

nation. Thus, we have an explanation for the rise in temperature due to nervous states.

DR. ABRAHAM JACOBI, New York: I have thought a good deal about what has been written on the subject of tonsils and I wish to say that in few cases is the tonsil at fault. Even large tonsils in a small child are not so dangerous as we are liable to be told. It is not the tonsil that is at fault, but the rest of the pharynx. All those small lymphoid bodies, so-called Waldeyer's nodes, and certain of the small bodies that surround the entrance between the nares and the throat are, as a rule, more frequently the cause of toxic symptoms and fever generally than the tonsils themselves. Meanwhile I have been teaching and practicing for fifty years and more that the nose must be kept clean. The common atomizer will not do it. You cannot clean the nose with an atomizer; you must irrigate the nose. It may be done by pouring in some warm water and salt; only caution against snuffing; that is dangerous. Bad results from nasal irrigation are the result, not of the irrigation but of snuffing, forcing the liquid into the ears. Patients should be warned about this. I have seen considerable ear disease from this cause.

DR. ST. GEORGE T. GRINNAN, Richmond, Va.: I want to ask Dr. Copeland if he has had any cases due to overexercise. I have seen cases where we could find no otitis, no tonsillitis, but the child had a temperature elevation for several months. It had gone through several hands, and very good hands, too. The only thing I could assign this to was overexercise. The child was extremely active. With instruction as to rest the child was entirely well in two weeks. In cases of what we call "obscure" rise of temperature, I really do not assume that either pyelitis or the ear can be called obscure any longer.

DR. J. L. MORSE, Boston: I want first to call attention to what seems a lack in our knowledge—that is as to the normal variation of temperature in the child. So far as I know, we have no series of experiments to show us how far the normal temperature may go in the child. Another thing in connection with obscure fever, we want to be sure the teeth are all right. Unfortunately, we have in the United States a large number of dentists who are one or two generations behind the times, who say that the first teeth should be left to take care of themselves. I feel it is the duty of this society to show these men up and, if it is possible, drive them out of business. The child may have infection from the teeth, even when they are filled. We cannot be sure they are normal without roentgenograms. Now and again will be found an abscess at the root of a tooth which will be the cause of all the trouble. Dr. Jacobi has touched on something I wished to say, that is, that children may have disease of the ethmoid cells and this may be the cause of the symptoms. Dr. Copeland did not say anything of infections of the urinary tract as a cause of fever. This is often the cause of persistent fever.

DR. C. G. KERLEY, New York: According to my observation a temperature under 100 F. may be considered normal. When the temperature ranges above 100 F. every day or for several days or weeks, I feel that the child needs close observation. In addition to examining the patient I put him to bed for three days. During this time the child is examined for the presence of occult pus, malaria, typhoid fever, pyelitis, etc. In not a few cases our clinical examinations are entirely negative and the rise in temperature which has been a daily occurrence has ceased entirely. This puts our cases among that class of children who readily develop a slight rise in temperature as a result of excessive play, overwork or excitement. The temperature during the time of the enforced quiet is taken three or four times a day.

DR. E. P. COPELAND, Washington, D. C.: I would first lay special emphasis on the fact that I did not mean to discuss all of the causes of obscure fever. It would be an interminable task. In certain types of children undue excitement, overexercise, may produce fever. Otitis media is one of the most difficult of causes to determine. I enjoyed Dr. Morse's remarks in respect to dentists. I have a great deal of trouble with them. Infections of the alimentary tract I will not allude to. I aimed to confine my remarks to cases that have given me trouble in the last year or so. The question of normal temperature is important. A reasonable variation has been allowed for in my cases.

THE RECENT EPIDEMIC OF GRIP

JOSEPH A. CAPPS, M.D.

AND

A. M. MOODY, M.D.

CHICAGO

Last winter an epidemic of grip swept over the United States. Accurate information concerning its prevalence is difficult to obtain, because in most communities the disease is not reportable. But judging from the public health reports and from personal correspondence with experienced physicians in many cities, it would seem that few of the large cities escaped. Meager reports from small towns indicate that they were no more fortunate in this respect than the cities.

