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The Health of Ferrous Foundry Workers

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Studies of the health of ferrous foundry workers have been made during the past two decades in many parts of the world (*1–30*). In most reports of such studies the dust hazard received major consideration. In spite of the many investigations and the recommendations made, the dust hazard still appears to be a real one. This was especially brought to our attention by health officials of three Midwestern States.

These officials observed that, in their respective jurisdictions, claims for silicosis among workers in the ferrous foundry industry were continuing in spite of apparent improvement of environmental conditions. They, therefore, requested that the Public Health Service investigate the matter. Following preliminary conferences with these officials and others concerned, it was agreed that the Public Health Service would, with the cooperation of the States, study the health status of the workers in the industry with special emphasis placed on certain diseases which might be caused by the occupation. It was further agreed that the study would be made in Illinois with the aid of the State Department of Public Health.

Review of the Literature

Some studies have been made of the general health of ferrous foundry workers, the most notable examples being those of Collis (*31*) and of Macklin and Middleton (*13*) in Great Britain; these give major emphasis to the lung diseases. Many other studies have been made of the pulmonary diseases in foundry workers. Although the previous reports served well the purpose for which they were intended, only for a limited number may comparisons for incidence of pulmonary fibrosis be made with the present report. Further, in some instances, license was used in reviewing and making interpretations from the published

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reports as to the occurrence of diffuse or nodular fibrosis. In general, however, it is felt that our interpretations were made without bias so that an approach to comparison with our data might be made. It was found that the incidence of diffuse fibrosis was reported as ranging from 3.3 to 22 percent, and nodular fibrosis from 0 to 17.5 percent. Conglomerate silicosis was observed only rarely. It is, of course, understood that not many cases of stage three silicosis would be found in such studies since they were made of persons who were working at the time of the examinations.

Objectives of the Study

The present investigation was undertaken to obtain information on the health status of ferrous foundry workers with special emphasis on the effects of the occupational environment, the ultimate objective being to find ways and means of improving that environment. For these reasons, the medical team assigned to the work obtained data on the health of the workers, and the engineering staff collected data on the environment. The correlation of the two sets of data, it was expected, would yield significant information.

Methods of Study

Selection of Foundries

Engineering studies were made in 18 foundries. Satisfactory medical data were collected for only 16, and these, therefore, will be discussed. The 16 foundries studied typified the industry medically, at least in Illinois. The selection of foundries was made after thorough review by the State Department of Public Health of all the ferrous foundries in the State. The final selection of the plants for study was based on an effort to obtain examples of different types of ferrous foundries, that is, small and large, mechanized and nonmechanized, gray iron and steel, and patently dirty or clean. In the 16 foundries discussed, the total employment was a little over 2,000, of which 1,937, all males, were studied.

Methods of Medical Examination

Medical histories, as well as occupational histories, were taken, and physical examinations were performed by the physicians. Chest roentgenograms were made on 14- x 17-inch films. Examination of the oral structures was done by dentists. Medical technicians did routine urine analyses, and checked for microscopic findings in the urines showing albumin. The technicians also obtained 10 cc. of venous blood, 5 cc. of which was used for the Kahn serological test for syphilis and the remaining 5 cc. added to a suitable anticoagulant.

Blood smears were made of fresh blood. Erythrocyte and leukocyte counts were done by standard methods and the hemoglobin estimation by the Haden-Hausser hemoglobinometer. The erythrocyte sedimentation rate was obtained by using Wintrobe tubes, the reading being taken at the end of 1 hour. Hematocrit determinations were done on the same blood samples, the blood being centrifuged for 30 minutes at 2,500 revolutions per minute. Vital capacity estimations were done with a water replacement type of spirometer, three tests being made for each worker, and the highest recorded as vital capacity.

Summary of Engineering Findings

The engineering phases of this investigation were made by using standard methods. Over 1,000 dust counts were made in the 18 foundries studied by the engineers. Free silica determinations were made for about 50 samples of airborne dust and for about 60 samples each of settled dust and the parent materials. Iron determinations of airborne dust were made for about 60 samples. A preliminary report of the engineering findings was presented at the 1949 annual meeting of the American Industrial Hygiene Association. Further study led to the following summarized data.

1. It was found that 90 percent and more of the airborne dust was 3 micra or less in particle size in all foundry environments.

2. The amount of free silica in the airborne dust varied with the operation and ranged from 13 percent at coremaking to 29 percent at pouring, shakeout, and sand conditioning. On the other hand, the free silica content in the settled dust was found to be uniformly 30 percent throughout the foundry.

3. The free silica in that portion of the airborne dust of less than 5 micra in size varied from 6 to 33 percent.

4. The percentage of iron in the airborne dusts was found to be low, ranging from 3 to 9 percent, for all operations except casting cleaning. For the latter, the proportion of iron was found to vary from 30 to 38 percent.

5. Operational dust levels at various foundry activities in general were found to be much lower than those reported in earlier investigations.

Results—General Characteristics

The median age of the foundrymen examined was 40.7 years—similar to that of other heavy industries we have studied. Although the present investigation limited its examination to males, women are employed in foundry industries and constitute about 5 percent of the production force. Thirty-one percent of the present study group were Negroes.

The hours of work per week generally averaged about 40. Since, of the foundrymen studied, 12.5 percent had been employed 30 years or more, 24.8 percent, 20 years or more, and 45.1 percent, 10 years or more, it is believed that we had an adequate sample from the point of view of years of exposure in the industry.

Questioning of the men about their occupations before coming into foundry work elicited the fact that approximately 4 percent came from trades where there might have been excessive dust in the occupation. This matter will be discussed further.

Consideration of each of the job classifications separately, in the correlations with the medical findings, would have resulted in such small numbers of workers as to make such correlation of doubtful value. For this reason, the job classes were grouped into larger segments. This classification has the further advantage that, essentially, the environmental conditions are relatively similar in at least the first four groups for the job classes. The six major occupational classes listed are coremakers, molders, cleaners and finishers, shakeout men, maintenance and supervisory employees, and laborers and others. Careful analysis was made of each history obtained and the principal occupation was determined. The present occupation, of course, was easily observed from those records. The principal occupation represents the particular broad occupation followed for the greatest number of years during work in foundries. There appeared to be a tendency for the present occupation to have less molders and cleaners and finishers, and more of the groups of maintenance and supervisory workers and of laborers. In further evaluating the relationship of present to principal occupation of the individual foundryman, it was found that, in general, in over 80 percent of instances the present and principal occupations were identical.

Medical Findings

In considering the medical observations made in this study, only those which in our opinion were of immediate consequence to the problem at hand will be discussed. The remaining data will be presented in separate communications.

Oral Findings

In the examination of the oral structures, attention was paid to conditions of the lips, oral mucosa, peridontal tissues, palate, velum, uvula, glands, tongue, and mandible, as well as the teeth. In general, conditions of the oral structures were found to be similar to other studies made by us in the past, except for the presence of attrition.

Attrition of the occlusal surfaces of the teeth, when compared with the incidence of this condition in similar groups of workers who were

not exposed to a hard gritty substance in the environmental air, was of greater frequency among the ferrous foundrymen. Further comparison made for this condition among the various occupational groups showed a direct relationship of the incidence of attrition to the dustiness of the environmental air. It appears, therefore, that ferrous foundrymen develop attrition of the teeth which is caused by the dustiness of the occupation.

Eye Studies

Tests for acuity of distant vision were made of 1,742 foundrymen by using the Keystone Telebinocular (*32*). All tests were done with the worker wearing the corrective spectacles he usually wore at his work. This served the purpose of testing the visual acuity which he had at his usual occupation.

Study of the distribution of the visual acuity findings, divided according to the dustiness of the industrial exposure and according to the presence in the workroom air of high-speed particles involved in the operation concerned, appeared to show no differences. In this evaluation no weight was given to the wearing of eye protective equipment, although it is recognized that such equipment when properly worn will appreciably lower the incidence of eye injuries.

To further test the possibility that the degree of dustiness of the occupation may have caused damage to the eyes, the incidence of certain eye symptoms and signs was correlated with the occupations of the foundrymen at the time of the examination. It was found that neither the symptom of photophobia nor the objective sign of conjunctival congestion was significantly related to any of the six major job categories in spite of the fact that the dustiness of these job categories varied.

Hernia

Inguinal hernia of one or both sides was diagnosed by observation and palpation of the scrotal sac, as well as of both inguinal canals, with the worker in the standing position. Such hernia either existed in the past or was found at the time of the examination in 11 percent of the workers. Considering the men having hernia from the point of view of their occupations, it was found that there were essentially no differences in incidence of the condition among the various occupational groups.

Inguinal hernia was found by the medical examination alone in 2.3 percent of the workers. In a large series of iron and steel workers recently reported, the incidence of hernia on examination was 4.3 percent (*33*). The differences in the findings of the two series of men may possibly have been due to the differences in the examiners and the criteria used in the two studies.

Skin

Interpretation of the dermatologic data from the medical records showed that 251 foundrymen had some type of skin disease at the time of the examination. Of these, the skin disease was most likely industrial in origin for 33, or 1.7 percent, of the total examined. These were distributed as follows: occupational contact dermatitis, 12 cases; heat rash, 18; and occupational acne, 3. These cases were distributed in a random manner through all the occupational groups.

