



New and Interesting Facts from Science and Life



What Made the EPIDEMIC of Spanish INFLUENZA So DEADLY? How Abnormal WAR CONDITIONS Favored the SPREADING of MALADY

WHEN the recent pandemic of influenza swept the country and within the short space of a few weeks exacted so awesome a toll of disability and death it naturally aroused widespread scientific and popular interest and the outbreak, coming at so crucial a time in the great world war and characterized as it has been by the severity of the disease, its frequently rapid course and high mortality, called forth many questions in the minds of the public.

Foremost among these questions is: "What made this epidemic of gripe so deadly?" While scientists say that a complete and satisfactory answer cannot be forthcoming, yet a partial explanation is given in the Scientific American by Wade W. Oliver, professor of Bacteriology, Long Island College Hospital, Brooklyn.

"The term 'influenza,'" says Prof. Wade, "is Italian in origin and literally translated means 'influence.' It must be confessed that all of the influences governing the disease are not yet definitely known. The term 'la grippe' was introduced by the French in about 1712 and has become accepted as the popular name of the disease.

"The course of the disease is fairly constant. The incubation period, that is the time elapsing between the entrance of the causative germs into the

body and the appearance of the first symptoms, averages about three days. The onset is sudden, the patient, after infrequent, showing marked prostration within a few hours. There may be a history of a slight sore throat, a feeling of being out of sorts for a few days previous, but many patients give no such history, passing from an apparently well condition to a state of most profound prostration within two to four hours. Headache and pains in the back, limbs and joints are initial symptoms. Along with this go a feeling of chilliness, fever varying from 101 deg. F. to 104 deg. F., and prostration. This prostration is one of the characteristics of the disease and is probably due to a rapid overwhelming of the body by poisons, produced by the rapidly multiplying germs. In a typical case the reddened throat, sneezing and cough develop about three days after the onset of the disease. It is during this period of cough and sneezing that the disease probably is most contagious. If an individual develops the disease gradually subsides and within a week the patient begins to return to normal, although his cough frequently persists for several more weeks. Another week of rest is advisable before the patient returns to his regular work.

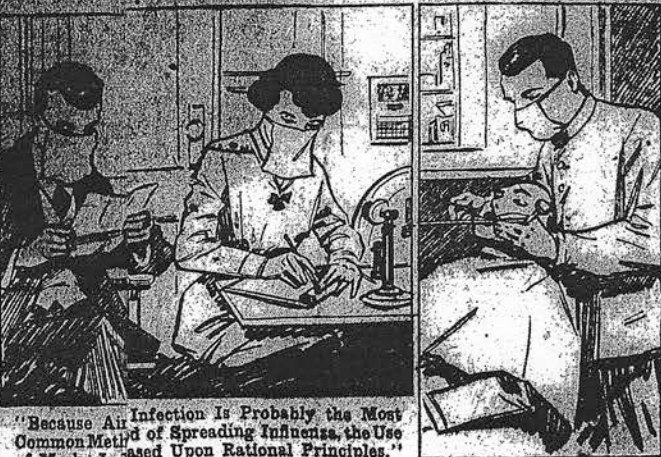
In some cases which develop complications not infrequently develop pneumonia, which causes the majority of the deaths.

Treatment, in so far as it lies within the hands of the layman, should be along two broad lines: (1) Prevention—to be attained by avoiding crowds, and also individuals affected with influenza. (2) Rest—go to bed immediately and call a doctor.

"The deaths resulting from the influenza epidemic have been largely due to complications, among which pneumonia has been the most common. The cycle of developments in a fatal case may briefly be given as follows:

"The influenza bacillus, a tiny germ averaging about 1-25,000 inch in length, discovered in 1893 by Pfeiffer, gains entrance to the throat of healthy individuals most often through the fine droplets expelled by an influenza patient during the act of sneezing, coughing or loud talking. These droplets are given the name of 'infectious droplets' because they contain, especially in the early stages of the disease, large numbers of the germs of 'grippe.' These germs, expelled into the air, may be breathed in by an individual in close proximity to the patient and thus passed via the aerial route from one person's body to another's. Because air infection is probably the most common method by which influenza is spread, the use of masks, often of gauze, to protect the nose and throat of healthy individuals is seen to be based upon rational principles.

"Along with the influenza bacillus are common-



"Because Air Infection Is Probably the Most Common Method of Spreading Influenza, the Use of Masks Is Based Upon Rational Principles."

ly associated to cause pneumonia. It is these latter two germs which have probably been responsible for the majority of the deaths in the influenza epidemic. Lodging upon the delicate mucous membranes of the throat they find there a soil rendered especially favorable for their growth and spread by the invasion of the influenza

bacillus. After effecting a lodgment, the stage is set for a deeper penetration of the germs into the lower respiratory tract with invasion of the lungs and setting up of pneumonia.

"The speed and universality of travel has been given as an explanation for the rapid spread of an epidemic. The reason why certain epidemics of a disease like influenza should be characterized by relatively mild symptoms, while other epidemics, such as the recent one, should be remarkable for the severity of its symptoms, is still obscure. However, certain factors may be considered to be relatively well established.

"Considering germ diseases broadly, we may look upon infection as a process in which disease-causing germs not only invade the human body, but multiply and carry on their life process within the body to the detriment of the latter. Infection, then, is the product of two factors: (1) The virulent, or invasive powers, or power of the germ to grow in the body and wreak injury, and (2) the resistance of the individual, that is the ability of the individual to prevent the germ from getting a foothold within his body. Accepting as our basis of argument, then, the ground that infection is determined by the outcome of a battle waged between two living opposing forces, the attacking germ and the invaded body, we find that there are many factors, some relatively well established and others but little understood, whose sum total determines the fortunes of the battle:

"(1) Resistance of the individual.

"Different races, and even individuals, differ in their powers of resistance to a given germ. Moreover, the resistance to disease of a given individual is apparently the result of the harmonious adjustment of a number of delicate factors, certain of which exhibit natural fluctuation and other of which may be modified by relatively simple procedures. Hunger, fatigue, a sudden change in the weather, may be sufficient to turn the scale and cause a normally resistant individual to become susceptible to an infection.

"(2) Virulence of the germ.

"Just as the resistance, or defending power, of the body, is not constant, but is always subject to natural or artificial change, so do we find that the virulence of bacteria, that is their power of invasion and of injury to the body, varies. Not only do we find certain kinds of germs which uniformly are more virulent than others, but we know that there are often different strains, or races, of the same kind of germs, which differ greatly in their ability to injure the body after they have gained entrance to it. Moreover, it has been determined that the virulence of many germs can be increased or decreased (exalted or lowered). Most germs lose in virulence when grown

outside of the body for a long time. Conversely, many germs gain in virulence when passed successively through the body of a susceptible animal. The streptococcus and pneumococcus, the germs which have been noted as being associated with the influenza bacillus, have been shown to gain in virulence when passed successively through the bodies of a series of white mice, an animal very susceptible to the germs.