day of a severe attack of influenza, the delirium of the latter developed into acute mania of a very wild and violent type. For several days she obstinately refused food in any shape and had to be fed by force; ultimately sank into a hypochond state and died about a fortnight after the initial symptoms. As a rule, however, the prognosis is more hopeful than it is in acute mania from ordinary causes, recovery being rather the rule than otherwise. "General paralysis of the insane" is rather a common sequel and is apt to develop very rapidly. In a case that I observed following the secondary epidemic wave, the patient, a woman of 58 years of age, became quite helpless in less than three months, and the sphincters paralysed. She died within nine months of the onset. Previous to the influenza attack she had shown no symptoms whatever pointing to the disease, and she was not, I believe, an alcoholic subject. The prognosis
of this affection appears to be very bad; much worse than in the other forms of insanity following influenza.

"Other varieties of insanity" have been met with as a sequel to influenza, but are not of so frequent occurrence as those above mentioned.

"Neuralgia." Knowing as we do, the great tendency neuralgia has to attack people when their nervous system is in a state of prostration from whatever cause, and thus to take the person at a disadvantage, it is no matter for surprise that it is exceedingly apt to occur as a sequel of influenza, seeing that the latter has so marked a tendency to cause profound nerve depression. It may affect almost any nerve, but it most frequently involves one of the branches of the fifth pair of cranial nerves. Neuralgias of the viscera are not of unfrequent occurrence, and it is probable that the original attacks which sometimes follow influenza, may in some instances be of this nature. The viscera supplied by the splanchnic plexus of nerves seem very apt to suffer in this respect.
I recently saw what I took to be a very aggravated case of the latter class. The patient, a woman of middle age, was attacked shortly after suffering from influenza with intense pain in the right hypochondriac region (paroxysmal in character), vomiting, and very obstinate but not quite complete, constipation. These symptoms lasted for several weeks and grew worse and the patient ultimately went into hospital, where a diagnosis of abdominal obstruction was made (probably of the nature of a constricting band). Abdominal section was performed, but neither a constricting band nor any other form of obstruction could be detected. After the operation however, all the patient's pain and her other symptoms were completely relieved.

Another region that is very apt indeed to be the seat of severe neuralgia is the lumbar region; the symptoms being often precisely similar to those of a severe case of lumbago, with very often pains shooting along the course of the sciatic nerve accompanying it.

Neuralgic pains of one or other of these
linds are very apt to persist for weeks and even months after the influenza attack. "Multiple Neuritis" has been recorded in several instances as following influenza (Lancet 1891. Vol I p. 100 and 103-4).

"Myelitis" is an occasional complication. I recently saw what I took to be a severe and fatal instance of it. The patient was a young man of 21 years of age, a coal-miner who had previously to the beginning of the present year enjoyed excellent health. Since January however, he had begun to lose flesh, to cough and have night-sweats. When I saw him for the first time on February 25th, these were his chief symptoms. On examination I found consolidation at the apex of both his lungs. Three days later he was seized with what appeared to me to be a severe attack of influenza, vomiting being especially severe, persistent, in addition to the ordinary symptoms. Three days after commencing influenza, i.e. on the third of March, he was seized suddenly in the night with intense pain in the back, and when I saw him the following morning, he
was completely paralysed in both legs. Retention of urine was present, breathing diaphragmatic only. Sensation in both legs and body was completely annulled. Broncho-pneumonia now rapidly supervened and the patient died on the sixth day after being attacked by influenza symptoms. There may be a question as to diagnosis in this case; it might be said of course that the influenza symptoms were merely part of the myelitis; the commencement of it in fact, and no doubt precisely similar symptoms might be present without any influenza, the case therefore be one of myelitis pure and simple. In favour of its influenzal origin however, it must be said that the initial symptoms were typical of it, and the disease was at the time very extensively prevalent in the particular district in which the patient resided. Then of course, the sudden onset of paralysis, with pain in the back might be said to indicate a haemorrhage into the spinal cord, or the myelitis might be a haemorrhagic one. I should think it very probable that the latter was the true
explanation of the case, I was unfortu-
nately unable to get a post-mortem on the case. 
"Spinal tenderness," according to Dr. Kerly 
Thorne (loc. cit. Vol. IV, p. 63, is present-
more or less in two-thirds of the cases 
of influenza. It is usually more marked 
in women than in men.
Sclerosis of the spinal cord, hysteria, 
aphasia, catalepsy, epilepsy, cerebral 
abless and diabetes are all apt to 
occur as sequelae to influenza.
Sleeplessness is a common result of it.
Drowsiness and even coma, on the 
other hand, are also liable to occur.
the former symptom quite frequently.
The significance of coma does not seem 
to be nearly so grave when appearing 
early in the acute stage, as it is 
later on, when it is apt to be an effect 
of meningitis.
"Meningitis" is a complication as a 
rule, of the acute stage and is one of which 
but very little mention is made in the 
history of previous epidemics. Its onset 
is marked by increased severity of head-
ache followed by drowsiness and coma. 
Quite a considerable number of cases
of this complication have been recorded during the present epidemic. It is of course a very grave complication and very apt to end fatally. "Tetanus" has been alleged to have complicated influenza, but must certainly be very rare, and some of the cases just down as tetanus, have doubtless been in reality cases of meningitis. A certain amount of stiffness and rigidity of the muscles of the neck and lower jaw is not at all an unfrequent occurrence in otherwise uncomplicated cases of influenza.

"Hyperesthesia & anesthesia" may also occur. "As regards the organs of special sense," optic neuritis & optic atrophy may follow. A peculiar form of keratitis has been ascribed to influenza, the most striking feature of which is often the great pain, which seems to be most readily relieved by salicylate of soda. It probably owes its origin to trophic changes of nervous origin (Julius Althaus).

"Loss of taste" is of exceedingly common occurrence both during and for some time after the acute attack.
Loss of the sense of smell may also occur. "Deafness" is a not at all uncommon complication, being doubtless often due simply to swelling of the Eustachian tube. But in addition, cataract is very apt to extend back from the Eustachian tube to the middle ear itself and set up "Otitis Media," which may be of a dry and comparatively harmless character, but often unfortunately it is purulent and ends in rupture of the tympanic membrane and a discharge of pus through the external ear. Such a condition is of course liable to all the dangers that may befall a similar condition resulting from other causes. Either one or both ears may be affected, and it is specially apt to occur in people who already have middle ear disease, though very often it attacks previously healthy ones. Ultimately they very often get well, but a little deafness may persist.

