INFLUENZA AND INDUSTRY

BY

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The following is a report of the influenza epidemic of December, 1936, and January, 1937, as it affected the employees of a large London works.

When in December, 1936, it was realized that influenza was assuming epidemic proportions among the employees of a large London works it was felt that a detailed inquiry might yield useful information. To this end records were kept and a questionnaire was submitted to all employees. The works in question seemed a very suitable ground for such an inquiry as it consists of a series of modern factories and offices. The working conditions are good, and in most ways the general conditions, from a hygienic standpoint, may be said to approach the ideal. There are between 6,000 and 7,000 workers of various ages and occupations, and both sexes are represented.

Objects of the Investigation

The investigation was made from two aspects: (1) general; (2) local.

(1) *General*.—To compile statistical evidence of the damage done to the health of wage-earners and of the derangement of industry due to epidemics of influenza; to determine the rate of incidence and the influence of sex, age, and occupation; to attempt to find out whether travel by public conveyance to and from work affected

FIG. 1

the incidence. Also it was hoped to be able to indicate whether or no these epidemics attack first of all the wage-earner, and secondly, his family at home; and whether the chief spread of the infection takes place at work.

(2) *Local*.—To provide the company with figures relating to incidence and loss of time, and to consider certain factors possibly connected with the duration of the illness. Finally, to review the effect of working conditions, and whether or not they influence incidence.

For the purpose of this inquiry influenza was considered to be of epidemic proportions from December 1, 1936, to January 31, 1937. The investigation was carried out by a combination of (a) personal observations

and records, (b) questionnaires. The latter were utilized in order to gather information which otherwise it would have been impossible to obtain. Questionnaires to the number of 6,374 were issued, all of which were completed and returned. Twenty of the forms had to be destroyed for various reasons. The remaining 6,354 were included in this inquiry, and were made up of question forms from 3,944 men and 2,410 women and girls.

The work performed by these people covers most trades and occupations, but classification may be made under five categories: (i) factory operatives, 2,103; (ii) clerical, 1,517; (iii) distribution, 1,157; (iv) engineers, 1,100; (v)

FIG. 2

transport, 477. The age distribution of the staff in ten-year periods, together with sex and numbers, is shown in Figs. 1 and 2. It will be noticed that the description "ten-year periods" in connexion with the age distribution charts is not strictly true, since the first group is of necessity 14-20. In each case the black lines in the charts indicate the number of employees whose ages fall between the figures immediately below and to either side of it.

Questionnaires

The questions asked of those employees who contracted influenza in December, 1936, or January, 1937, were:

1. Name
2. Age
3. Sex
4. Department
5. Married or single
6. Did you contract influenza in December, 1936, or January, 1937? (State which month)
7. How long were you ill? (Unable to attend work) ..
8. Did you have any complications?
9. Have you had influenza before?
10. How do you get to or from work? (Train, bus, tube, walk, etc.)
11. Were you the first of your family to contract influenza this time?

The questions asked of those employees who did not contract influenza in December, 1936, or January, 1937, were Nos. 1, 2, and 10 only. These were utilized for control purposes.

The chief results of the investigation are shown in the tables. The enormous damage done to the health of the wage-earners of the country by epidemics of influenza (if this study is representative of what happened in works all over the country, and it is believed that it is) is demonstrated by the fact that during two months 1,214

people out of a total number of 6,354—that is, 19.1 per cent.—contracted influenza. The combined total period of incapacity of these 1,214 sufferers was 12,882 days.

Table showing Results of the Investigation

	Men	Women	Total
1. Total number of employees	3,944	2,410	6,354
2. Number of employees who contracted influenza in two months	653	561	1,214
3. Total duration of illness (in days) ..	6,758	6,124	12,882
4. The average duration of illness (in days)	10.3	10.9	10.6
5. The average duration of the illness of 154 married women—when calculated separately (in days)	—	12	—
6. Incidence	16.5%	23.2%	19.1%
7. Cases that have had previous attacks ..	49%	42%	—
8. Cases that were the first or only ones in the family to contract influenza ..	74%	71%	—

Incidence

(A) *Sex in Relation to Incidence.*—Women and girls at these works had an incidence rate of 23.2 per cent., whilst for men the figure was 16.5 per cent. It appears that in this epidemic females were more susceptible than males.