In the course of the study, one of the plants had an outbreak of contact dermatitis, the cases of which are not included in the above summary. All occurred among coremakers and were shown by patch tests to be due probably to a phenol-formaldehyde resin which was being newly used as the sand binding material. With the institution of the customary protective measures, such as protective clothing, barrier creams, and personal cleanliness, new cases ceased to occur. It may be of interest to observe that, since the completion of the field studies of this investigation, other instances of dermatitis outbreaks among coremakers have come to the attention of the Public Health Service. In all cases, the further occurrence of disease was halted by the institution of protective measures.

Cardiovascular-Renal Disease

Blood Pressure

Blood pressure readings were made after a 5- to 10-minute rest period with the worker seated. With the data corrected for age, a positive association between elevated blood pressure of 100 mm. or more diastolic or 160 or more systolic was found for increasing degrees of pulmonary fibrosis. The reason for this is not apparent at this time.

The cardiac status in silicosis has been a controversial matter for many years (*34–46*). However, this has centered about right-sided cardiac hypertrophy due to advanced silicosis, that is, conglomerate silicosis. In the present study, only one case of this stage of the lung disease was observed, and, thus, it would not be expected that cardiac complications would be prominent.

In addition to the blood pressure records, the medical study included, in the single examination of each worker, the following for evaluation of the cardiac status: (1) the medical history; (2) medical examination including palpation and auscultation of the heart; (3) blood Kahn serological test for syphilis; and (4) the chest roentgenogram taken at 6-foot target distance. Diagnosis of heart disease, of course, requires other data such as an electrocardiogram as well as studies of the worker on more than one occasion. With the limitations imposed on us by these facts, each clinical record was reviewed and an

opinion recorded as to the probable presence or absence of heart disease and, if heart disease was suspected, a record was made of its etiological diagnosis according to the criteria of the New York Heart Association (*47*). It was found that the data were, in general, similar to the cardiac findings in other studies we have made in recent years.

Blood Studies

It appeared that the erythrocyte counts in the present study group were significantly lower than in a group of open-hearth steelworkers studied.[1] On the other hand, the total leukocyte counts of the foundrymen compared with those of the open-hearth steelworkers were not significantly different. The data indicated that the hemoglobin values for the foundrymen were significantly lower than those for the open-hearth steelworkers. Correlations of erythrocyte counts, leukocyte counts, and hemoglobin estimations, respectively, showed no association with occupation. Since lowered erythrocyte counts and hemoglobin estimations were found for the total foundry population studied and when compared with open-hearth steel men and specific occupations in the foundry did not account for the difference, it would appear that factors other than the industry were probably responsible for this situation. Thus, dietary or geographic differences between the two groups may have been responsible for the blood variations. Hematocrit levels and erythrocyte sedimentation rates for the total group showed no difference from other groups studied.

Vital Capacity

Estimation of pulmonary failure based on vital capacity is at best a doubtful procedure. However, since the use of the finer methods of measuring the pulmonary capacity and its various components was not feasible in this study, it was believed that vital capacity studies might be of some value. Compared with those of a recent study of a worker group in which no similar pulmonary dust hazard existed in the occupation, and correcting for age, no appreciable differences in vital capacity were observed.

Chest Roentgenograms

In evaluating the effect of dust on the lungs, the chest roentgenogram is of paramount importance. This is especially true in exposures to silica dust, as in the present study. Many investigations of the effects on the lungs of silica dust inhalation have amply documented the importance of the roentgenographic findings. It is not to be inferred, however, that correlative medical data such as medical history and physical examination as well as occupational history are

[1] Health of Workers Exposed to Sodium Fluoride at Open Hearth Furnaces. Division of Industrial Hygiene, Public Health Service, 1948, 64 pp.

to be disregarded. On the contrary, these data are of great significance, especially for differential diagnosis.

All films taken in this study were interpreted by each of two physicians working independently. Where difference of opinion of the interpretation existed, it was resolved by conference between the two interpreters. Assistance from experts in the field of pulmonary tuberculosis studies was obtained for reading of the films suspected of showing disease.

As in previous studies of the industrial pulmonary dust diseases made by the Public Health Service, the findings were classified according to intensity of linear fibrosis, appearance of graininess (ground glass), and nodulation. The chart shows graphically the scheme used to represent the various stages in the progression of the pulmonary fibrotic state due to silica dust inhalation.

Generally, films indicated as normal, linear exaggeration one, and

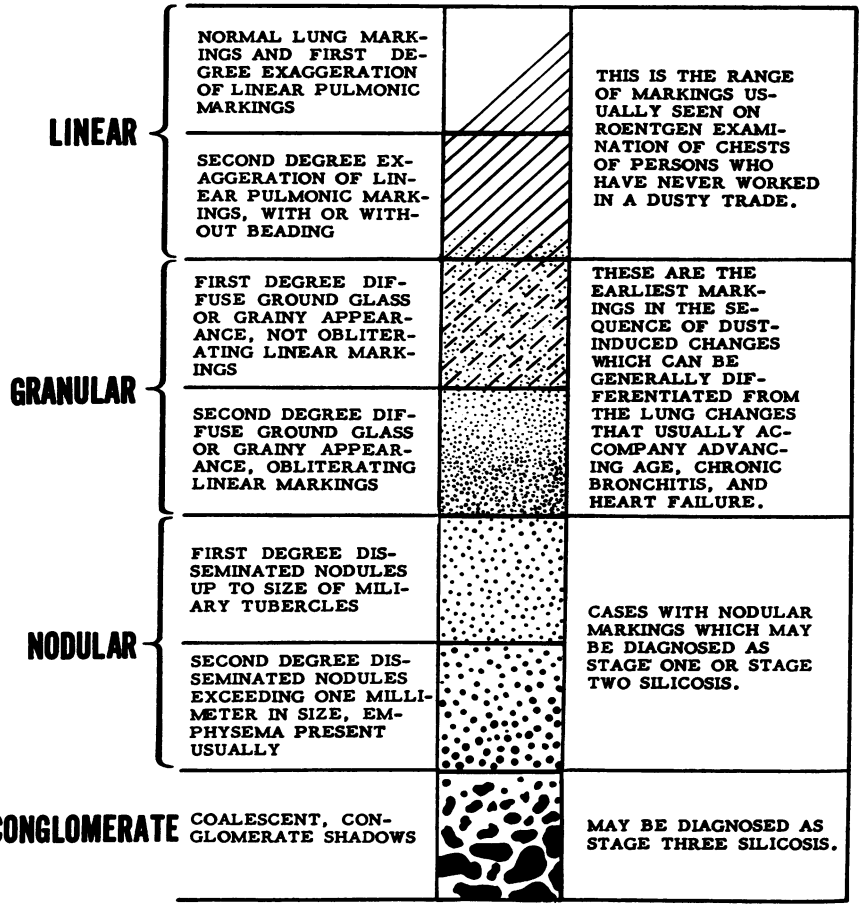

Figure 1. Scheme representing the sequence of lung-field markings in a typical case of uncomplicated silicosis.

linear exaggeration two may be considered as being within normal limits or due to lung changes unrelated to the dustiness of the occupational environment. The ground glass one appearance may or may not be due to the dust in the environment. Films showing the ground glass two appearance are strongly suggestive of an effect due to the dust of the occupational environment, when there is a history of exposure to silica dust and other medical findings are essentially negative. Generalized nodulation and conglomerate masses of nodules appearing in the roentgenogram, together with the supporting data of an occupational exposure to silica dust and the other pertinent medical data, signify lung changes due to the dust. In the present study 140 persons, or 7.7 percent, showed ground glass two lung markings, and 28, or 1.5 percent showed nodular fibrosis. Of the latter, 24 had stage one nodular, 3 had stage two nodular, and 1 had stage three, or conglomerate silicosis.

The medical records of the 28 persons whose chest roentgenograms showed nodular fibrosis revealed the following data of importance. The men, all white workers, ranged in age from 45 to 73 years, with 15 in the sixth, seventh, or eighth decade. The absence of nonwhite workers in this series may possibly be explained by the fact that such workers had spent a significantly lesser number of years in foundry work as observed in this study.

Examination of the occupational histories of the group revealed that 18 were gray-iron workers and 10 steel foundry workers, a ratio similar to that of these groups in the entire study. Of the 18 iron workers, 14 had the principal occupation of molder. Of the steel foundrymen, 9 were cleaners and finishers. The time spent in the principal occupation by each of the men approximated closely the total years each had spent in foundry work, and was 14 to 52 years with the exception of two men. Of the latter two, one had 13, and the other 5 years of foundry experience. The first of these had been a burner for a significant part of his life in foundry work and may fall into the category of persons exposed to appreciable amounts of iron fume, a group so well described by Hamlin (*48*). The second worker's experience in the foundry was allegedly 5 years, but his work and occupation histories were considered unreliable.

Three of the workers with nodular fibrosis gave a history of probably significant inorganic dust exposure in other industries and occupations prior to their foundry experience; one in brick and tile manufacture, one as a welder, and the third in a brick yard.

It appeared that for the iron foundrymen the molders have a higher incidence of nodular silicosis, whereas for the steel workers the cleaners and finishers have the higher incidence. The high incidence rate for the molders may be due to their longer exposure.