2. Respiratory System.

The complications of this system are by far the most important cause of the mortality that results from influenza.
Whether this be due to the altered nerve force produced by the virus in the pulmonic branches of the vagus, or whether it be due to a selective affinity on the part of the virus for the pulmonary and bronchial tissues (for it has been asserted that pneumonia is an essential part of influenza), or whether even it be due to either of these, has not as yet been definitely decided. The majority of cases of both bronchitis and pneumonia, complicating an attack of epidemic influenza, are not preceded by a catarrh of the higher part of the respiratory tract, and cannot therefore be due to the descent of such catarrh, as is the case in a non-epidemic form of catarrh of the respiratory tract, which is popularly and often, indeed, by medical men, designated by the term influenza. It seems to me that the evidence points very strongly to many of these cases being due, as pointed out by the late Dr. Graves, to an effect of the virus of influenza on the pulmonic branches of the vagus. The fact that
pulmonary affections are apt to supervene without any undue exposure whatever, during the course of the attack; that not infrequently the breathing is rapid far out of proportion to any pulmonary lesion that may be present to account for it; that a spasmodic and often, apparently utterly objectless cough is apt to be present; and that paralytic affections not unlike those following croup are apt to follow an attack of the disease, all seem indeed to point to this conclusion.

"Oedema of the larynx." A case of this sort is reported by Dr. Wolfenden (Brit. med. journal 1891 Vol I p. 541) as following influenza a week after the acute symptoms.

"Laryngitis" is a not infrequent complication of the acute symptoms.

"Paralytic affections of the laryngeal muscles" are said by Dr. Prosser James, to occasionally follow an attack of influenza and to be very similar to those occurring after croup (S. med. Feb 1892 p. 498). Haemorrhage from the mucous lining of the larynx may also occur.

Epistaxis and loss of smell have been referred to.
Bronchitis.

This is an exceedingly common complication, and is especially apt to occur if the patient has been previously subject to bronchitis, in elderly people or very young children; in those who are already handicapped by the existence of some organic disease, and especially in people who neglect to take sufficient care of the influenza attack. It generally comes on either during the existence of the acute symptoms of influenza, or early during convalescence. The exciting cause may be in the form of a chill, or it may come on without this, even if the patient take the greatest care. Its onset is usually very rapid, and is usually accompanied by pain behind the sternum and difficulty of breathing. A distressing cough also sets in, and though at first it is apt to be of a dry character, sooner or later, expectoration very often becomes copious, even more so than in ordinary bronchitis. This expectoration consists very often of greenish-yellow masses, which are apt to be very thick and tenacious. Rhonchi
are often not so numerous as might be expected, in proportion to the general severity of the symptoms and are frequently most abundant at the base posteriorly. It was pointed out by Dr. Graves, that the sputa of influenza were not as a rule, mixed with air bubbles (G. P. Thompson: Influenza p. 329) and this has been very often the case in the present epidemic but by no means invariably so.

"The cough" as a rule is of a very hacking and spasmodic character. In a certain proportion of cases it is of a most irritating and violent description, coming on, it may be almost every minute both day and night, and is very distressing to hear. In these last-mentioned cases, expectoration is as a rule, only very scanty or is even absent altogether. The physical signs in the chest, too, may be of a very trivial description; and yet I have seen the cough last as long as 3-4 weeks of this violent character. And this without any relief being given by the administration of most of the ordinary expectorant and sedative drugs that
one is in the habit of administering; and despite the fact that the patient was kept in bed in a warm room for the greater part of the time. It seems probable that such cases are dependent on some irritation of the pulmonary branches of the vasa, rather than on any definite pulmonary or bronchial lesion.

The severity of the bronchitis varies considerably in different cases; in some it is but slight, affecting perhaps only the trachea and larger bronchial tubes, but in others it is much more severe, involving perhaps the smaller tubes often, especially in young children, passing into the capillary form of bronchitis, which is so apt to be fatal. A much larger proportion of cases were complicated with bronchitis in the epidemic wave of 1891 than in that of 1890 possibly owing in part to the more severe character of the weather of 1891.

Pneumonia.

This is a very frequent, and of course, an exceedingly serious complication of influenza. The proportion of patients
who suffer from influenza, who are attacked by pneumonia, has been variously estimated; some placing it as high as 16 per cent; but this must certainly be too high a proportion if we bear in mind that many cases of influenza are slight and practically unnoticed. Still, the number of people who do so suffer, and very often fatally, is sufficiently large as to constitute pneumonia one of the most formidable of the very numerous complications of Epidemic Influenza.

It may occur in patients of any age; but it is specially apt to attack those at the two extremes in this respect; namely, the very old and the very young. It is very liable, too, to seize upon debilitated subjects, no matter what the cause; precisely those subjects in fact who have least reserve energy in their frames and who are therefore in a very poor condition to hold out against such an attack. It is apt to attack, above all others, those who neglect to treat the influenza attack, who fight against it, and attempt to go about their occupation as usual.
Like ordinary pneumonia, however, it may attack a strong and vigorous young adult, without any exposure to chill or other exciting cause; it frequently does so in the case of the very aged, the very young, and the debilitated. In many instances it can be directly traced to the patient getting a chill from going out too soon after having influenza, or even during the attack; but it not unfrequently overtakes people who take every care of the influenza attack, and who it may be have not yet left their bed or their room. Moreover, it is not the patients who suffer most severely from the influenza symptoms, who would appear most liable to develop pneumonia; for the latter frequently follows the most trivial attack of influenza; indeed, the influenza very often passes quite unnoticed, or only as a slight cold.

It has been asserted from time to time, that a certain degree of pneumonia, or of hypostatic congestion of the lungs is present in almost every case of influenza, in fact that it is an essential part—
of it, and that a dull patch in one or both lungs may almost always be found. No doubt, the pulmonary circulation, especially at the lower and back part of the lungs, is generally rather sluggish, owing doubtless, in large extent, to cardiac weakness induced by the influenza, but this is a totally different affair from a well developed patch of pneumonia, which is fortunately, as a matter of fact, not nearly of such frequent occurrence. "The symptoms" very much resemble those of ordinary acute pneumonia; but the physical signs are often not so well pronounced; the area of dulness being more limited, whilst tubular breathing and crepitation may not be quite so distinct. The onset is generally marked by a sudden rise of temperature, pain in the side, and difficulty of breathing, accompanied or soon followed by the physical signs just referred to. Prostration is more marked than in ordinary idiopathic pneumonia; the expectoration is perhaps, not quite so often of the characteristic rusty type as in the latter; whilst there is generally
far more bronchitic trouble accompanying it; it being in fact, often more of the nature of a broncho-pneumonia.
Cases of catarhal pneumonia are, according to statistics compiled by Dr Pepper, twice as frequent as eruprous (Daniel Vol I. 1890. p. 1248.) The same authority points out, that it most frequently involves the right lung, and that there is an unusually large proportion of apex cases, with predominance of cerebral symptoms; whilst the temperature for the first two days is unusually high even for pneumonia. He finds the mortality rate to be about 11.6 per cent, or only slightly in excess of that of ordinary pneumonia.
Hothnagel also points out that the pneumonia is most often of a catarhal type, and he regards it as merely a further development of the bronchiolitis associated with, and according to him belonging to influenza. He also asserts that when eruprous pneumonia follows influenza, it is decidedly due to secondary infection, for which the disturbance in the respiratory organs, had, as it were, paved the way.
The pneumonia in some cases appears to commence at the very onset of the influenza; but more often supervenes at a later stage of the acute attack or during the early part of convalescence. Pleurisy.