Statistics which give an idea of the percentage of morbidity are meager. We have secured the written records of patients ill with grip from four hospitals in Chicago. Of a total of 677 persons investigated, 144, or 21 per cent., were confined to bed for one or more days. This does not include many who had colds of less severity.

The epidemic began early in December, and by the latter part of January had nearly spent its force.

Was the disease essentially different from the ordinary winter colds?

Most cases began rather abruptly with coryza, pharyngitis, laryngitis or bronchitis. The chief complications were inflammation of the accessory sinuses of the head, and bronchopneumonia, the latter being responsible for most of the fatalities. None of these symptoms taken alone would justify the distinctive name of grip. But the widespread and almost simultaneous onset of this fairly uniform symptom group and the rapid cessation of the epidemic after a few weeks reminded physicians generally of the great grip pandemic of 1889-1890. This resemblance was further strengthened by the unusual prostration lasting days or weeks after even mild attacks. The older practitioners can recall no similar epidemic during the twenty-five years intervening between 1890 and this year. The numerous epidemics of septic sore throat have all been entirely different in their symptomatology, and all were restricted to certain localities. The term "grip," therefore, seems justified from a clinical standpoint.

Leukocytosis.—We studied the leukocyte reaction in fifty-three cases.

In thirty cases there was a count of 10,000 or less. A number showed leukopenia. In sixteen cases there was a leukocytosis of from 10,000 to 15,000. In seven cases there was a leukocytosis of 15,000 or more. It is seen from these figures that in the majority of patients leukocytosis was absent, although a temperature of from 1 to 3 degrees above normal was the rule at the time of examination.

Pneumonia.—The public health reports offer evidence of an unusual prevalence of pneumonia in the larger cities. Nicolas¹ calls attention to the fact that the incidence of grip was greatest in those cities in which the mortality from pneumonia was most strikingly increased. According to Mathers, a large proportion of the pneumonia cases in Chicago were of the bronchial type, such as was known to have occurred so often as a complication in the great pandemic.

1. Nicolas: Bull. Dept. Health, New York, February, 1916.

BACTERIOLOGY

If physicians are generally agreed on the existence of a grip epidemic, it is equally true that bacteriologists have failed to agree on the causative organism.

An analysis of throat cultures taken from fifty cases clinically diagnosed as grip and sent to the New York City Health Department was reported by Williams² as follows: streptococcus, twenty-six cases; pneumococcus, nineteen; *Micrococcus catarrhalis*, eighteen; influenza bacillus, nine, with other less important organisms.

Moody³ examined a series of thirty-one cases of supposed grip at St. Luke's Hospital, Chicago. Cultures from the throat were grown on blood agar. All the cases showed *Streptococcus viridans* and pneumococcus, and all showed hemolytic streptococcus in variable numbers. The influenza bacillus was found only twice.

Mathers,⁴ in a similar group of twenty-four cases obtained cultures of hemolytic streptococcus in seventeen and *Streptococcus viridans* and pneumococci in all. No instance of influenza bacillus was recorded.

Reports received by correspondence from Philadelphia, Baltimore, Boston, Cincinnati and San Francisco state that the influenza bacillus was rarely found in throat or sputum cultures.

We may then infer, first, that the infection showed many organisms, the streptococcus and pneumococcus predominating; and secondly, that the influenza bacillus was not often identified. It has been suggested that the examination may have been made too late in the course of the disease to discover the influenza bacillus, which could be crowded out by the other bacteria. In a number of typical cases, however, in which cultures were made early in the disease by Moody, the results were the same as in older cases. From a cultural standpoint the streptococcus deserves more serious consideration as the causative organism than the influenza bacillus. The possibility of some ultra-microscopic germ being the cause of the disease is suggested by the investigations of Kruse⁵ and more recently by Foster,⁶ who was able by inoculation of filtrated nasal secretions to reproduce the symptoms of common cold.