The criteria for interpreting the stage of re-infection type of pul-

monary tuberculosis in this study were those of the National Tuberculosis Association (*49*). The degree of activity of the cases was classified as probably active, probably inactive, or doubtful, depending upon the general characteristics of the roentgenographic shadows, as well as upon the clinical data. Pulmonary tuberculosis was thus suspected from the roentgenograms in 25 workers. Careful review of the clinical records of the workers and the roentgenograms revealed that the disease was probably active in 5, probably inactive in 8, and of doubtful activity in 12. It is recognized that activity of pulmonary tuberculous lesions cannot be evaluated on the basis of one roentgenographic examination and one medical examination, especially in the absence of sputum studies. The data concerning the findings for pulmonary tuberculosis must, therefore, be accepted with caution. Further, in at least some instances, the worker may have had the disease before his employment in the foundry industry. This factor could not be evaluated since pre-employment chest roentgenograms were not available to us.

Re-infection type of the disease was found in 21 white workers and in 4 nonwhite, which yields a rate of 0.7 percent for the white and 1.7 percent for the nonwhite workers. For the area in which this study was made, the rates for suspected pulmonary tuberculosis, based upon almost 300,000 roentgenograms, has been reported as 1.75 percent for white adults of both sexes and 1.32 percent for the nonwhite (*50*).

The relationship of the dustiness of the occupation in the foundry industry to the incidence of pulmonary tuberculosis has been discussed by many investigators (*4–6*, *51–54*) and is thus of great interest. In the present study, the relationship of pulmonary tuberculosis incidence to that of pulmonary fibrosis was tested for significance, and none was found. In the same vein, it is noted that tuberculosis infection was not observed as a complication among the 28 workers who had nodular silicosis.

Study was made to determine whether or not dustiness of occupation was itself associated with an increased incidence of pulmonary tuberculosis. Comparison thus was made between the two categories of cleaners and finishers, and coremakers, the former being exposed to appreciably more dust than the latter. It was found that, for those in these two work categories whose roentgenograms showed markings read as normal, linear one, and linear two—conditions regarded as being unrelated to the dust—no differences existed for the incidence of pulmonary tuberculosis. This was found for those with less than 10 years in the occupation as well as for those whose work experience extended beyond 10 years. These data indicated that dustiness of occupation, as it occurred in the ferrous foundry industry, was probably not associated with a greater or less likelihood for the development of pulmonary tuberculosis.

X-ray evidence of pulmonary tuberculosis was found more frequently among the steel than the gray-iron foundrymen. Thus, although the steel foundrymen made up 30 percent of the total study group of 1,937 men, they constituted 60 percent of the cases of tuberculosis.

At this point it might be well to consider the subject of iron deposition in the lungs and its possible relationship to the roentgenographic appearance of silicosis, a matter which has evoked international interest for some years. The earliest notation on this point we could find in medical literature is that in 1919, Holland (*55*), in a personal communication, mentioned this possibility since he recognized the relative opacity of iron to roentgen rays. Holland's reference was to the possible occurrence of this condition in iron miners. The occupation of iron mining was, thus, the first industry in which this possibility was considered. Other occupations receiving attention in this regard have been welding, silver polishing, boiler scaling, and, finally, work in the foundry.

Review of the literature on this subject leads us to the following deductions: (1) Electric arc welders exposed to high concentrations of welding fumes may develop iron deposition in the lungs which, in some instances, is roentgenographically difficult to distinguish from nodular silicosis but which is not associated with pulmonary fibrosis; (2) in exposure to iron and silica dust together, there may be a modification of the fibrotic process by the simultaneous presence of the two agents, the iron causing a slowing of the fibrotic process; (3) to our knowledge, there are no post-mortem data for humans to indicate that the exposure to iron dust in foundries modifies the action of the silica exposure.

In the present investigation the matter of iron deposition in the lungs received limited attention. The incidence of various degrees of pulmonary roentgenographic markings was compared for cleaners and finishers, and sandblasters, the former being exposed to relatively higher levels of iron dust. This comparison failed to show that the exposure to larger amounts of iron resulted in appreciably more marked pulmonary roentgenographic markings.

Pulmonary Fibrosis and Previous Work History

As mentioned, there were 73 foundrymen, approximately 4 percent, whose work histories included periods of employment in dusty trades other than foundry work. The medical and historical data for each of these men were carefully reviewed. On the basis of the general knowledge of the probable dustiness of their former trades, as well as upon the time spent in the former and present occupations, efforts were made to determine what influence the former dusty occupation may have had upon the degree of pulmonary fibrosis observed in the

present study. It was believed that in only a relatively small number was there a likelihood that the former occupation was etiologically of importance. All of these had ground glass roentgenographic changes, some having ground glass one, and some, ground glass two. In the entire study, ground glass one roentgenographic changes were present in 375 instances and ground glass two in 140.

On the basis of the foregoing data it is not felt that previous occupation in dusty trades, other than in ferrous foundries, had a significant influence on the degree of pulmonary fibrosis observed in this study. Further evidence lending support to this observation was found by comparing the frequency in the study of the occurrence of previous dusty occupations of groups showing varying degrees of pulmonary fibrosis.

Pulmonary Fibrosis and Occupation

It was found that pulmonary fibrosis of the degree of ground glass two and nodular fibrosis occurred in 10.0 percent of all the gray-iron workers and 7.9 percent of steel workers; the difference between these two incidence rates was not statistically significant, a finding which is at variance with other studies (*2*, *7*, *9*, *21*). The average years of exposure of gray-iron foundrymen and steel foundrymen was approximately the same for both in this study. In both types of ferrous foundry workers, there was a progressive increase of incidence rates with increased years of exposure.

Since data for exposure levels to dust, percentage of free silica, percentage of iron, and particle-size determinations were available for only three steel foundries, we believed that further comparison among the occupational groups of steel and gray-iron foundrymen was unwarranted. Comparison, however, was made among the occupational groups of gray-iron workers since useful environmental data for this purpose were available. It is well to note in this connection that such data for maintenance and supervisory workers, as well as the group of laborers and others, were of doubtful value since each of these was heterogenous in terms of the nature of occupational exposures.

All other factors being equal, it might be expected that the frequency rate of pulmonary fibrosis would be in direct proportion to the dustiness of the occupation. In the gray-iron foundrymen, among the four occupational groups of shakeout men, molders, cleaners and finishers, and coremakers, the incidence rates of pulmonary fibrosis show a trend in the expected direction; that is, as the weighted dust exposures decrease, the rates for pulmonary fibrosis decrease. This trend is probably somewhat more apparent when the groups of molders, and cleaners and finishers, the two occupational classes having similar dust exposures, are considered together.

It is pointed out that the higher incidence rates for fibrosis among the gray-iron molders than among the cleaners and finishers, both being exposed to the same level of dustiness, was in part due to the fact that the molders had longer years of experience in their occupation. Further, the iron content was appreciably higher for the cleaners and finishers than it was for the molders. The part that iron itself may have played in the observed roentgenographic appearance cannot be evaluated at this time. This matter was discussed in detail above.

Pulmonary Fibrosis and Blood Findings

Reports on the blood findings in pulmonary fibrotic conditions due to inorganic dusts, especially silica, have appeared from time to time in medical literature (*56–65*). In a study reported from the Public Health Service in 1936 (*66*), suggestive data of a positive relationship in this regard were reported for erythrocyte sedimentation rate and for differential leukocyte counts. The hematolgic data collected in the present study permitted further extension of these observations.

It was found that, although no correlation with degree of pulmonary fibrosis existed for erythrocyte count, hematocrit value, hemoglobin estimation, mean corpuscular volume, mean corpuscular hemoglobin, and mean corpuscular hemoglobin concentration, significantly positive correlations were found between the degrees of lung changes and the total leukocyte counts as well as the erythrocyte sedimentation rates. As the degree of pulmonary fibrosis increased for the group, the total leukocyte counts were elevated and the corrected erythrocyte sedimentation rates were found to be more rapid. Similar observations have been made by others and have been variously interpreted (*57*, *58*). The present data do not warrant the opinion that the blood changes observed indicate infection superimposed on the pulmonary fibrosis. Rather, it appears that the lung fibrosis may itself be associated with an elevated leukocyte count and an increased erythrocyte sedimentation rate, confirming an opinion expressed in recent publications on this subject (*57*, *58*).

Increased speed of settling of erythrocytes occurs in many disease states and is, therefore, a nonspecific test as is the occurrence of leukocytosis or an elevated temperature. Thus, in general, it is used to call attention to occult diseases or as a means of following the progress of recognized disease states. In the present study, it is quite likely that certain of such disease states were probably present which could have given rise to an acceleration of the sedimentation rate. Nevertheless, there is no reason to suspect that such disease states were more frequent in those with pulmonary fibrosis than they were in those without pulmonary fibrosis. This hypothesis was tested and was found to be the fact. Thus, it is felt that the elevated sedimenta-

tion rate was probably due to the pulmonary fibrosis as it occurred in the study itself.