This is not at all unfrequently met with. In many cases, especially in children, it is but slight, only lasting whilst the acute symptoms of influenza are present; being in fact only simple cases of localised dry pleuritis. In other cases, effusion takes place, and this is apt to occur rather insidiously and to gradually again disable the patient after he has got better of the influenza itself. The latter, indeed, may have been mild, or only noticed as a trifling cold; but soon after it, the patient perhaps becomes weaker & shorter of breath, from accumulation of pleuritic fluid in one or both pleural sacs. Although as a rule, under appropriate treatment, the fluid is gradually absorbed, it is more liable, on the whole, to become purulent and form an empyema than is ordinary pleurisy with effusion.
"Haemoptysis" may occur as a complication during the acute stage of influenza, independent of the occurrence of phthisis. Phthisis Pulmonalis.

It is hardly to be wondered at that influenza is occasionally the starting point of this disease, when one considers how liable it is to set up nerve prostration and a want of recuperative power, very often combined with some degree of bronchial cataract. Dr. West at St. Bartholomew's Hospital, found that one fourth of all the cases of phthisis admitted there during 1890, attributed their illness to having suffered from influenza a few months before. In addition to this, it has been repeatedly observed that old standing cases have often been much aggravated by an attack of influenza, the phthisis subsequently pursuing a more rapid course, if the patient escaped having a fatal pulmonary complication during the influenza attack.

3. Circulatory System.

"Angina Pectoris" is certainly an occasional sequela of influenza, and of course, a very serious one; not only because of
the intense suffering which the attack causes whilst it lasts; but also because it may at any instant prove fatal. This was the case with the late Dr. Strange of Worcester, who died in an attack of angina, after having given a very graphic description of his sufferings in the first seizure, which followed an attack of influenza. Another case is recorded in which the patient suffered frequent attacks for three months after the influenza, and recovered under the influence of amyl nitrite and nerve tonics, (Dr. Saragorglades. Brit. Med. Journ. 1890. Vol. I. p. 42.) In all probability such attacks belong to the nervous or neuralgic form of angina, seeing that influenza is so apt to be the cause of nerve lesions, especially of the vagus. If such really be its nature, the indications for its treatment are to improve the state of the general health and especially by the administration of nerve tonics. During the actual attack nitrite of amyl may be administered. "Syncope and other forms of cardiac weakness." Hardly sufficient stress was, I think, been laid on the extreme
debility of cardiac action induced by influenza. This debility often manifests itself whilst the acute symptoms are present, in the form of a very weak and low tension pulse, which may be slower than normal, and irregular in character occasionally. Sometimes actual syncope occurs at this stage. One case came under my personal observation where this was the very first symptom. The patient, who was a middle-aged man, and an outdoor labourer, suddenly fainted, falling in the middle of the street. On recovering from this under the influence of stimulants, he rapidly developed the ordinary symptoms of influenza, from which he made a good recovery. It seems, however, to be more especially during convalescence that extreme and even fatal cardiac weakness is apt to declare itself. Four fatal cases of this description are mentioned by Dr. Wilks, as having come under his notice during and after the first epidemic wave (Lancet, Vol I. 1890, p. 984). I saw an instance of this class following the epidemic wave of 1890. The patient was
a woman of 63 years of age, who suffered from a severe attack of the disease with marked abdominal symptoms, purging having been especially violent for 24 hours. Convalescence was extremely tedious, on account of obstinate cardiac debility. No cardiac murmur could be detected, but the pulse was slower than normal (49 to the minute) and intermittent. She had never previous to the attack of influenza, suffered from cardiac symptoms, but now, on the slightest exertion she felt faint, giddy and short of breath. About three weeks after the attack of influenza, induced by the occurrence of an exceptionally warm day, she ventured out of doors (contrary to my instructions I may add) and had walked about three quarters of a mile, when in ascending a slight incline, she was suddenly overtaken by an attack of syncope & died almost immediately. No doubt the excessive heat of the sun, together with the little extra strain thrown on the heart in ascending the hill, were the last straw as it were, concerned in stopping the heart's action; but
at the same time, it seems to me that the influenza attack was the prime cause of the cardiac weakness therefore of its failure. The question that arises in connection with this weakness is—

(a) Is it due to simple weakness of the heart muscle, such as one sees after most febrile affections?
(b) Or is it due to some effect of the influenza virus on the vagus or sympathetic nerves, and thus weakening the nerve force of the heart?

No doubt there is a good deal to be said in favour of each of these views.

In favour of the first named it may be mentioned that weakness of the heart muscle, and often more or less consequent dilatation is of frequent occurrence after most of the ordinary acute specific fevers. In such cases, however, the condition as a rule very readily improves under the influence of rest and the administration of tonics, whilst that of influenza is certainly more enduring and far more apt to prove fatal. Judging from the generally depressed condition of the
muscular system induced by influenza, one cannot but admit, however, that there is bound to be a participation in this relaxed condition by the heart muscle itself.

In addition to this weakness of the cardiac muscle, it is highly probable that the organ is still further depressed through the influence of the influenza virus on the nervous system more especially on the vagus nerve. For we have ample evidence that the other important organs supplied by the vagus, are exceedingly apt to suffer severely either during or after the acute attack of influenza, (as witness the frequent occurrence of pneumonia, gastric catarrh). The late Dr. Strange recorded a very striking example of this liability of the great vis versa supplied by the vagus to be attacked by complications during the influenza attack, which lends support to this view.

The case was that of an elderly medical man, who first began to suffer during an attack of influenza with great weakness, irregularity, and slow action of the heart, lasting for some hours. This condition
quite disappeared under the influence of diffusible stimulants; but only to be followed by a violent, spasmodic and irritating cough, which lasted for several hours without intermission. On this condition disappearing, in a couple of days there supervened a violent gastric catarrh, which lasted for several days. The patient ultimately recovered. (Brit. med. journal 1890. Vol. II. P. 629.)

In this case, therefore, there seemed very strong evidence indeed, that the influenza poison strongly affected in turn, the cardiac, the pulmonary and the gastric branches of the vagus. Very rapid action of the heart (tachycardia), in some cases as rapid as 200 beats per minute; and abnormally slow action of it (bradycardia), are both of occasional occurrence as sequelae of influenza; and are both of them most strongly suggestive of some nerve lesion being concerned in the production of the cardiac debility. Cardiac complications seem more especially prone to occur in middle aged and elderly persons; and in consequence of this fact, it has been said by some authorities
that such sudden deaths as those above mentioned, were really due to old standing fatty heart. She would have expected, however, if such were the case, that the patient would have suffered from some cardiac symptoms, however ill-defined in character, for some time previous to the fatal seizure, which has not generally been the case. Even admitting that such cases had previously existing fatty heart, the result is still the same in the end, namely, the influenza attack precipitates the patient’s death by causing intense cardiac depression, and is thus the immediate cause of death.