(B) *Age in Relation to Incidence of Both Males and Females* (Fig. 3).—It was found that the highest incidence

FIG. 3

rate for both sexes was between the ages of 14 and 20 years. The percentages were calculated by comparing the number of persons of the same sex in the same age group who contracted influenza with the total number of employees of that sex in that particular age group. In the case of females an abrupt descent from a rate of 22.8 per cent. between the ages of 30 and 40 years to 15.4 per cent. between the ages of 40 and 50 is witnessed; thereafter the rate rises to 21.2 per cent. between the ages of 50 and 60 years. The 50-60 class of female represents only a small proportion of the total female sufferers, and the curve obtained possibly does not truly state the case, as deductions from small numbers are often misleading.

(C) *Incidence Rate as between Two Classes of Female Workers.*—This was investigated, and showed that 197 female members of the office staff out of a total of 902 (21.8 per cent.) and 237 female factory hands out of a total of 836 (28.3 per cent.) contracted influenza. This

somewhat unexpected result (since office workers are commonly said to contract this infection with greater facility than any other class) is possibly to be explained by such factors as poorer home and sleeping conditions of the factory girls. A further point of difference between these classes of worker is that nearly 50 per cent. of the factory girls are married, whilst the vast majority of the office workers are single. Married women factory hands have serious domestic and economic problems to contend with. Do these difficulties so lower the resistance of this class of employee that a higher incidence rate of infection results? The experience of the approved societies in relation to married women workers would appear to favour this suggestion.

The incidence rate in relation to four classes of male workers was investigated, with the following result:

	Case Rate
Engineers	15 per cent.
Out-of-door workers	15.9 " "
Office workers	17.7 " "
Factory hands	19.6 " "

It is often stated that out-of-door workers are less susceptible to influenza than indoor workers. The above figures support this belief, except those in the case of engineers. It should be mentioned that as a rule engineers are paid by the hour and get no sick pay, but in this instance about 50 per cent. of this class of worker do receive sick pay. The higher rate of the factory hands is possibly due to economic reasons combined with lesser knowledge of hygienic principles.

The average duration of the illness as between four classes of male workers was studied, with the following results:

	No. of Cases	
Engineers .. 165	9.9 days per person	
Office workers .. 66	10.1 " " "	
Factory workers .. 168	10.9 " " "	
Out-of-door workers.. 122	11.5 " " "	

This small analysis was made as an experiment, and it should only be surveyed as such, since much depends on such factors as age, gravity of the infection, and complications; but it was surprising to find that engineers again hold the premier position. With regard to the out-of-door workers, possibly a higher degree of physical fitness is required before returning to work than in the other classes.

Of the 653 males affected in this epidemic 49 per cent. stated that they had had previous attacks, and of the 561 women 42 per cent. had suffered from influenza before. Many of these people have had several attacks. It was found that in this study 74 per cent. of the males and 71 per cent. of the females who contracted influenza were the first or only ones of their respective families to contract the complaint. The suggestion is that it is the "wage-earners" who are the first to be infected, and that the chief place of spread is at the works or office. This idea is supported by the fact that it was repeatedly noticed during the course of the epidemic that in some departments or offices the great majority of cases occurred in December, 1936 (up to 90 per cent. of the infected), whilst in other departments or offices a similar thing happened in January, 1937.

Mode of Travel

It was found that of a total of 6,354 employees 4,345 travelled by public conveyance to and from work. The remaining 2,009 did not. Of the 4,345 users of public conveyances 860 (19.7 per cent.) contracted influenza. Of the 2,009 non-users of public conveyances 354 (17.6 per

cent.) contracted influenza. This result appears to show that very little, if any, spread of infection can be attributed to public conveyances. It is realized that those people who do not travel to and from work by this means may do so after working-hours for pleasure, but in that case the "rush hour" would be over and close contact not so likely. It is possible that the walkers or cyclists have slightly increased resistance.

Influenza is not a notifiable disease, and it is impossible to obtain reliable statistics as to its incidence. In times of epidemics certain catarrhal affections of the throat and bronchial tubes are undoubtedly called influenza when possibly they are not. It is difficult to say clinically where a feverish cold ends and influenza begins. It is reasonably certain, however, that the bulk of the cases under review were caused by the same virus. A very large number of the patients were seen and were sent off from work by the same medical officer. It is known that the epidemic was widespread throughout the country, and presuming that there are ten million people employed in industry to-day it would mean that something like two million wage-earners contracted the disease in two months—that is, if the incidence rate for industry as a whole was the same as that shown in this paper. Furthermore, the total amount of illness for all affected workers must have approached twenty million days. It is agreed that the later figures are pure conjecture, but it must be remembered that only about 25 per cent. of the population have been considered.