Summary of Medical Findings

1. A total of 1,937 ferrous foundrymen from 16 establishments were medically examined to determine what effects the work had upon their health. Data for the environment were available from the engineering studies. The medical examinations included, among other things, routine history and physical examination, examination of the oral structures by dentists, routine 14- x 17-inch chest roentgenograms, routine urine analyses, tests for visual acuity, and a battery of blood studies. Correlations of many of the findings were made with the engineering data.

2. Study of the oral structures reveals that attrition was of greater frequency in this group than in a comparable industrial group who did not have exposure to a dust of the hardness of silica.

3. The condition of the eyes to the extent that they were examined did not reveal any abnormalities which could be attributed to the occupation.

4. In the blood findings the foundrymen had lower erythrocyte and hemoglobin levels than a comparable industrial group; these alterations were probably not due to the occupation.

5. X-ray evidence of active and inactive re-infection type of pulmonary tuberculosis was found in 0.7 percent of white and 1.7 percent of nonwhite workers, rates not remarkably different from those of the general population of the area in which the study was made.

6. Nodular pulmonary fibrosis (silicosis) was found in 1.5 percent of the workers; in 1.3 percent it was stage one; in 0.15 percent, stage two; and in 0.05 percent, stage three. Diffuse pulmonary fibrosis (ground glass two), probably related to the dust of the occupation, was present in 7.7 percent of the study group.

7. Exposure to dust in occupations other than foundry work did not appear to have an influence on the degrees of fibrosis observed or the incidence rates.

8. Pulmonary fibrosis occurred with about equal frequency in steel and gray-iron foundrymen.

9. The part played by iron dust in the forms of metallic iron and the oxides of iron, although it did not appear to be of importance in the roentgenograms observed in this study, cannot be fully evaluated at this time.

10. Among the steel foundrymen, casting cleaning was the most hazardous occupation from the point of view of pulmonary fibrosis; among the gray-iron foundrymen, molders had the highest incidence of pulmonary fibrosis.

11. It generally required more than 14 years of exposure in the industry for the appearance of nodular fibrosis.

12. A positive association was found between progressively increasing degrees of pulmonary fibrosis and erythrocyte sedimentation rate as well as total leukocyte count. These findings were not associated with infection complicating pulmonary fibrosis.

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Communities Awarded Milk Sanitation Ratings of 90 Percent or More During 1949 and 1950[1]

This is the semiannual revision of the list of Public Health Service Milk Ordinance communities which were reported by State milk sanitation authorities during the 2-year period January 1, 1949 to December 31, 1950, as having a market milk rating of at least 90 percent. The inclusion of a community in this list means that if pasteurized milk is sold in the community it is of such a degree of excellence that the weighted average of the percentages of compliance with the various items of sanitation required by the Public Health Service Milk Ordinance for grade A pasteurized milk is 90 percent or more. Similarly, if raw milk is sold in the community, it must so nearly meet the standards that the weighted average of the percentages of compliance with the various items of sanitation required for grade A raw milk is 90 percent or more.

These ratings are not a complete measure of safety, but represent the degree of compliance with the grade A standards. High-grade

[1] From the Division of Sanitation, Milk and Food Branch, Public Health Service.

pasteurized milk is safer than high-grade raw milk because of the added protection of pasteurization. Safety estimates should take into account the percentage of milk pasteurized (see table). To obtain this added protection, those who are dependent on raw milk can pasteurize the milk at home by the use of an approved home pasteurizer or by either of the following methods: (1) after the water in the bottom of a double boiler has been brought to a vigorous boil, place the inner container with milk in the outer container, cover it, and continue to apply the same heat for 10 minutes; or (2) heat the milk in an open saucepan over a hot flame to 165° F., stirring constantly, then immediately place the vessel in cold water and continue stirring until cool, changing the water when it warms up; however, if a dependable thermometer is not available, bring the milk to a boil instead. Method 1 produces a cooked flavor, while method 2 is not quite as safe as method 1.

The milk ordinance recommended by the Public Health Service is now in effect State-wide in 13 States, as well as in 367 counties and 1,468 municipalities located in 39 States. It has been adopted as a regulation by 34 States and Territories.

The primary reason for publishing the rating lists is to encourage these communities to attain and maintain a high level of excellence in the enforcement of the ordinance. No comparison with communities operating under other milk ordinances is intended or implied. Some communities which have high-grade milk supplies are not included because arrangements have not been made for the determination of their ratings by the State milk sanitation authority. In other cases the ratings which have been submitted are now more than 2 years old and have therefore lapsed. In still other communities with high-grade milk supplies there seems, in the opinion of the community, to be no local necessity nor desire for rating or inclusion in the list.

The rules under which a community is included in this list are as follows:

1. All ratings must be determined by the State milk sanitation authority in accordance with the Public Health Service rating method [2] based upon the grade A pasteurized milk and the grade A raw milk requirements for the Public Health Service Milk Ordinance and Code. A recent departure from the method described consists of computing the pasteurized milk rating by weighting the plant rating twice as much as the rating of the raw milk for pasteurization.

2. No community will be included in the list unless both its pasteurized milk and its raw milk ratings are 90 percent or more. Communities in which only raw milk is sold will be included if the raw milk rating is 90 percent or more.

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[2] Pub. Health Rep. 53: 1386 (1938). Reprint No. 1970.

3. The rating used will be the latest rating submitted to the Public Health Service, but no rating will be used which is more than 2 years old. In order to promote continuous rigid enforcement rather than occasional "clean-up campaigns," it is suggested that when the rating of a community on the list falls below 90 percent no resurvey be made for at least 6 months, which will result in removal from the next semi-annual list.

4. No community will hereafter be included on the list whose milk supply is not under an established program of official routine inspection and laboratory control provided by itself, the county, a milk control district, or the State. In the absence of such an official program there can be no assurance that only milk from sources rating 90 percent or more will be used continuously.

5. The Public Health Service will make occasional check surveys of cities for which ratings of 90 percent or more have been reported by the State. If such check rating is less than 90 percent but not less than 85, the city will be removed from the 90 percent list after 6 months unless a resurvey submitted by the State during this probationary interim shows a rating of 90 percent or more. If, however, such check rating is less than 85 percent, the city will be removed from the list immediately. If the check rating is 90 percent or more, the city will be retained on the list for 2 years from the date of the check survey unless a subsequent rating during this period warrants its removal.

Communities now on the list should not permit their ratings to lapse since ratings more than 2 years old cannot be used.

State milk sanitation authorities who are not now equipped to determine municipal ratings are urged, in fairness to their communities, to equip themselves as soon as possible. The personnel required is small; in most States one milk sanitarian is sufficient for this work.

Communities Awarded Milk Sanitation Ratings of 90 Percent or More, 1949–50

ALL MARKET MILK PASTEURIZED

Community	Percent of milk pasteurized	Date of rating	Community	Percent of milk pasteurized	Date of rating
ALABAMA			COLORADO—continued		
Auburn	100	Sept. 29, 1949	Durango	100	July —, 1950
Birmingham and Jefferson County*	100	Nov. 17, 1949	Grand Junction	100	Mar. 29, 1950
Montgomery	100	May 11, 1950	GEORGIA		
Opelika	100	June 15, 1950	Columbus	100	Oct. 27, 1949
ARKANSAS			Cordele	100	Sept. 8, 1949
Fort Smith	100	Dec. 15, 1950	Quitman	100	Aug. 25, 1949
COLORADO			West Point	100	Mar. 29, 1949
Colorado Springs	100	Nov. —, 1949	IDAHO		
Cortez	100	July —, 1950	Bonners Ferry	100	May 14, 1949
			Caldwell	100	Apr. 14, 1949
			Idaho Falls	100	Aug. 24, 1949
			Sandpoint	100	May 14, 1949

*Not operating under milk ordinance recommended by the Public Health Service.

Communities Awarded Milk Sanitation Ratings of 90 Percent or More, 1949–50—Continued