"Pericarditis" is sometimes met with as a complication, but must be of rare occurrence. "Endocarditis" has not unfrequently been observed as a complication; but the symptoms do not as a rule appear to have been very acute or well marked & seem often to have passed off again in a short time; and it has been suggested that in many such cases, the endocarditis is of a very superficial character—analagous in fact to the occurrence of a rash externally.
Phlebitis.

This is a not uncommon sequel of influenza. During the present epidemic wave, I have seen two cases of it; in both instances, in women, in both affecting the left femoral vein, and in both of them, curiously enough, a relapse occurred, most probably I believe from their getting up too soon. The swelling of the leg was not nearly so marked as it is in cases of ordinary phlegmasia dolens, but pain was very severe. Both ultimately did well.

Phlebitis has also been recorded as attacking other veins, but it most often seems to single out the femoral, most often the left.

"Gangrene" has been recorded as coming on during an attack of influenza or probably owing to cardiac weakness, especially in already debilitated subjects (see recorded in Med. Press Journal 1590, Vol I, p. 437).


"Loss of taste" is of very common occurrence during the acute stage; occasionally it is reversed. These conditions will sometimes persist for weeks after the attack of influenza has subsided.

"Lues illitis" is an extremely common
complication of the influenza attack; and very often, especially in children, there is some enlargement of the glands behind the angles of the lower jaw. Neither of these conditions, as a rule, causes any serious trouble.

"Post-nasal catarrh" is apt to persist after an attack of influenza, and is apt to be a very troublesome sequel, sometimes not disappearing for several months.

"Vomiting" as before mentioned, is often one of the symptoms that usher in an attack of influenza. Occasionally it is rather intractable and may last for two or three days. Nausea too, is very frequently present at this stage.

"Gastric Catarrh" of variable severity is quite a common complication of influenza; and sometimes passes into "Actual Gastritis," but this is decidedly exceptional.

"Haematemesis" is of occasional occurrence.

"Dyspepsia" is apt to persist for some time after the influenza attack, and anorexia is often difficult to overcome.

"Diarrhea" is quite a common complication. It varies considerably in severity, some
cases being very mild whilst others are very severe and may develop into -
"Enteritis," with discharge of mucus,
shreds of mucous membrane, or blood.
There is apt to be much tympanites with it.
"Jaundice" has been of occasional occurrence
in the present epidemic, but not nearly
so frequent as it is recorded to have
been in some previous epidemics, notably
in that of 1847.
"Peritonitis has been recorded as occurring,
but is fortunately very rare.
5. Urinarian System.
This seems to be more fortunate than
any other system of the body in escaping
the incidence of the influenzal virus.
The explanation of this fact cannot be
that the virus, or its products, does not
come in contact with these organs;
for admitting it to be present in the
blood, as, indeed, we must do; it is
bound to come into very intimate
contact with the renal tissue, during
the process of excretion. And yet nephritis
is only very rarely met with as a result
of influenza. The only explanation that
seems possible for this circumstance is,
that the virus or its toxic product, has a selective affinity for certain tissues or organs, and that the kidneys are not especially susceptible to such poison. The urine during the acute stage is as a rule, scanty, high coloured, and very liable to deposits of urates, i.e. it is uric.

"Albumen" appears to be occasionally present as a passing condition. I was much impressed with the very large amount of albumen that may be present in this way, and yet completely disappear within 10-14 days after the attack of influenza has subsided, by an instance of it in the present epidemic wave.

"Haematuria" is said occasionally to occur.

"Pyelitis" has sometimes been noticed to follow. "Nephritis" resulting from influenza is certainly rare. (Cases recorded in Lancet, Vol I 1890 p. 1012 + Vol I. 1891 p. 1427). According to Dr. Pepper it is very apt to accompany pneumonia occurring as a complication of influenza. (Lancet, Vol I. 1890 p. 1248).

6. Reproductive System.

"Orchitis" is the most common complication in the male sex. It is most frequently unilateral and generally yields readily
to the usual treatment of such a condition. Sexual power is for a time impaired, or may even be temporarily quite annulled in many instances of influenza.

Effect on the female.

The effect of influenza on the menstrual flow is very frequently to precipitate it sooner than normal, and in many cases to produce some degree of menstruhagia. The latter is apt to persist too, for some months after the attack is over, in some instances. I have noticed that in several cases the periodicity of the flow has been disturbed after an attack; it being very apt to return every fortnight or three weeks, and if it be at the same time excessive, as it is apt to be, it still further intensifies the anemia caused by the influenza. In some cases, on the contrary, especially in weakly women, the flow may become quite suppressed for some months after the influenza, just as is apt to be the case after any other exhausting illness.

Effect on pregnant women.

But few reliable observations in regard to this subject have yet been published
in connection with the present epidemic. Personally, I have had to deal with a considerable number of such cases, and it seems to me that abortion is an exceedingly common result of an attack of influenza in pregnant women; or in the later months of pregnancy it occasionally gives rise to miscarriage. Such accidents are far more liable to occur if some other grave complication, such as pneumonia, has already seized the patient. Very often, however, they occur without any other complication whatever. As a rule too, they occur either during or directly after the acute stage of influenza. "Abortion" in these cases, i.e., I think most common of all between the second and third month. At this period especially the haemorrhage that accompanies abortion is often far more severe than when the latter is due to other causes. A larger proportion of them too require curettage subsequently or account of haemorrhage. Blood formation is for some time subsequently apt to be exceedingly slow, so that a condition of pronounced anemia is apt to persist for, it may be, several months.
Very possibly a relaxed condition of the uterine muscle induced by influenza may have a good deal to do with the admission of the haemorrhage, and with the liability to retention of membranes etc, but when one considers also the haemorrhage tendency frequently present in numerous other organs during an attack of influenza we must admit the possibility of some altered condition of the blood itself being concerned in the production of the haemorrhage at the time of the attack.

In the latter months of pregnancy, when premature labour occurs, this tendency to haemorrhage, though perhaps not quite so marked as it is in the cases of abortion, is certainly of more frequent occurrence than in ordinary labours. The labour, too, in such cases is very apt to be of a lingering character, as is also the case if natural labour takes place soon after an attack of influenza, the reason most probably being the relaxed state of the uterine and deficiency of nerve force resulting from the attack of influenza. The child in these last-mentioned cases, even if viable, is very
Morbid Anatomy.

