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CONTENTS

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THE LESSONS OF THE PANDEMIC

THE pandemic which has just swept round the earth has been without precedent. There have been more deadly epidemics, but they have been more circumscribed; there have been epidemics almost as widespread, but they have been less deadly. Floods, famines, earthquakes and volcanic eruptions have all written their stories in terms of human destruction almost too terrible for comprehension, yet never before has there been a catastrophe at once so sudden, so devastating and so universal.

The most astonishing thing about the pandemic was the complete mystery which surrounded it. Nobody seemed to know what the disease was, where it came from or how to stop it. Anxious minds are inquiring to-day whether another wave of it will come again.

The fact is that although influenza is one of the oldest known of the epidemic diseases, it is the least understood. Science, which by patient and painstaking labor has done so much to drive other plagues to the point of extinction has thus far stood powerless before it. There is doubt about the causative agent and the predisposing and aggravating factors. There has been a good deal of theorizing about these matters, and some good research, but no common agreement has been reached with respect to them.

The measures which were introduced for the control of the pandemic were based upon the slenderest of theories. It was assumed that the influenza could be stopped by the employment of methods which it was assumed would stop the other respiratory diseases. This double assumption proved to be a weak reed to lean upon. The respiratory diseases as a class are not under control. They constitute the most frequent cause of death, yet it is not known how they can be prevented.

Three main factors stand in the way of pre-

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vention: First, public indifference. People do not appreciate the risks they run. The great complexity and range in severity of the respiratory infections confuse and hide the danger. The infections vary from the common cold to pneumonia. They are not all separate entities by any means. An attack which begins as a coryza or rhinitis may develop into a pharyngitis, tonsilitis, laryngitis, bronchitis or pneumonia. The gravity increases with the progress toward the lungs. The infection sometimes seems to begin in the chest, sometimes in the throat, sometimes in the head. It may stop where it started or pass through several phases. This is the story of the common cold. It is generally more discomforting than dangerous. Most people get well without skillful treatment, or indeed any great interference with business. No specific virus is known to produce it.

There is another group of diseases, a more unusual one, which is often at first confused with the foregoing. This includes the specific infections such as diphtheria, measles and scarlet fever. Influenza is in this class. The symptoms at the beginning may be identical with those of the common cold and the true nature of the disease escape notice until the patient shows unmistakable and alarming symptoms. By that time other persons may be infected.

The second factor which stands in the way of prevention is the personal character of the measures which must be employed. The enteric infections can be controlled by procedures of a general sort which impose no great restriction upon the conduct of the individual, but this is not true of the respiratory infections. The waste products of influenza containing the infective virus are not deposited in a vessel or sewerage system where they can be properly dealt with as in typhoid. The excreta of the nose and throat are projected into the air and allowed to pollute the hands, the food, the clothing and, in fact, the entire environment of the infected person. This is done unconsciously, invisibly, unsuspectingly. General methods directed against this kind of germ distribution must necessarily be of limited value.

It is an epidemiological point of great interest that the kind of preventive measures which must be taken in order to control the respiratory infections devolve upon the persons who are already infected, while those who are liable to contract the disease can do little to protect themselves. The burden is placed where it is not likely to be well carried. It does not lie in human nature for a man who thinks he has only a slight cold to shut himself up in rigid isolation as a means of protecting others on the bare chance that his cold may turn out to be a really dangerous infection.

Third, the highly infectious nature of the respiratory infections adds to the difficulty of their control. The period of incubation varies considerably; in some infections it may be as short as a day or two. And the disease may be transmissible before the patient himself is aware that he is attacked.

This list of the obstacles which stand in the way of controlling the respiratory diseases may fittingly be closed by remarking that healthy persons often carry about in their persons the germs of disease, thereby unconsciously acting as a continuing danger to themselves and a menace to others. It is not to be wondered at, therefore, that of all the things which were done to stop the spread of influenza, nothing seems to have had any material effect upon it.

This may all seem very discouraging but it need not depress anybody. The control of typhoid once seemed an impossible task. To rightly measure a difficulty is often the first step toward overcoming it.