ALL MARKET MILK PASTEURIZED

Community	Percent of milk pasteurized	Date of rating
ILLINOIS		
Chicago	100	Oct. 28, 1949
Decatur	100	Apr. 27, 1950
East Moline	100	May 18, 1950
Elgin	100	Dec. 8, 1949
Glencoe	100	Nov. 7, 1949
Highland Park	100	Nov. 7, 1949
Joliet	100	July 14, 1950
Kenilworth	100	Nov. 7, 1949
Lake Bluff	100	Nov. 7, 1949
Lake Forest	100	Nov. 7, 1949
Moline	100	May 18, 1950
Northfield	100	Nov. 7, 1949
Oak Park	100	Sept. —, 1949
Peoria	100	Apr. 15, 1950
Rock Island	100	May 10, 1950
Silvis	100	May 18, 1950
Skokie	100	Nov. 7, 1949
Waukegan	100	Nov. 2, 1949
Winnetka	100	Nov. 7, 1949
INDIANA		
Anderson	100	Dec. 19, 1949
Bedford-Orleans	100	Sept. —, 1950
Berne	100	Feb. —, 1950
Bluffton	100	Dec. 14, 1950
Calumet	100	June —, 1950
Evansville	100	Aug. —, 1950
Hope	100	Dec. 12, 1949
La Porte	100	May —, 1950
Shelbyville	100	Oct. —, 1950
South Bend	100	Dec. —, 1949
IOWA		
Clinton	100	July 12, 1950
KANSAS		
Dodge City	100	May 24, 1950
KENTUCKY		
Bowling Green and Warren County	100	July 13, 1950
Hopkinsville	100	Mar. —, 1950
Mayfield and Graves County	100	May 11, 1950
Mount Sterling	100	Aug. 16, 1950
Murray	100	Apr. 19, 1950
Owensboro	100	Nov. 17, 1950
Paducah	100	May 5, 1950
MISSOURI		
Cape Girardeau	100	Oct. 25, 1950
Columbia	100	Dec. 13, 1949
Concordia	100	June 7, 1950
Eldon	100	Dec. 14, 1950
Jackson	100	Oct. 25, 1950
NORTH CAROLINA		
Charlotte	100	Feb. 23, 1950
Cumberland County	100	Feb. 10, 1950
Mars Hill	100	Dec. 9, 1949
Transylvania County	100	Jan. 16, 1950
Wilson	100	Aug. 2, 1950
OKLAHOMA		
Cushing	100	Feb. 10, 1950
SOUTH DAKOTA		
Sioux Falls	100	Sept. 21, 1950
TENNESSEE		
Athens	100	June 14, 1950
Bristol	100	Nov. 4, 1949
Chattanooga	100	Oct. 26, 1949
Columbia	100	Apr. 20, 1950
Covington	100	Aug. 15, 1950
Dyersburg	100	Aug. 17, 1950
Erwin	100	Feb. 17, 1949
Fayetteville	100	May 10, 1949
Franklin	100	May 5, 1950
Greenville	100	Oct. 7, 1949
Kingsport	100	Sept. 23, 1949
Knoxville	100	Sept. 23, 1949
Lawrenceburg	100	Aug. 21, 1950
Lebanon	100	July 19, 1950
Lewisburg	100	Apr. 17, 1950
Manchester	100	Oct. 5, 1950
Morristown	100	Oct. 13, 1949
Nashville and Davidson County	100	Apr. 10, 1950
Newbern	100	Aug. 16, 1950
Shelbyville	100	June 13, 1949
TEXAS		
Bay City	100	May 4, 1950
College Station	100	Sept. 20, 1950
Galveston	100	Apr. 18, 1949
Gladewater	100	July 25, 1949
Harlingen	100	Mar. 20, 1950
Houston	100	June 30, 1950
Jacksonville	100	Apr. 12, 1950
Kilgore	100	July 25, 1949
Mission	100	Apr. 5, 1950
Pharr	100	Apr. 5, 1950
San Antonio	100	Mar. 11, 1950
San Juan	100	Apr. 5, 1950
Sweetwater	100	Apr. 19, 1950
Texarkana	100	Aug. 5, 1950
Texas City	100	Apr. 25, 1949
Tyler	100	Mar. 2, 1950
Weslaco	100	Apr. 5, 1950
UTAH		
Delta	100	Nov. 17, 1950
Ogden	100	June 1, 1949
Provo	100	Apr. 29, 1949
Salt Lake City	100	May 27, 1949
VIRGINIA		
Boydton	100	Apr. 4, 1950
Bristol	100	Nov. 4, 1949
Lawrenceville	100	Apr. 6, 1950
Pulaski	100	June —, 1950
Radford	100	June —, 1950
Richmond	100	May —, 1950
Roanoke	100	Sept. 23, 1950
Staunton	100	Nov. 3, 1950
Suffolk	100	May 24, 1950
Waynesboro	100	May 19, 1949
WASHINGTON		
Spokane	100	July 21, 1950
Whitman County	100	Aug. 16, 1950

Communities Awarded Milk Sanitation Ratings of 90 Percent or More, 1949–50—Continued

BOTH RAW AND PASTEURIZED MARKET MILK

Community	Percent of milk pasteurized	Date of rating
ALABAMA		
Lanett	97.5	Nov. 9, 1950
GEORGIA		
La Grange	76.2	Mar. 29, 1949
Macon	97.1	Sept. 13, 1949
Thomaston	79.7	May 24, 1950
IDAHO		
Boise	99.3	Apr. 30, 1949
Payette	72	Apr. 14, 1949
Weiser	92.1	Apr. 13, 1949
INDIANA		
Michigan City	98	May — 1950
IOWA		
Davenport	99	Jan. 27, 1950
KENTUCKY		
Lexington and Fayette County	96	June 23, 1950
MISSOURI		
Boonville	87	Oct. 12, 1950
Jefferson City	88.5	July 20, 1950
Moberly	92.5	Oct. 13, 1949
Sedalia	92.5	Aug. 17, 1950
Springfield	99	Nov. 10, 1950
NORTH CAROLINA		
Alexander County	73.5	Mar. 31, 1950
Avery County	73.5	July 12, 1949
Buncombe County	95.4	June 10, 1949
Cabarrus County	73.4	Jan. 20, 1950
Greensboro	99.7	July 27, 1950
Henderson County	86	Feb. 6, 1950
Macon County	91.4	Aug. 10, 1950
NORTH CAROLINA—continued		
Wilkes County	89.7	Jan. 25, 1950
OKLAHOMA		
Ada	84	June 24, 1949
Holdenville	89	Mar. 28, 1950
Lawton	96	Feb. 20, 1950
Shawnee	96	May 25, 1949
Stillwater	96	July 7, 1949
Sulphur	98	Sept. 6, 1949
OREGON		
Portland	99.2	July 24, 1949
TENNESSEE		
Cleveland	94.4	Sept. 7, 1950
Elizabethton	94	Aug. 8, 1950
Jackson	95.8	Mar. 30, 1950
Johnson City	96.6	Aug. 9, 1950
McMinnville	95.1	May 25, 1950
Murfreesboro	98	July 27, 1949
Pulaski	91.6	May 6, 1949
TEXAS		
Brenham	92	Apr. 15, 1950
Brownsville	84.8	Mar. 20, 1950
Bryan	98.8	Sept. 21, 1950
Corsicana	99.6	Jan. 31, 1950
Edinburg	85.9	Apr. 5, 1950
Fort Worth	99.95	Feb. 4, 1950
Laredo	62	Aug. 24, 1950
Longview	99	July 27, 1949
Lubbock	99.2	Nov. 8, 1950
Palestine	79.8	Apr. 28, 1949
Paris	92.4	Nov. 16, 1950
VIRGINIA		
Emporia	34	Apr. 7, 1950

NOTE.—In these communities the pasteurized market milk shows a 90 percent or more compliance with the grade A pasteurized milk requirements and the raw market milk shows a 90 percent or more compliance with the grade A raw milk requirements of the Public Health Service Milk Ordinance and Code.

Note particularly the percentage of milk pasteurized in the various communities listed. This percentage is an important factor to consider in estimating the safety of a city's milk supply. All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method.

Incidence of Disease

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

Reports From States for Week Ended February 3, 1951

The incidence of measles has increased in recent weeks, the number of cases reported for the current week (11,627 cases) being 18 percent greater than the number for the previous week and 87 percent greater than for the same week last year. Texas reported 1,584 new cases; California, 1,149; and Wisconsin, 1,077 cases during the current week.

Reports of Epidemics

Dysentery. Dr. W. L. Halverson, California, Director of Health, has reported an outbreak of 23 cases of shigella infection in one small area of California. In six families single cases occurred, and in four families there were 2 or more with a total of 17.

Plague. The Medical Officer-in-Charge, CDC Activities in San Francisco, has reported that the axillary gland and venous blood from a fatal case of bubonic plague was proved plague-infected. The patient resided in Hobbs, Lea County, N. Mex., as reported in the Communicable Disease Summary for January 13, 1951. He shot and dressed eight rabbits on January 2, became ill on January 6, consulted a physician on January 9, and died the same day. In January 1950, a case of bubonic plague was reported in the same county and a similar history was obtained, namely, that infection followed when a hunter shot and cleaned cottontail rabbits. This patient was treated with streptomycin and sulfadiazine and recovered.

Influenza. D. H. Stevens, Commissioner of Health and Welfare, Maine, has reported a severe type of influenza in Jackman Plantation, Maine, a remote, forested area in the west central part of the State near the Canadian (Quebec) border on U. S. Route 201. Investigation by district health officers revealed that between January 15 and 27, 67 cases were reported in a population of 1,000. At Forks Plantation six cases occurred in a population of 100. The cases are reported to have sudden onset, marked prostration, and severe aching. Whole families have been affected, and 25 cases occurred in a convent school. No reports have been received of confirmation of a diagnosis of "epidemic influenza" by means of serologic tests or by isolation of virus.

Dr. R. F. Korns, New York State Health Department, has reported 51 cases of an influenza-like infection among 369 inmates housed in one building of a State institution in Utica from January 16 to the present date. The largest number of cases reported in 1 day was 7. Symptoms consisted of fever, chills, aching, and malaise lasting from 3 to 5 days. Two deaths occurred, one in a woman with cardiovascular disease. Otherwise, the disease has been mild and not explosive in character. There has been no increase in respiratory disease in Utica. Throat washings and blood have been obtained for laboratory examination.

An influenza-like infection has also been reported to have been prevalent in Niagara during late January and early February. The symptoms have been mild and have consisted of fever, sore throat, and asthenia with a duration of 2 to 3 days. There have been no deaths. Laboratory confirmation of the presence of influenza virus has not been reported.