The precise lesion, if there be, of uncomplicated cases of influenza, is probably still, as at the commencement of the present epidemic, an unsolved problem. Or, if it has been discovered, it has not, at all events, been generally agreed upon. Nevertheless, observations and suggestions which may prove to be of considerable value, have been made during the present epidemic. Amongst the more important of these are perhaps the surmises supported in part by observation, on the condition of the brain, and more especially of that part of it named the Medulla, of Dr. Julius Althaus; and the observations of Prof. For a on the condition of the spinal cord. With regard to past epidemics, the most important observations are probably those of Dr. Green, who, in a large number of P.M.'s in the epidemic of 1836-37, found the principal morbid appearances as follows:

"The bronchial mucosa was found in every case more or less congested and inflamed. The inflammation in most cases was found to occupy both the
apt to be stillborn, and in some such cases is apt to bear traces of some of the complications of influenza, e.g. I recently saw a well marked case of otitis media in such a still born child. "Even if born alive and well" the child is exceedingly apt to contract an attack of influenza within the first few days after its birth if the mother still has traces of the disorder, and in these cases it is much more apt to be fatal than in older children. If the child die from the disease in utero, it seems often to be retained there for a fortnight, and to undergo considerable decomposition before expiration. Women who have infants at the breast when they contract influenza, as a rule suffer very severely from the disease, and their milk is apt to leave them. The child is in these cases almost invariably attacked, and usually suffers severely in the gastric form of the malady, in addition to being very liable to be attacked by acute bronchitis. It is both for mother and child, to at once mean the latter, whether it has already become affected or not.
Effect on the birth rate.
Influenza must undoubtedly have a very marked effect in diminishing the birth rate (or at least the potential birth rate), partly by the very large number of abortions and miscarriages of which it is the cause, and partly by reducing the general vitality and tone of all who are attacked by it. In the latter manner, it is bound to diminish materially the number of conceptions both during and for some months subsequent to the epidemic. It has been ascertained that the number of births was very much less in France in 1890 than in 1889, probably in great part owing to this cause. When too, one considers the very large number of deaths of which influenza is directly or indirectly the cause, keeping in mind its pandemic character; and considers in connection with this, the enormous numbers in which the product of conception is destroyed in utero; the diminished conception rate; the increased death rate; the diminished birth rate; must have an enormous tendency to restrain the normal increase of population of the earth.
trachea and bronchial tubes of both lungs; in rarer cases it was confined to one lung. Frothy, sanguinolent mucus occupied the tubes, increasing in quantity in the smaller tubes. The lung substance in some cases was in the second or third stage of pneumonia, but more often not so. If the former were met with, it was generally in young subjects, the latter in elderly people. In the latter event, too, the lung tissue was of a darker tint than normal, and either did not crepitate at all, or only feebly when pressed with the fingers.

When a section was pressed, it presented a quantity of frothy blood-stained mucus as in the bronchial tubes. In some cases the lower and back part of the lungs were very dark coloured and very friable, easily breaking down under the pressure of the fingers, resembling very much a piece of gangrenous lung, except in the absence of fator. This was usually found in very old people.

'The blood' as a rule was found to be dark coloured and fluid. The appearances of the other viscera were not such as to
make them appear to have contributed to the fatal issue." (Dr. S. Thompson, 'Woolff,' 325-326.)

No doubt, in the great majority of cases in which death is caused by influenza, the appearances described by Dr. Green are to be met with; but when one remembers that an attack of influenza as a rule does not directly kill, but most often causes death indirectly by some complication on the part of the lungs, especially bronchitis and pneumonia, or a combination of the two, we must confess that the appearances just referred to are in all probability only secondary ones, and not the prime factor concerned in the causation of uncomplicated influenza symptoms. In order to account more satisfactorily for the latter, a somewhat elaborate theory has recently been propounded by Dr. Julius Althaus, which has been supported in part at least by post-mortem appearances. The more important features of this theory are as follows:

He points out that the symptoms and sequelae of influenza point to irritant poisoning of the nervous system, such poison being probably secreted by a pathogenic
bacillus. This poison he calls grippe-toxine; and he suggests that in the course of a day or two, an antidote, which he names anti-gripp-toxine is formed in the serum of the patient. He asserts that if enough of the latter is formed, the patient has a crisis and recovers. If, however, an insufficient quantity of this antidote is secreted to neutralise all the grippe-toxine, the course of the disease is protracted and there is only a pseudo-crisis, and complications and sequelae ensue.

He regards the grippe-toxine as having a selective affinity for certain centres in the Medulla, notably for—
(a) The thermodystic centre, concerned in regulating the loss of heat (and which includes the vaso-constrictor centre).

Irritation of the latter centre is the cause of rise of temperature and it also produces secondarily, congestion of other parts of the central nervous system and of its membranes. Excessive irri-

-tation of the vaso-constrictor centre is apt in some cases to produce in-

flammation even of various organs, e.g.
Meningitis (Fraser), cerebral Abscess (Bristowe), etc. In most cases of influenza, this does not go beyond the stage of congestion. Thus many cases of intense headache are probably due to congestion of cerebral membranes. Back ache and pain in the limbs are probably due to congestion of the cord & its membranes, and it may be of peripheral nerves induced in the same way.

(b) In the catarrhal form of influenza there is probably a special irritation of the nuclei of origin of the fifth pair of cranial nerves and of the vagus where they lie close together at the junction of the spinal cord and medulla. Artificial irritation, or by morbid growth, of these nerves, is apt to give rise to a similar train of symptoms to those occurring in the catarrhal type of the disease; those of the upper part of the respiratory tract being due to irritation of the fifth pair; those of the lower part, to the vagus. The whole extent of the respiratory tract that these nerves supply is implicated in influenza; hence the
concludes that the irritation (whether from congestion or inflammation) is high up, and probably therefore, where they are in close contact, namely at their nuclei of origin.

(c) The gastric or abdominal variety is also explained on the theory of irritation of the vomiting centre in the medulla.

Dr. Althaus likens influenza to syphilis, from the fact, as he says, of its having primary to often secondary symptoms of a milder character, and tertiary affections or sequellae of a more dangerous type. (S recept. Nov. 14th and 21st. 1891.)

Since making the above mentioned suggestions, he has adduced the following evidence in support of his theory. In twelve autopsies by Vaillard in the sanatorium hospital of Geneva, there was evidence of some cerebral lesion in all. One case had hyperaemia of the right side of the cerebellum, with haemorrhagic spots and softening of the medullary matter. Another had haemorrhage at the base of the brain, proceeding from an aneurysm of the basilar
artery (the increased tension caused by
the irritation of the grippe-toxine
having probably sufficed to rupture it).
In the remainder of the cases there were
evidences of inflammation of one or
other of the membranes of the brain,
in most of them with subarachnoid
edema (Lancet March 5, 1892 p. 55-56).
Another instance, reported by Dr. Mac
Donald of the Dorset Asylum
showed intense congestion, almost-
amounting to capillary haemorrhage, of
the medulla. In addition to this, the
pia mater was thickened and excessively
congested; there was an excess of
subarachnoid fluid, and a more or less
general cortical hyperaemia (Lancet March 5, 1892).