What is said here of the influenza pandemic is put forward only as the writer's view at the present time. Nobody can now speak authoritatively upon this subject. When all the facts are brought together some of the ideas which are held to-day may be found to require modification. We are still too close to the event to fully measure it. Individual researches and the efforts of innumerable workers, must be reported and evaluated. The

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mass of statistical data which has accumulated in cities, towns, camps and hospitals must be assorted, tabulated and studied before it will be possible to speak with anything like finality as to the efficacy of the measures of control employed.

Until this is done, it will be impossible to give the number of persons attacked, their age, sex, condition and race, the complications and sequelæ of the disease, much less the relations which these facts bear to the preventive measures. This work is now engaging the attention of many experts. Public health officers, skillful workers in bacteriology and pathology and able clinicians who have had opportunity to study the disease intensively are making their reports. It will be months and perhaps years before the records of all the scientific study connected with the pandemic are brought to a conclusion.

A good deal may confidently be expected of the work which has been done from so many angles and in so many places. How far the mysteries which have obscured the true nature of influenza for so many years will be cleared up must be left for time to show.

No disease is more difficult to study than pandemic influenza. It comes, it spreads, it vanishes with unexampled suddenness. It possesses such terrific energy that little time is afforded during its visitations in which to study it in a careful and painstaking manner. Both its total absence and its great prevalence stand in the way of its study.

But, it will be asked, is influenza entirely absent in the intervals between epidemics? Opinion is divided on this point. Some hold that pandemic influenza is a separate infection. Others think it is always with us. It does not ordinarily manifest such a fatal aspect as that recently seen, but many of the symptoms of the usual epidemic and the extraordinary pandemic influenza are the same. Perhaps the recent pandemic is best explained on the assumption that a particularly virulent type of the common infection was to blame.

All attempts at excluding influenza from a community seem to have failed. There is one and only one way to absolutely prevent it and that is by establishing absolute isolation. It is necessary to shut off those who are capable of giving off the virus from those who are capable of being infected, or vice versa. This is a very difficult procedure. First, it is difficult because it is impossible to discover all the virus producers. Second, it is difficult because it is impossible to know who are and who are not immune. Complete isolation is not feasible for entire cities nor for parts of cities, nor for individuals in cities. It is feasible for some small towns and villages, and some have tried it with success. The fact that in many instances the attack has been merely postponed by no means invalidates the principle.

It is natural to suppose that a phenomenon of such general nature as the influenza pandemic has had an equally general cause and the only cause which most people can think of as general enough to give rise to a world pandemic is one which possesses an atmospheric or terrestrial character. This is a very old conception and one which has survived all others so far as the general public is concerned. In one of its forms it is known as Sydenham's theory of epidemic constitution. In spite of the repeated statement that this theory has been discredited, there are many well-informed persons who believe as Sydenham did that there are general conditions beyond our knowledge which help to cause disease to assume a different aspect and prevalence in some years and at some seasons than at others.

As late as the pandemic of 1889–90 it was thought by many that the cause of the influenza outbreak was in some way connected with world conditions and quite independent of human intercourse. To-day there are some who think that the extraordinarily cold winter of 1917–18 followed by the hot summer was largely responsible for the recent pandemic. Others believe that the great war precipitated the plague. Not a few think that the infection was spontaneously developed in many places at about the same time. The arguments which have been made in support of

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these suppositions are often ingenuous if not convincing. Unfortunately, they seldom stand the test of scientific analysis.

The weight of evidence now available indicates that the immediate cause of the great pandemic of 1918 was an infective virus which passed from person to person until it had spread all over the world. The method of spread is believed to have been the same as in other respiratory infections. The reasons for the belief that it was transmitted in this manner lies chiefly in the fact that the pandemic spread rapidly, and no more so, than people traveled from point to point.

Nobody so far has positively shown what the virus is, nor how it leaves or enters the body, nor at what period in the disease it may be transmitted to others. Some hold that the Pfeiffer bacillus is the causative agent, others believe that there is a filterable virus which acts independently or in conjunction with the Pfeiffer bacillus. Nearly all agree that the influenza and pneumonia were independent diseases and that the high fatality was due to a very remarkable reduction of resistance to the pneumonia brought about by the influenza. Being of the respiratory type, it is believed that the virus leaves the body by way of the nose and mouth. It is supposed to enter the body by way of the nose, mouth or eyes.