Dr. W. L. Halverson has reported that information from physicians and school authorities in northern California indicates an increase in prevalence of mild upper respiratory infections, etiology undetermined. Symptoms are characterized by sudden onset with high fever, chills, and generalized aches. Many have sore throat, nausea, vomiting, and diarrhea. Materials for virus isolation and serologic study have been obtained.

Excerpts from a report by Dr. C. H. Andrews, World Influenza Center, National Institute for Medical Research, London, are given below:

The epidemic seems to be spreading across much of Europe but remains generally mild. Reports have been received of the isolation of virus A strains in WHO influenza laboratories in France, Finland, Spain, Germany, Turkey, and Israel, in addition to those reported earlier. Wherever reports are available, the strains seem to be of the A-prime type. As already suggested, the facts are consistent with a spread from foci in Scandinavia, Spain, and Ireland. No opinion can be offered as to the origin of outbreaks in Turkey and Israel. In Britain the epidemic has been spreading rather slowly through the rest of the country; deaths are now rising in the Midlands; incidence in London and the South is still relatively low. Reports from some other countries are: Belgium—disease mild except in old people. Germany—epidemic not very extensive; some A virus is prevalent; serological tests suggest that some B virus may be present also but no B viruses have been isolated. North Ireland—deaths from influenzal pneumonia still rising (74 in week ended January 20 in Belfast). Yugoslavia—local outbreaks, probably B; virus isolated and sent to the World Influenza Center.

Influenza Information Center [1]

The Walter and Eliza Hall Institute of Medical Research at the Royal Melbourne Hospital, Australia, reports the isolation of type A influenza virus from 6 to 12 throat washings obtained from cases of suspected influenza on Ocean Island in the mid-Pacific about the middle of November 1950. It seems likely that the virus is closely related to the A-prime virus isolated from the same area in 1948.

The Strain Study Center reports the isolation at Columbia Presbyterian Medical Center in New York of an A-prime strain in the last part of January.

Dr. M. M. Siegel, of the Virus Diagnostic Laboratory at the Children's Hospital of Philadelphia, isolated an A-prime strain of influenza virus from pooled throat washings obtained from several young adult cases. The onset of these were January 28 and 29. He reports no general increase in the number of influenza cases in the Philadelphia area.

The Division of Preventive Medicine, Office of the Surgeon General of the Army, reports that the Sixth Army Medical Laboratory has demonstrated a diagnostic rise in hemagglutination-inhibition titer to A and A-prime types on one pair of serum secured from a patient in Camp Cook, Calif. Another paired serum test indicates a diagnostic rise in hemagglutination-inhibition titer for type B. This serum was from a case at Mather Air Force Base, Calif.

The National Microbiological Institute of the National Institutes of Health reports the isolation of two strains of influenza A-prime virus. One strain was from a young adult seaman on the ship *Liberte* which left South Hampton, England, January 12 and arrived in New York January 18. The other strain was also from a young adult seaman on the *Queen Mary* which left South Hampton January 13 and arrived in New York January 18. Throat washings were taken on the day of arrival in New York.

The Department of Virus and Rickettsial Diseases of the Army Medical Service Graduate School has reported the isolation of two hemagglutinating agents from an influenza outbreak at Fort Monmouth, N. J., during late January 1951. One of these agents has been identified as A-type influenza in tests with human sera. In tests with highly specific rooster antisera, this virus was shown to resemble the FM 1–50 (Cuppett) and London 1–51 viruses. The second agent has not been examined to date. (A mild febrile disease with body aches and a diffuse inflammation of the nasopharynx has occurred among individuals from whom these laboratory specimens were obtained.)

[1] National Institutes of Health, Bethesda, Md.

Comparative Data for Cases of Specified Reportable Diseases: United States

[Numbers after diseases are International List numbers 1948 revision]

Disease	Total for week ended—		5-year median 1946–50	Seasonal low week	Cumulative total since seasonal low week		5-year median 1945–46 through 1949–50	Cumulative total for calendar year—		5-year median 1946–50
	Feb. 3, 1951	Feb. 4, 1950			1950–51	1949–50		1951	1950	
Anthrax (062)	2	------	1	(1)	(1)	(1)	(1)	8	2	6
Diphtheria (055)	92	180	227	27th	3,390	5,170	7,564	483	899	1,206
Encephalitis, acute infectious (082)	11	5	10	(1)	(1)	(1)	(1)	46	50	40
Influenza (480.483)	2,519	2,859	2,859	30th	25,274	22,330	28,320	10,732	11,746	11,746
Measles (085)	11,627	6,230	7,997	35th	71,735	42,259	54,406	43,034	23,129	28,282
Meningitis, meningococcal (057.0)	117	83	83	37th	1,497	1,348	1,348	536	435	435
Pneumonia (490–493)	1,939	2,493	------	(1)	(1)	(1)	(1)	8,261	11,343	------
Poliomyelitis, acute (080)	113	106	59	11th	32,925	42,055	25,155	706	581	358
Rocky Mountain spotted fever (104)	1	2	1	(1)	(1)	(1)	(1)	2	6	3
Scarlet fever (050) [2]	2,407	1,934	2,705	32d	26,150	24,539	35,688	10,459	8,100	12,393
Smallpox (084)	1	1	5	35th	12	14	37	4	6	16
Tularemia (059)	19	15	18	(1)	(1)	(1)	(1)	84	122	122
Typhoid and paratyphoid fever (040, 041) [3]	36	49	49	11th	3,123	3,591	3,609	208	217	208
Whooping cough (056)	1,623	2,570	2,289	39th	30,106	33,005	35,251	8,504	11,469	11,469

[1] Not computed.
[2] Including cases reported as streptococcal sore throat.
[3] Including cases reported as salmonellosis.

Reported Cases of Selected Communicable Diseases: United States, Week Ended Feb. 3, 1951

[Numbers under diseases are International List numbers, 1948 revision]

Area	Diphtheria (055)	Encephalitis, infectious (082)	Influenza (480–483)	Measles (085)	Meningitis, meningococcal (057.0)	Pneumonia (490–493)	Poliomyelitis (080)
United States	**92**	**11**	**2,519**	**11,627**	**117**	**1,939**	**113**
New England	**3**	**3**	**28**	**653**	**11**	**83**	**3**
Maine			21	6	2	25	
New Hampshire			3	1	1	3	
Vermont				313	1		
Massachusetts	2	3		283	6		3
Rhode Island			1	14	1	1	
Connecticut	1		3	36		54	
Middle Atlantic	**15**	**2**	**13**	**1,687**	**21**	**200**	**6**
New York	9		[1] 3	376	8	89	3
New Jersey	3	2	10	352	9	60	2
Pennsylvania	3			959	4	51	1
East North Central	**1**	**2**	**51**	**2,657**	**26**	**129**	**11**
Ohio	1		4	652	12		
Indiana			38	71	1	9	
Illinois		1	7	457	6	102	1
Michigan		1	2	400	5	18	10
Wisconsin				1,077	2		
West North Central	**3**		**21**	**547**	**4**	**138**	**3**
Minnesota			1	80	3	2	1
Iowa				8	1		
Missouri	1		1	176			
North Dakota			18	18		116	
South Dakota	1			15			
Nebraska	1						2
Kansas			1	250		20	
South Atlantic	**26**		**1,144**	**822**	**23**	**409**	**18**
Delaware				22			
Maryland			4	24	4	29	
District of Columbia			5	58	1	17	1
Virginia	7		780	218	4	102	2
West Virginia	1		227	33	3	18	5
North Carolina	4			111	4		5
South Carolina	4		35	10	2	22	1
Georgia	7		93	304	4	221	
Florida	3			42	1		4
East South Central	**10**		**70**	**292**	**9**	**61**	**6**
Kentucky			6	138	4	27	2
Tennessee	5		58	46	2		1
Alabama	1			17	2		1
Mississippi	4		6	91	1	34	2
West South Central	**20**	**3**	**600**	**1,915**	**11**	**708**	**8**
Arkansas	2		411	109	3	66	
Louisiana	2		3	69	1	53	
Oklahoma	4	1	186	153	4	49	2
Texas	12	2		1,584	3	540	6
Mountain	**1**	**1**	**515**	**1,274**	**2**	**113**	**5**
Montana			28	19	1		
Idaho				46			
Wyoming				72			
Colorado	1		82	800	1	31	4
New Mexico				60		15	
Arizona		1	405	213		67	1
Utah				64			
Nevada							
Pacific	**13**		**77**	**1,780**	**10**	**98**	**53**
Washington	1		15	597		1	5
Oregon	1		34	34	3	34	3
California	11		28	1,149	7	63	45
Alaska						2	3
Hawaii			7				

[1] New York City only.

Anthrax: Pennsylvania, 2 cases. *Leprosy:* District of Columbia, 1 case. *Psittacosis:* California, 1 case.