In regard to the spinal cord,
Prof. Foa of Turin found lesions here
in a patient who had suffered with
the usual symptoms of influenza and
died of bronchitis. The cord was intense-
ly hyperaemic, and on microscopic
examination showed haemorrhagic foci,
chiefly at the periphery of the posterior
columns. In the vicinity of the haemorrhages
the vessels were occluded, possibly by
micro-organisms. Degenerative changes were also present in places, the axis cylinders being very much swollen, and the nerve fibres degenerated in such foci. Examination of the brain was not permitted. (Brit. med. Journ. 1890. Vol. I. p. 1439.)

This theory of Dr. Althaus can at best, only be accepted as yet as a working hypothesis, whereas to explain that more pronounced symptoms of the disease, until it is either verified or the contrary by a much larger number of carefully conducted autopsies on patients dead of influenza than have yet been published. If one were to venture any criticism on it, it would be, that whilst admitting that there is unmistakable evidence of great irritation of certain centres in the medulla, one can scarcely see why all the other nervous phenomena should be considered as secondary ones dependent on such irritation of the medulla. To my mind it certainly seems more rational to look upon the influenza virus as attacking the central nervous system in general, rather than as singling out one particular spot of it.
This conclusion is certainly borne out by the extreme susceptibility during and for some time after influenza, for disease of very varied parts of the central nervous system to develop itself; and also by the extreme depression of the whole nervous system (as is exemplified by the blunting of all the mental faculties, and the extreme depression of spirits). Just as the rheumatic poison singles out the fibrous membranes as its principal seat of attack, and is much more deadly when it happens to attack the fibrous membrane around or within the heart, so the influenza virus singles out nerve tissue (probably especially nerve cells) as its seat of attack in general, but so far more deadly when it happens to settle with special severity on the centres in the medulla, because these are of such vital importance in the maintenance of organic life. It seems, too, a little premature for Dr. Althaus to have given names to both a poison and an antidote, when the latter at all events, has not as yet been proved to exist; and the nature
of the former is as yet quite unknown. It is comparison of influenza to syphilis can, I think, scarcely be considered a very happy one; for in syphilis the nervous affections come on very much later than in influenza, and are caused by well-marked organic changes. The nervous phenomena of influenza, on the other hand, come on as a rule, soon after the acute symptoms and are much more transitory in many instances; bearing a much closer resemblance to diphtheria in both respects than to syphilis. It has also been pointed out by Dr. Guthrie (Sancet: Dec. 19th 91), that influenza and diphtheria have each irritant and depressant properties; the latter in both diseases being especially liable to involve the heart, whilst skull motor paresis has been noticed after influenza as after diphtheria; and sensory and motor disturbances from neuritis are of not-unfrequent occurrence after both diseases. I may here briefly allude to a theory as to the manner in which the virus of influenza gains access to the system, which has been brought forward by
Dr. Benley Thorne. It attests it has been the general belief that this took place through the respiratory tract. Dr. Thorne has pointed out, that there is invariably present, early in the attack, capillary congestion of the conjunctiva; and this has led him to believe that the materiae morbi enters the system through the conjunctiva, in which structure it probably incubates its infecting blood, and thence passes through the tissues of the eyes and orbit nerves into the encephalon and spinal cord; that the overflow of tears carries the infection through the nasal duct into the nares, which may or may not pass into a state of acute cataract, according to the state of health in which they happen to be at the time; that from the nares infecting material passes into both esophagus and larynx, and that affections of the respiratory or gastro-intestinal systems may endue or not, according to whether they present the conditions which are favourable to the development of acute catastral affections.
Report p. 63). With respect to this question it should be noted that the short period of incubation of influenza is decided in favour of the virus entering by the respiratory passages in the first instance; whilst prophylaxis directed to the conjunctiva has little or no effect in warding off an attack.

Bacteriology of Influenza. So far as our present knowledge goes, we can as yet only presume that influenza has any bacteriology. Reasoning from analogy, however, the probability would appear very great, in fact it would seem almost certain, that some micro-organism is concerned in the causation of the disease. For in almost all acute specific diseases, it has been observed within recent years, that micro-organisms are concerned in their causation, and, as pointed out by Dr. Klein, the epidemic character and the infectiousness of influenza are most strongly suggestive of its microbic origin. Since the outbreak of the present epidemic, bacteriologists have been actively on
the took out for such a micro-organism, with the hope of being able to trace the disease home to it. There would appear to be no lack of micro-organisms in connection with the malady; for some half dozen or more eminent bacteriologists have detected such, as being constantly present in cases of influenza, but unfortunately they almost all seem to detect a different one; first one finding favour for a time, then another. At the present moment a bacillus first described by Pfeiffer of Berlin, seems to hold the field; how long it will do so, it would be difficult to foretell; but it certainly cannot at present be confidently asserted that influenza has been proved to be directly due to it. And in the absence of such direct proof it would be useless to here repeat his description of the bacillus. Other bacteriologists who have been prominent in the search for an influenza microbe are, Jolles, Weichselbaum, Klebs, Ribbert, Finkeler and Besser.
Treatment of Influenza.

I. Prophylaxis.

We know of no means which tend to prevent an outbreak of the epidemic, seeing that as yet we have been unable to ascertain its precise cause. It is exceedingly doubtful whether there is any practicable plan of preventing its spread through a given body of people living under ordinary conditions; and at present the best that can be said of prophylactic measures is that they can only be tolerated and only of effectual service in institutions, or with delicate subjects, where rigid isolation can be carried out. Possibly not always even then. Some of the more important suggestions for prophylaxis may here be stated—

“Wholesale revaccination” of the population has been recently recommended, on the ground that in the German army in which it was practised at the time of the first epidemic wave (it being compulsory at stated intervals), the number of men attacked by influenza was much less in proportion, than was the number
among the civil population; it being only 11 per cent in the army, as against 42 per cent in the general population. Moreover, it was said that they had the disease in a milder form. It seems to me that this comparative immunity of the army is capable of explanation on other grounds than those of prevaccination; for the army comprises the most vigorous portion of the population, and therefore precisely those whom one would expect to be able by their superior vitality to withstand the attack of the influenza virus; or if attacked, to shake it off more readily. Another of the grounds on which this plan has been advocated, was that in the first epidemic wave it was noticed that infants and very young children, suffered little if at all from the disease, because it was said, if their having been recently vaccinated. As before mentioned, however, such children have been very far from being exempt in the most recent epidemic wave; for young children were often attacked by the disease, and not unfrequently succumbed to capillary bronchitis.
"Bathing the conjunctiva of each eye daily with a germicide solution (such as thymol) has been advocated by Dr. Rexley Thomas, in accordance with his theory of the mode of entry of the virus into the system. In practice this has been found in numerous instances to fail in preventing an attack; the proposer himself having in fact suffered twice from the complaint in spite of this daily ablution. It is claimed, however, that the number of people attacked is less per cent. in those who adopt this precaution; but it must be remembered that people who will take the trouble involved in this precaution are probably very careful of themselves in other respects; for example, in not needlessly exposing themselves to patients who already suffer from the malady. The most that can be said for this plan is probably that such ablutions are not likely to do any harm, if they fail in preventing an attack. The only objection one can see to it is that it will be apt to get rather onerous when a patient person has to do it during three or four months,
for it may be, three years in succession.