But, it may be asked, if the influenza and the Pfeiffer bacillus are always with us, why should the disease suddenly become so different from its ordinary type in respect to severity, infectivity and complications? Nobody has answered these questions.

There are various ways of replying to them. One is to assume that the infective poison was brought into civilized countries from some distant point where it originated. Another is to suppose that it developed locally. It is not possible to follow these theories through all their details here. The arguments are not convincing by any means. Certainly a complete explanation of the pandemic requires a demonstration of how the disease developed wherever that development took place.

The development of the disease was undoubtedly a complicated biological phenomenon. A virus was produced which was capable of overcoming the resistance of a large proportion of those who were exposed to it. Reductions in virulence are familiar occurrences in connection with infective poisons. Controlled attenuations have been at the foundation of a great deal of the best work in immunology since the time of Pasteur. Increases are less often observed, but it is a well established fact that a virus which has practically lost its pathogenic properties can be exalted to a high state of virulence by inoculating it into susceptible animals. The spontaneous recrudescences of virulent disease in epidemics which sometimes appear to have originated in mild epidemic infections suggest the same process.

Reasoning by analogy it would appear not unlikely that an influenza virus which existed somewhere, perhaps among persons who had become accustomed to it and had consequently gained a toleration to it, was introduced among others to whom it was a stranger and who were consequently particularly susceptible to it. This would naturally result in an outburst which might attain pandemic proportions.

The pandemic has shown among other things how widely and how quickly respiratory infections may travel. It has shown what an enormous interchange of germs takes place in the respiratory apparatus of those who live in cities and towns and villages. It is disquieting to find how readily and frequently the bacterial products of the sick gain entrance into the noses and mouths of other persons, but the facts must not be hidden if to acknowledge them will do any good.

The pandemic calls attention not only to the fact that there is an interchange of mouth germs wherever people meet, but it illustrates how frequently respiratory infections may occur to which little or no attention is given. Some people think that pandemics of colds occur from time to time which are almost as universal as was the recent influenza. Their pandemic character is not suspected because

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they are so mild. A pandemic of influenza swept over the United States five months before the fatal wave but it attracted notice only in a few places.

The frequent presence of epidemics of colds affords the groundwork upon which other respiratory diseases should be studied. It has been well said by Sir Arthur Newsholme, Medical Officer of Health to the Local Government Board of England, that until the common respiratory infections are studied and controlled, it will be impossible to understand and manage influenza. With this opinion the present writer heartily agrees. The way to study influenza is to study the common cold. The place to study the common cold is a village or other circumscribed environment. The time to study it is now.

The great lesson of the pandemic is to call attention to the prevalence of respiratory diseases in ordinary times, to the indifference with which they are ordinarily regarded and to our present inability to protect ourselves against them. They are not amenable to control through sanitary works as are typhoid, malaria and so many other diseases. They must be controlled by administrative procedures, and by the exercise of appropriate measures of self protection.

Will there be another visitation? Nobody can positively answer this question. Influenza commonly sweeps in more than one wave over a country. America experienced an unmistakable, but mild, wave before the great one of September and October and since then there have been local disturbances corresponding to fresh outbreaks in many places. In England a new and alarming prevalence has been reported. It would not be surprising if there should be another pandemic in the United States.

The steps which should be taken to suppress the disease if it breaks out afresh are such as seem best for the maintenance of general health and protection from respiratory infections as a class. If doubt arises as to the probable efficacy of measures which seem so lacking in specificity it must be remembered that it is better for the public morale to be doing something than nothing and the general health will not suffer for the additional care which is given it.

First as to the things which it is desirable not to do. It is not desirable to close theaters, churches and schools unless public opinion emphatically demands it. It is not desirable to make the general wearing of masks compulsory. Patients should not be masked except when traveling from one point to another —they need air. Suspects should wear masks until their cases are positively diagnosed. Influenza patients should be kept separate from other patients. A case of influenza should be dealt with as though it was as contagious as a case of small-pox: there is danger in the presence of the sick, in his eating utensils, in his clothes and in the air into which he coughs and sneezes, if indeed these respiratory symptoms are present. He is to be regarded as much more seriously ill than his visible symptoms perhaps indicate.