Reported Cases of Selected Communicable Diseases: United States, Week Ended Feb. 3, 1951—Continued

[Numbers under diseases are International List numbers, 1948 revision]

Area	Rocky Mountain spotted fever (104)	Scarlet fever (050)	Smallpox (084)	Tularemia (059)	Typhoid and paratyphoid fever[1] (040,041)	Whooping cough (056)	Rabies in animals
United States	**1**	**2,497**	**1**	**19**	**36**	**1,623**	**142**
New England		**247**			**6**	**210**	
Maine		28			2	46	
New Hampshire		16				9	
Vermont		3				41	
Massachusetts		163			4	77	
Rhode Island		7				23	
Connecticut		30				14	
Middle Atlantic	**1**	**343**			**8**	**229**	**17**
New York		[2] 201			4	76	16
New Jersey	1	45				76	
Pennsylvania		97			4	77	1
East North Central		**614**		**5**	**1**	**211**	**34**
Ohio		163			1	30	7
Indiana		64				19	[3] 20
Illinois		97		5		15	1
Michigan		239				79	6
Wisconsin		51				68	
West North Central		**111**	**1**	**2**	**1**	**79**	**18**
Minnesota		29				10	
Iowa		18				14	16
Missouri		17	1	2		9	
North Dakota					1	4	
South Dakota		3				2	
Nebraska		8				2	
Kansas		36				38	2
South Atlantic		**238**		**5**	**5**	**237**	**27**
Delaware		2					
Maryland		43				16	
District of Columbia		9				4	
Virginia		38		2		28	
West Virginia		7			2	28	3
North Carolina		81				90	
South Carolina		8			1	3	18
Georgia		29		3	2	39	6
Florida		[2] 21				29	
East South Central		**98**		**2**	**2**	**49**	**17**
Kentucky		44				18	8
Tennessee		33		1	1	5	6
Alabama		15			1	13	3
Mississippi		6		1		13	
West South Central		**64**		**4**	**3**	**381**	**29**
Arkansas		2			1	29	1
Louisiana		12				6	
Oklahoma		3		1		45	1
Texas		47		3	2	301	27
Mountain		**228**		**1**	**3**	**144**	
Montana		25				16	
Idaho		42				4	
Wyoming				1		1	
Colorado		19			2	12	
New Mexico		2			1	44	
Arizona		18				66	
Utah		[2] 122				1	
Nevada							
Pacific		**464**			**7**	**83**	
Washington		111				20	
Oregon		60			1	22	
California		[2] 293			6	41	
Alaska							
Hawaii		3					

[1] Including cases reported as salmonellosis
[2] Including cases reported as streptococcal sore throat.
[3] Report for 2 weeks.

FOREIGN REPORTS

CANADA

Reported Cases of Certain Diseases—Week Ended Jan. 13, 1951

Disease	Total	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Brucellosis	4						4				
Chickenpox	1,597	1		66	3	218	719	55	47	243	245
Diphtheria	9					5	2		1		1
Dysentery, bacillary	9						4				5
Encephalitis, infectious	1					1					
German measles	337			16		28	154		3	21	115
Influenza	51			39			12				
Measles	2,041	11		14		317	1,520	76	26	16	61
Meningitis, meningococcal	6					1	3			2	
Mumps	1,929	14		22	1	184	604	76	79	459	490
Poliomyelitis	4								2	2	
Scarlet fever	405	2		1	1	107	49	13	11	142	79
Tuberculosis (all forms)	180	3		1	13	37	39	29	10	3	45
Typhoid and paratyphoid fever	2					1				1	
Venereal diseases:											
Gonorrhea	322	6		9	2	96	56	27	16	51	59
Syphilis	77	4		6	1	24	23	5	8		6
Primary	6						4		2		
Secondary	3			1		1	1				
Other	68	4		5	1	23	18	5	6		6
Whooping cough	262	2		3	7	55	130	20	2	7	36

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

The following tables are not complete or final for the list of countries included or for the figures given. Since many of the figures are from weekly reports, the accumulated totals are for approximate dates.

CHOLERA

(Cases)

Place	January-November 1950	December 1950	January 1951—week ended—			
			6	13	20	27
ASIA						
Burma	1,201	910	[1] 9	[1] 32	[1] 26	[1] 8
Akyab	2			3	4	
Bassein	3	13	8	29	21	6
Kyaukpyu	2					
Maubin	3					
Moulmein	1					
Pegu	1					
Rangoon	[2] 7		1		1	2
Toungoo	8					
India	156,797	10,039	[1] 124	[1] 80	[1] 114	[1] 106
Ahmedabad	10					
Allahabad	3					
Bombay	[2] 430	[3] 1				
Calcutta	9,335	187	52	41	76	60
Cawnpore	1					

CHOLERA—Continued

Place	January–November 1950	December 1950	January 1951—week ended— 6	13	20	27
ASIA—continued						
India—Continued						
Cocanada	2					
Cuddalore	59	1				1
Lucknow	12					
Madras	[2] 1,029	107	12	6	6	17
Masulipatam	47					
Nagpur	71	[3] 19	41	11	3	
Negapatam	[2] 117	28	7	10	15	12
New Delhi	125					
Port Blair (Andaman Islands)	[2] 2					
Tellicherry	27					
Tiruchirappali	24	26	7	10	10	11
Trichinopoly	1					
Tuticorin	26	42	5	2	4	5
India (French):						
Karikal	441	64	1			
Pondicherry	776	38	9			
India (Portuguese)	17					
Indochina:						
Cambodia	15					
Viet Nam	15		1			
Giadinh	3					
Rachgia	1					
Saigon	1					
Pakistan	26,214	2,941		[1] 4		
Chittagong	186	1				
Dacca	194	6		4		

[1] Preliminary. [2] Includes imported cases. [3] Imported.

PLAGUE

(Cases)

AFRICA						
Belgian Congo	31					
Costersmansville Province	15					
Stanleyville Province	16					
Madagascar	105	49		[1] 16		
Rhodesia, Northern	2					
Union of South Africa	17					
Cape Province	3					
Orange Free State	11					
Transvaal Province	1					
Johannesburg	1					
ASIA						
Burma	281	40				
Bassein	1					
Bhamo	[2] 4					
Henzada	15					
Kyaiklat	34					
Minhla	2					
Moulmein	[2] 3					
Myaungmya	5					
Myingyan	2					
Pegu	[2] 5					
Prome	[2] 1					
Pyapon	3					
Rangoon	[2] 8					
Yenangyaung	58					
China:						
Chekiang Province	42					
Wenchow	[4] 4					
Fukien Province	988					
Amoy	10					
Kwangsi Province	[4] 63					
Kwangtung Province	627					
India	41,540	920		[3 5] 2	[3 5] 2	
Allahabad	[3] 19	[3] 1		[3] 2	[3] 2	
Bombay	[2] 5					
Calcutta	[2] 3					
Cawnpore	18					
Lucknow	[2] 10					
Indochina:						
Cambodia	[6] 46					
Pnompenh	3					

Place	January–November 1950	December 1950	January 1951—week ended— 6	13	20	27
ASIA—continued						
Indochina—Continued						
Viet Nam	132	3	2	4	4	
Phanthiet	94	2		1	4	
Saigon	1					
Laos	2					
Indonesia:						
Java	423	5		[3] [5] 1		
Bandoeng	6					
Djakarta	3			[3] 1		
Jogjakarta	234	5				
Pakistan	[3] 1					
Karachi	[3] 1					
Thailand	56	2				
SOUTH AMERICA						
Brazil	50					
Alagoas State	17					
Bahia State	15					
Ceara State	2					
Paraiba State	5					
Pernambuco State	10					
Sao Paulo State: Santos	1					
Ecuador	27					
Chimborazo Province	4					
El Oro Province	4					
Loja Province	19					
Peru	28					
Ancash Department	3					
Lambayeque Department	2					
Libertad Department	1					
Lima	11					
Piura Department	11					
Venezuela	5					
Miranda State	5					

[1] Jan. 1–10, 1951. [2] Includes imported cases. [3] Imported. [4] Deaths. [5] Preliminary figure. [6] Includes suspected cases.

SMALLPOX

(Cases)

AFRICA						
Algeria	139	7				
Angola	270					
Bechuanaland	204					
Belgian Congo	4, 537	423	64	47		
British East Africa:						
Kenya	12					
Nyasaland	282	7		3		
Tanganyika	4, 581	120	[1] 1			
Uganda	4	2				
Cameroon (British)	438	4				
Cameroon (French)	133	1				
Dahoney	417	120		[2] 45	[2] 67	
Egypt	[4] 6	3				
Eritrea	1					
Ethiopia	36					
French Equatorial Africa	454	5				
French Guinea	12					
French West Africa: Haute Volta	230	14		1		
Gambia	6					
Gold Coast	366	76	28	40		
Ivory Coast	664	35		[2] 27	[2] 9	
Libya	2					
Mauritania	1					
Morocco (French)	15	3		[2] 4		
Mozambique	353	17				
Nigeria	18, 526	440				
Niger Territory	1, 219	53		[2] 21		
Rhodesia:						
Northern	5					
Southern	703					
Senegal	2					