"Inhalation of an antiseptic vapour" has been advocated, among others, by Dr. Cory of Bournemouth, who says it has been very successful in his hands. The particular prophylactic he recommends is composed of equal parts of pure carbolic acid and glycerine, and two or three drops are recommended to be dropped on the handkerchief in use, before leaving the bed-room each morning. Admitting, however, for the sake of argument, that the disease is certainly microbic, if one may judge from the behaviour of microbes which cause the ordinary epidemic infectious diseases, it is not at all likely that any antiseptic in strength which is harmless to the mucous membrane of the patient's air-passages, will be sufficiently strong either to kill the microbe or to render it inert. Eucalyptus is another of very popular agents that has been employed for the same purpose. With regard to this plan, as with that last described, probably the most that can be said is, that people
who adopt it are probably for the most part people who take great care of their general health, and also avoid contagion as carefully as possible; and in all probability, if they enjoy any immunity at all, such immunity is very likely referable to these causes, rather than to the inhalation.

"Isolation of patients" affected with the disease has been recommended by Dr. Sisley, to be carried out in the same way as in ordinary infectious diseases. No doubt, isolation of a patient as far as is possible at his own home, is a very proper course to pursue; but to attempt to rigidly isolate influenza patients in a fever hospital, in the same way as one does a scarlet fever patient, appears to me to be utterly impracticable. For the instances in which patients have the disease mildly, or at all events, who go about as usual I won't own to being ill (and there are the very people who are capable under ordinary circumstances of spreading an infectious disease most) are so very numerous, that isolation simply of patients
who happened to go under treatment would be utterly useless. At the first outbreak of the epidemic too, the only period at which isolation in hospital could possibly be practised, there were cases are apt to be particularly numerous. Moreover, as before mentioned, it has not been positively proved that contagion is the only method by which the disease spreads. Short of such rigid isolation, it is certainly well to insist on a patient remaining within doors for a week or ten days, and certainly for him not to frequent places of public resort, or houses where there is a susceptible body of people.

"Isolation of susceptible persons" who are debilitated and in whom the disease would be likely to have a serious and fatal result, and also of inmates of institutions, is quite practicable, and often in fact occurs quite accidentally; at all events to a sufficient extent for such debilitated subjects or inmates of institutions to escape the disease. For such people being usually either confined to bed, or at all events not permitted to go out of doors, are under
ordinary circumstances, brought but very little in contact with other people. This is probably in part, the explanation of why it is that inmates of institutions have escaped the disease entirely when there was a virulent epidemic in their immediate vicinity.

"Administration of preventive medicines" has recently been much recommended and very widely practised; including quinine & a list of other things. The most that can be said of these is, that as a rule, probably, they do no harm, if we except alcohol. In the case of moderate doses of quinine, by improving the general health in certain cases, it may occasionally, perhaps, enable the patient to withstand the attack of the influenza virus, or to ward off some of the complications. It may occasionally, too, have some effect in removing the morbid dread, & thus in nervous people, it may help to ward off an attack; so that in debilitated subjects or in nervous people, the administration of a little quinine need scarcely be discouraged.
II. Treatment of an attack.
The profession has been very much reviled during the course of the present epidemic for alleged ignorance as to the treatment of the malady. And yet as a matter of fact, the general mode of treatment is just as rational and quite as satisfactory as it is in any of the acute infectious fevers; for in none of them do we possess a true specific.

"Indications." Every patient who is attacked by influenza ought certainly to keep within doors; and in the great majority of cases, should at once take to bed and have a fire in his room; whilst the latter should be large and well ventilated; a stuffy room aggravates the symptoms and probably predisposes to pneumonia. Having in this way guarded as far as possible against the patient sustaining a chill, the next indications are to stimulate the emunctories, relieve the most distressing symptoms, and to sustain the patient's strength as much as possible.

In the first place, the condition of the bowels should be attended to; and one of
the milder purgatives administered, if constipation be present. In the next place, for the first three days or so, one of the ordinary febrifuge mixtures (such as one of Pot. Bism. 4th Ammon. Acet. 4 th. Iterim), should be regularly administered with the view of acting freely on the eminences and thus eliminating as much of the poison or of its products, as possible from the system, and of reducing the febrile symptoms. I believe that keeping the patient in bed and the administration of such febrifuge medicine, are by far the most important factors in the treatment of influenza; and this to be continued over 3-4 days at the least. The acute suffering under this treatment tends to subside in the natural order of things within this time, without the administration of drugs designed specially for that purpose, though no doubt, in severe cases, the latter form a very useful adjunct. Almost all the worst cases of influenza that I have seen, have been either people who have quite neglected to undergo any treatment whatever, or have attempted to
fight against the complaint and go about their occupation as usual; and in this way by inducing additional fatigue, lowering still further the force of the vital organs, of thus facilitating the onset of serious complications. Or else if subjected to treatment, they have been treated simply on the plan of relieving the urgent symptoms by such drugs as antipyrin. I have noticed this circumstance repeatedly. The administration of a little febrifuge medicine and keeping the emunctories in good working order has seemed to me to have the most marked effect in eliminating the influenza virus, or at all events in preventing it from setting down with severe, or it may be, deadly effect on some particular organ or system.

"To relieve symptoms.