Conclusion and Summary

A study of certain aspects of an epidemic of influenza as it affected a number of industrial workers—that is, wage-earners—has been made.

It has been shown that in spite of modern premises, good food at well-arranged canteens, rest periods, and hygienic conditions generally, 1,214 workers out of 6,354 (19.1 per cent.) contracted influenza within a period of two months.

In this study the virus showed a predilection for females and for the young worker of both sexes. Also the factory worker of both sexes showed a higher incidence rate as compared with other classes of worker of the same sex.

The suggestion has been made that it is industrial workers who are the first to be attacked by epidemics of influenza, and that much of the spread takes place at work, and is due to unavoidable contact and not to poor hygienic conditions.

The relation of public conveyances, if any, to the spread of epidemic influenza has been discussed. The evidence produced shows no relation.

Statistics have been compiled showing incidence, duration of the illness and of previous attacks.

Arrangements are being made to hold the fourth International Leprosy Conference in Cairo, beginning on March 21, 1938. It is being organized by the International Leprosy Association, and will be the first international conference to be arranged by that body since its inauguration in 1931. Three previous conferences of this nature have been held—at Berlin in 1897, at Bergen in 1909, and at Strasbourg in 1923. The Egyptian Government is inviting all countries concerned to send official delegates. In addition to these and the members of the International Leprosy Association, doctors and others interested in the subject are invited to be present. Full information can be obtained from the secretary of the International Leprosy Association, 131, Baker Street, London, W.1.

A MALARIAL TREATMENT CENTRE THE UNIT AT HORTON MENTAL HOSPITAL

A report summarizing the results of observations made by Dr. W. D. Nicol, medical superintendent of Horton Hospital, during a recent visit to the nerve psychiatric clinic at Vienna, where the treatment by induced malaria of cases of general paralysis of the insane was established originally by Professor Wagner Jauregg, has been presented to the London County Council. Dr. Nicol also visited the Steinhof, a large mental hospital outside Vienna, the research department in neuro-histopathology at the Kaiser Wilhelm Institute at Munich, the nerve psychiatric clinic under the charge of Professor Kleist at Frankfurt, and the mental hospital at Düsseldorf under the administration of Professor Sioli, as well as the Bayer chemical factories at Leverkusen and the research laboratories at Elberfeld, between which and Horton Hospital there has been close co-operation for some years in the provision of opportunity for the use of anti-malarial drugs.

A Twofold Purpose

The Mental Hospitals Committee, in bringing forward to the Council Dr. Nicol's report, states that the special unit at Horton Hospital, established in 1925 in conjunction with the Ministry of Health as a centre for the treatment by induced malaria of cases of general paralysis of the insane, serves not only its immediate purpose but as a means for the study of malaria itself, a matter of great importance in view of the close and constant relations between this country and other parts of the Empire where malaria is endemic. The laboratory technique and the development of the entomological side of the work in breeding and infecting mosquitoes have been copied and reproduced in other centres in Europe. The clinic at Vienna has adopted the Horton laboratory technique of examining blood films; the plans of the insectarium in which mosquitoes are bred at Horton Hospital have been reproduced in Germany, Rumania, and Holland. The malaria research at Horton, which has been made possible only by team work on an organized scale, has attracted outside workers from all parts of the world. The medical care of cases by one of the medical officers, the charge of the laboratory under Mr. Shute and two laboratory assistants, the clerical aid given by the Ministry of Health, and the direction of the work by Colonel James have contributed to the establishment of a research centre on a sound scientific basis. Since Colonel James's recent retirement a liaison has been effected between Horton and the London School of Hygiene and Tropical Medicine, and recently a whole-time worker with a research fellowship from the Royal Society has started his studies at Horton. The arrangements which were under the direction of Colonel James have now been taken over by Professor J. G. Thomson of the School of Tropical Medicine.

Research in Neurosyphilis

Active treatment of general paralysis of the insane has gone on vigorously at Horton Hospital, but there has not until recently been opportunity there for the prosecution of research in general paralysis and in neurosyphilis to a degree comparable with the research in malaria. That deficiency has now been remedied, and a start has been made at Horton with the appointment of a whole-time research worker (Dr. E. L. Hutton) and a clerical assistant, who will help in the compilation of the records upon which successful investigation of large numbers of cases must depend. Facilities are needed, too, for dealing with cases of asymptomatic neurosyphilis; it would appear that there is a prospect of the successful application of malaria as a therapeutic means in preventive medicine. An inquiry is now being made into the incidence of syphilis in families of general paralytics. The report to the L.C.C. adds that some 800 cases have been treated at Horton