Was the influenza bacillus responsible for earlier grip epidemics?

It is interesting that the two organisms most constantly described in the pandemic of grip of 1889-1890 were the streptococcus and pneumococcus. Not until 1892 during a recurrent epidemic did Pfeiffer⁷ publish his discovery of the influenza bacillus, and it is still unproved that this organism was a factor in the earlier and more extensive pandemic.

When we call to mind the marked tendency of the influenza bacillus to appear as a secondary infection in measles, whooping cough and other respiratory diseases (Davis), the rôle of this organism in grip may well be questioned.

Transmission of Grip.—The theory commonly accepted is that the disease is spread directly from one individual to another. Although Leichtenstern advocates this hypothesis, he calls attention to the fact that

in many large institutions, prisons and hospitals, the inmates were almost immune, while the disease was prevalent among attendants, employees and visitors. A similar relative immunity of patients has been commented on in two large hospitals in Chicago.

At present no evidence has been offered to implicate milk, water or food as mediums of infection, and the appearance of the disease over the whole country at nearly the same time renders such means of transmission very improbable.

Nicolas notes an outbreak of grip among horses in New York, characterized by a high mortality from pneumonia. A similar epidemic among horses at the Chicago Stock Yards was exhaustively studied last winter by Mathers. This investigation affords most interesting and valuable results. The nasal secretion at the very beginning of the disease yielded pure cultures of streptococcus. Death from bronchopneumonia was common. Cultures from the lung likewise showed almost pure growths of hemolytic streptococcus. Further investigation of the relationship of the strains of streptococcus obtained from equine and human influenza opens up the most promising opportunities of solving the problem.

MEANS OF PREVENTION

As we look back on this epidemic, we may well ask what we have done to prevent its inception and its dissemination. Have we profited from the knowledge of the last pandemic of grip, and have we developed any measures of defense against the ancient foe? Not in any adequate measure. Nor is it possible to make headway along preventive lines until we have a better understanding of the etiologic factors, the bacteriology not only of the throat, nasal and bronchial secretions, but also of the blood; the results of animal and human experimentation with cultures and filtrated secretions; the comprehensive study of clinical observations; the systematic collection of data on its prevalence in institutions, in towns and cities, and the further investigation of influenza of horses and other animals.

The Need of More Field Work.—We have plenty of research institutions, plenty of state and municipal laboratories, plenty of men capable of doing first class investigation. The trouble lies in bringing together the problem and the investigators. This year's experience illustrates the fact that epidemics cannot be properly studied in hospitals alone or from the material that is sent in to our health laboratories. Since the mountain will not come to Mahomet, Mahomet must go to the mountain. The laboratory workers must go out into the community and there obtain their material for study.

Furthermore, there should be a better organization of team work, so that a group of men can attack the problem simultaneously from several directions and correlate their efforts. To make such a campaign effective, it is of the utmost importance to attack the epidemic at the earliest possible moment, and for this purpose a plan of preparedness is necessary. We are aware of the splendid field work that has been done in recent years by the U. S. Public Health Service, a few research institutes and by certain progressive municipal health departments. Only by great extension of this type of field investigation can we hope finally to determine the cause and discover the means of prevention of the grip epidemics.

St. Luke's Hospital.

2. Williams: Bull. Dept. of Health, New York, February, 1916.

3. Moody, A. M., and Capps, J. A.: Notes on Grip Epidemic in Chicago, THE JOURNAL A. M. A., May 27, 1916, p. 1696.

4. Mathers, George: The Etiology of the Current Epidemic of Respiratory Infections in Chicago, THE JOURNAL A. M. A., Jan. 1, 1916, p. 30.

5. Kruse: München. med. Wchnschr., 1914, lxi, 1547.

6. Foster, G. B., Jr.: The Etiology of Common Colds, THE JOURNAL A. M. A., April 15, 1916, p. 1180.

7. Pfeiffer: Ztschr. f. Hyg., 1892, xiii.