In numerous instances, the pain in the head, and, it may be, in the back and limbs, is so urgent as to call for more speedy relief than is given by a febrifuge, and for this purpose we have a considerable variety of drugs at our disposal. Amongst these are included antipyrin,
antifebrin, phenacetin, salicyrin, bromides, quinine & salicylate of soda. Most of the vaunted cures of influenza are drugs of this description, and even some medical men have taken to administering one or other of them indiscriminately to the exclusion of all other drugs. Such a practice deserves to be utterly condemned, for these drugs should ever be regarded merely as adjuncts, that may be required to be administered only for a few hours, and whose effect requires very carefully watching, or otherwise they might cause serious depression. Other authorities advise the routine administration of stimulants instead of any of the above mentioned drugs, such as ammonia, camphor, alcohol. This is going to the other extreme, may do harm just as depressants may. A wise discretion must in fact be exercised in this as in any other disease or the results must be disastrous. It will be well perhaps to particularize the more important indications for each of these plans.
"For the headache" the administration of antifebrin or of antifebrin, in 5 gr. doses, often has the most rapid and salutary effect. These drugs however, must only be given where there is no marked cardiac depression, and their effect should always be narrowly watched and their administration stopped as soon as the headache is relieved. They are both contra-indicated if there be great cardiac debility or profound nervous depression. The same remarks will apply to salicyrin (a combination of salicin and antifebrin) which has recently been extolled in the treatment of influenza. "Phenacetin" in 5-10 gr. doses is certainly less objectionable as regards subsequent depression; and it often gives great relief to the headache and frequently to the muscular pains as well. "Bromides," but especially in the shape of a mixture of X - XV. m. of Hydrobromic Acid with a couple of grains of cinchre often relieves the headache rapidly, without causing cardiac or nerve depression. "Pains in the back and limbs," when they are the most distressing feature,
are often rapidly relieved by salicylate of soda given in X- XV gr. doses every 2-3 hours. Very often too, it at the same time relieves the headache. There also, symptoms of depression will have to be guarded against. "When depression is very marked," whether circulatory or nervous, but especially the former, the condition calls for the administration of stimulants in the first place, more especially ammonic, camphor and alcohol. In such instances the administration of such drugs as antipyrine is attended with considerable risk; and it is better to avoid them altogether, even though the pain be great, and to trust in such instances to the administration of stimulants and febrifuge drugs, to tide the patient over the critical period. "The pyrexia," as a general rule subsides quite readily in the course of a couple of days under this treatment; but in exceptional instances it may require the administration of drugs for this special purpose, such as quinine, anti-pyrine. In rare instances of such
Hyperpyrexia, even these have failed to lower the temperature; and in such cases the cold bath has been employed with the most marked benefit (cases reported by D. Gibbon. Brit. Med. Journal. Vol I 1891, p. 123). Cases demanding such extreme measures are fortunately exceedingly rare. In the gastric variety of the complaint, opium is of great value in easing pain and arresting diarrhea; such symptoms must in fact be treated simply on general principles, remembering only that there is often more tendency to depression and collapse perhaps, than when similar symptoms are produced by other causes; and therefore stimulation must be more free. The same holds true of the cataleptic variety of the disease and with regard to complications. They must be treated in fact on ordinary principles, remembering this tendency to adynamia, for which ammonia and bark are often of the greatest service. In these latter cases too, nourishment and the administration of alcohol are of the very first importance and should be very frequently given.
"Large doses of an alkalet have been strongly recommended by Dr. Eras of Narsaport (Lancet Dec. 19, 1897) in the treatment of influenza, with the object of producing in the system the most effective antagonism to the multiplication of germs in the system. He administers it in the form of bicarbonate of potash, 30 gr. doses in milk every 2-3 hours, and has almost invariably found relief given after a couple of doses, and the patient comparatively well on the second day. Personally, I have not seen such rapidly salutary results either from Potas. Bicarb or other alkalets; and certainly the repetition of numerous doses of the former is open to the most serious objection, that there is already a great tendency to severe depression which such large doses of Pot. Bicarb are not calculated to improve.

III. "Administration of Nourishment."

Even in the old days of blood-letting it was almost universally agreed that influenza requires a sustaining plan of treatment; and it was almost universally admitted, that blood-letting.
far from improving the patient's prospects, as a rule, actually did harm. In the present day such a plan is never even thought of for an uncomplicated case, and is seldom practiced for the graver complications like meningitis, pneumonia &c. In fact all the indications point urgently to a very sustaining diet for the patient. - The very rapid loss of body weight; the adynamic tendency of the circulation; the fact that it is most fatal in people wanting in stamina, viz., the very young, the very old & the debilitated; that the temperature after the acute stage, is very apt to be subnormal; the tendency to the onset of complications, such as pneumonia, which so strongly tests the vital powers of the very strongest man, much more one who is already weak from an attack of influenza; and the prolonged period of nerve depression remaining after the acute symptoms have subsided.

The imperative indication is therefore the frequent administration of nutritious and easily assimilable food, whether in the form of milk (simple or pasteurized),
chicken broth, beef tea or other meat extract, the various forms of meat jelly &c.
If the depression be very marked, this indication is all the more possible, and the patient should be urged and coaxed by frequent changes of nutritious liquid foods, to take as large a supply as possible; for if left to the prompting of his own sensations in that respect, he would probably for several days take next to no nourishment at all.
In this way we may, if not actually helping to ward off the onset of serious complications, certainly improve the patient's chance of the vital powers being able to hold their own until the time when such complications have pursued their course & convalescence supervenes. When complications are present, these indications in regard to feeding are doubly imperative; careful nursing and feeding will give such a patient a far better chance than the administration of any drug in the pharmacopoeia. It has been pointed out by Dr. Sissley that the insomnia which is so apt to succeed influenza is due to
malnutrition, and should be treated by food, not by drugs. The patient should have at hand some form of easily assimilable food during the night. A little stout taken at bedtime is valuable in such cases.

"Alcohol" is quite unnecessary for most ordinary cases; but if cardiac failure threaten, or if complications with an adynamic tendency supervene, it must be administered in unstinted quantities and usually in the form of good spirits (brandy or whiskey) for preference. Very large doses may often be given with manifest advantage in such cases. Even in the worst cases, however, the administration of powerfully stimulating liquid foods should always have priority over alcohol; the latter is in fact only an adjunct to the former, though frequently an exceedingly serviceable one.

"Convalescence." Great care is required in numerous instances, as it is a period when the onset of sequelae is to be dreaded; it is a period too, when sudden death is very apt to ensue in cases with weak cardiac action. It stands to reason
therefore, that if there be anything in the patient's history pointing to a neurotic disposition, or if recovery from the acute symptoms be unusually tardy, a prolonged period of functional inactivity should be strictly enjoined. A course of nerve tonics is at this time especially serviceable, including such drugs as iron, strychnine, quinine & phosphorus, either separately or combined, as in the form of Epsom's syrup. It very often happens that patients allow the disease to drift through the acute stage without having advice, with the result that very often when one sees them in perhaps a fortnight after the initial symptoms, they are thoroughly broken down, low spirited, and destitute of energy. Under such circumstances I have been much impressed with the value of cinchona combined with ammonia. Under it, such cases often rally very rapidly & get quite well in a few days. During convalescence, too, a nourishing diet must be enjoined and a little wine or beer allowed. If there be no special cardiac weakness, it is very often of
the greatest service to send the patient to a health resort, for preference to the seaside for a few weeks.
In cases where extreme cardiac weakness is the most prominent feature, it is best to enjoin complete rest in the recumbent posture, and to administer stimulants and cardiac tonics on general principles.