It is worth while to give more attention to the avoidance of unnecessary personal risks and to the promotion of better personal health. Books have been written on the subject. The writer's idea of the most essential things to remember are embodied in the following twelve condensed rules which were prepared in September, recommended by the Surgeon-General of the Army and published by order of the Secretary of War to be given all possible publicity:

1. Avoid needless crowding—influenza is a crowd disease.

2. Smother your coughs and sneezes—others do not want the germs which you would throw away.

3. Your nose, not your mouth was made to breathe through—get the habit.

4. Remember the three C's—a clean mouth, clean skin, and clean clothes.

5. Try to keep cool when you walk and warm when you ride and sleep.

6. Open the windows—always at home at night; at the office when practicable.

7. Food will win the war if you give it a chance—help by choosing and chewing your food well.

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8. Your fate may be in your own hands—wash your hands before eating.

9. Don't let the waste products of digestion accumulate—drink a glass or two of water on getting up.

10 Don't use a napkin, towel, spoon, fork, glass or cup which has been used by another person and not washed.

11. Avoid tight clothes, tight shoes, tight gloves—seek to make nature your ally not your prisoner.

12. When the air is pure breathe all of it you can—breathe deeply.

George A. Soper

Sanitary Corps,
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THE FREAS SYSTEM

Professor Thomas B. Freas, of the department of chemistry of Columbia University, has devised a scheme for the handling of apparatus and supplies that is not only novel and capable of indefinite expansion and adaptability to any chemical laboratory, but takes out of the hands of the instructional staff all handling of students' apparatus and chemicals.

The object of the Freas system is fourfold. First, to save the student's time by giving him all the chemicals and apparatus he needs at his bench, second, to insure pure and clean chemicals, third, to save of chemicals by giving the student just the amount needed, and doing away with the wasteful and sloppy side shelf reagents bottle, and fourth, to relieve the instructor of those details, and thus to enable him to devote his entire time to teaching and research.

Professor Freas has been too busy to publish an account of his scheme, and his extreme modesty prevents him undertaking the task, had he the time. As an interested outsider who has watched very closely how it works, at Columbia, I am perhaps better qualified than even he to speak of what seems to me the best scheme in America to handle this difficult problem. This scheme has been in operation in all divisions of chemistry at Columbia for the past seven years, and has given an ever increasing satisfaction to all concerned.

Many instructors spend most of their time handling supplies, although they are hired to teach, but they are not allowed to do so by the short-sighted and expensive policy of many institutions, which compel them to do work which a moderately paid employee could do just as well. One full professor of industrial chemistry of my acquaintance spends a greater part of his time supplying his students with chemicals, when an organized system could do it immensely better, leaving him free to devote his time to instruction.

In a modern chemical laboratory, and especially so in a large one, the problems are so numerous and so complex, that modern business methods require a sharp line to be drawn between the pedagogic and administrative affairs from those of up-keep maintenance, purchase, and handling of supplies. This eventually demands that the head of the department divest himself of all duties pertaining to the physical side of the laboratory, and turn that work over to the carefully selected and specially trained curator of supplies. If the administrative head has chosen wisely, he is not only relieved of an enormous burden, thus freeing himself for the instructional side of his profession, but the laboratory students and instructional staff gain by having this work done by an expert.

The success of the Freas system depends upon having some one man in the department, who is interested, selected to be the curator of supplies. He must have recognition, both in rank and salary, to attract a man of character, ability and training in laboratory needs. His time should be free for general guidance of others, by having several competent assistants, one in the office, one to handle chemicals and superintend the bottling, and one to handle all apparatus. In a small chemical department some of these divisions could be combined. The man or preferably a woman, in charge of the office, attends to all student accounts, keeps the books, takes dictation, and if the work is excessive has enough help to properly handle the work. The salary is about $75 to $100 a month, with two weeks' vacation, and one week sick leave during the year. This

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