Place	January–November 1950	December 1950	January 1951—week ended— 6	13	20	27
AFRICA—continued						
Sierra Leone	33					
Sudan (Anglo-Egyptian)	80	3	1	8		
Sudan (French)	301	27		[2] 33		
Togo (French)	121	6		[2] 12		
Tunisia	1					
Union of South Africa	914					
ASIA						
Afghanistan	530					
Arabia	336					
Bahrein Islands: Bahrein	36					
Kamaran Island: Kamaran	[1] 2					
Burma	5,058	39	[4] 2	[4] 2	[4] 2	[4] 8
Ceylon	[5] 3					
China	785	3				
India	134,892	7,241	705	583	722	558
India (French)	592	195	42			
India (Portuguese)	102					
Indochina:						
Cambodia	89	10				
Viet Nam	250	19		2		2
Indonesia:						
Borneo	1,342	10				
Java	7,695	79	10	22	2	
Sumatra	346					
Iran	376	68	18	8		4
Iraq	220	52	13	10	31	122
Israel	16	1				
Japan	6					
Korea (Republic of)	1,331					
Lebanon	[5] 2					
Netherlands New Guinea	3					
Pakistan	17,703	2,943	[4] 3	[4] 4	[4] 2	[4] 3
Palestine	95					
Straits Settlements:						
Singapore	[5] 2					
Syria	15	1				
Thailand	460					
Transjordan	35					
Turkey. (*See* Turkey in Europe.)						
EUROPE						
Great Britain:						
England:						
Brighton		15		14	1	
Liverpool	1					
Scotland: Glasgow	21					
Greece	15					
Portugal	1					
Sicily	2					
Spain: Canary Islands	1					
Turkey	9					
NORTH AMERICA						
Guatemala	9					
Mexico	506					
SOUTH AMERICA						
Argentina	517					
Brazil	111					
Chile	3,588					
Colombia	602					
Ecuador	237					
Paraguay	4					
Peru	2,680					
Venezuela	1,538					
OCEANIA						
Australia: Freemantle	[1] 1					

[1] Imported. [2] Jan. 1–10, 1951. [3] Jan. 11–20, 1951. [4] Preliminary figure. [5] Includes imported cases

TYPHUS FEVER *

(Cases)

Place	January–November 1950	December 1950	January 1951—week ended—			
			6	13	20	27
AFRICA						
Algeria	116	11				
Basutoland	24					
Belgian Congo	[1] 90					
British East Africa:						
Kenya	23					
Mombasa	[2] 3					
Uganda	2					
Egypt	93	3				
Eritrea	35	2		1		
Ethiopia	1,046					
French Equatorial Africa	5					
Gold Coast	10					
Libya:						
Cyrenaica	27					
Tripolitania	73		1			
Madagascar	2					
Morocco (French)	10					
Morocco (International Zone)	2					
Morocco (Spanish Zone)	6					
Mozambique	3					
Nigeria	1					
Rhodesia, Southern	[1] 7					
Sierra Leone	[2] 5					
Sudan (Anglo-Egyptian)	5					
Tunisia	59					
Union of South Africa	98					
ASIA						
Afghanistan	1,308					
Burma	[1] 15					
Ceylon	2					
China	[1] 20					
India	327	36	6	1		
India (Portugense)	84	6				
Indochina: Viet Nam	34	1		2		
Indonesia:						
Java	6					
Sumatra	1					
Iran	[1] 211	9		2		1
Iraq	132	5		1	1	
Japan	[1] 928	2				
Korea (Republic of)	[2] 1,161					
Lebanon	[1] 2					
Netherlands New Guinea	2					
Pakistan	102	1				
Palestine	7					
Straits Settlements: Singapore	[1] 8					
Syria	[1] 39					
Transjordan	28					
Turkey (see Turkey in Europe):						
EUROPE						
France	1					
Germany (British Zone)	[1] 2					
Germany (French Zone)	2					
Germany (United States Zone)	3					
Great Britain:						
England: Liverpool	[2] [3] 1					
Island of Malta [1]	40					
Greece	28					
Hungary	4					
Italy	53					
Sicily	41					
Poland	37					
Portugal	5					
Spain	47					
Turkey	193	34	7	5	4	3
Yugoslavia	264					
NORTH AMERICA						
Costa Rica [1]	17					
Guatemala	33					
Jamaica [1]	31	3	1			
Mexico [1]	361	1				
Panama Canal Zone [1]	6					
Puerto Rico [1]	21	3				
Virgin Islands	1					

Place	January–November 1950	December 1950	January 1951—week ended— 6	13	20	27
SOUTH AMERICA						
Argentina	2					
Chile	134	9				
Colombia	515					
Curacao	3					
Ecuador	348					
Peru	1,089					
Venezuela	133					
OCEANIA						
Australia [1]	104					
Hawaii Territory [1]	8					

*Reports from some areas are probably murine type, while others include both murine and louse-borne types.

[1] Includes murine type. [2] Murine. [3] Imported.

YELLOW FEVER

(C—cases; D—deaths)

AFRICA							
Belgian Congo	C	1	1				
Stanleyville Province	C	1	1				
French Equatorial Africa	C	[1] 1					
Port Gentil	C	[1] 1					
Gold Coast	C	18			[1] 1		
Accra	D	[2] 4					
Ankobra Ferry	D	1					
Bogoso	C	[2] 2					
Kade	C	1					
Oda Area:							
Akwatia	C	[2] 8					
Atiankama	C	1					
Bawdua	D	1			[1] 1		
Taquah-Aboso	D	[2] 1					
Nigeria	D	[2] 1					
Calabar	D	[3] 1					
Ibadan	D	[1] 1					
Sierra Leone	C	[2] 2					
Koinadugu District	C	[2] 2					
NORTH AMERICA							
Panama:							
Colon	D	1					
SOUTH AMERICA							
Bolivia	C	867					
Chuquisaca Department	C	[4] 850					
La Paz Department	C	[4] 17					
Brazil	D	2	20		20		
Bahia State	D	1					
Ipiau	D	1					
Goiaz State	D		[6] 20		[6] 20		
Uruacu	D		[6] 20				
Maranhao State	D	1					
Colinas	D	1					
Colombia	D	8	2				5
Boyaca Department	D	1					
Chizu	D	1					
Magdalena Department	D	1					
Los Angeles, Rio de Oro	D	1					
Meta Territory	D		2				
Puerto Lopez	D		2				
North Santander Department	D	1					2
La Vega	D						2
Ocana	D	1					
Putumayo Commissary	D	3					
Mocoa Locality	D	3					
Santander Department	D	2					3
Campohermoso	D						1
Cuesta Rica	D	1					
Landazuri	D	1					
Maradales	D						1
Veneoas	D						1

Place		January-November 1950	December 1950	January 1951—week ended—			
				6	13	20	27
SOUTH AMERICA—continued							
Peru	D	14					
Cuzco Department	D	2					
Quincemil	D	2					
Huanuco Department	D	6					
Tingo Maria	D	6					
Junin Department	D	1					
San Ramon	D	1					
Loredo Department	D	1					
Pucalpa	D	1					
San Martin Department	D	4					
Bellavista	D	1					
Juanjui	D	1					
Lamas	D	1					
Tarapoto	D	1					
Venezuela	D	3					
Bolivar State	D	2					
Argelia	D	1					
La Parida	D	1					
Tachira State	D	1					
El Milagro	D	1					

[1] Suspected. [2] Includes suspected cases. [3] Imported. [4] Estimated number of cases reported in an outbreak in Asero Province, Jan. 1–Mar. 14, 1950. [5] Outbreak in North and South Youngas Provinces. [6] Estimated deaths. The number of cases from Dec. 1 to Jan. 20 was estimated to be 200.

Examination for Chemists and Biochemists

Competitive examinations for the appointment of chemists and biochemists to the Regular Commissioned Corps of the Public Health Service will be held in various cities throughout the country on April 16, 17, and 18, 1951. The examination will include professional written tests, an oral interview, and a physical examination. Completed applications must be in the Washington office by March 19, 1951.

Appointments are permanent and provide opportunities for career service in research and public health activities. Appointments will be made in the grades of assistant and senior assistant, equivalent to Navy ranks of lieutenant (j. g.) and lieutenant, respectively. Entrance pay is $4,486 for assistants with dependents, and $5,346 for senior assistants, including rental and subsistence allowance. Applicants must expect to receive the master's or doctor's degree no later than January 16, 1952, and by that time must have completed a total of 7 years of training and professional experience subsequent to high school.

For application forms and additional information write to: Surgeon General, Public Health Service, Federal Security Agency, Washington 25, D. C., Attention: Division of Commissioned Officers.

Symposium on Venereal Diseases

The Fourth Annual Symposium on Recent Advances in the Study of Venereal Diseases will be held in Washington, D. C., on April 24 and 25. This meeting will be sponsored jointly by the American Venereal Disease Association and the Experimental Therapeutics Study Section of the National Institutes of Health, Public Health Service.

The meeting will be held in the auditorium of the Federal Security Building, Independence Avenue between Third and Fourth Streets, the scientific sessions beginning each day at 10 a. m. The program includes papers on the fundamental biology and the clinical and epidemiological aspects of venereal disease. All persons interested in this branch of medical research are cordially invited to attend.

The annual business meeting of the American Venereal Disease Association will be held at 9 a. m. on Wednesday, April 25.

Copies of the program will be available about April 1. Requests for copies should be sent to Dr. Frederick W. Appel, Executive Secretary of the Experimental Therapeutics Study Section, Division of Research Grants, National Institutes of Health, Bethesda 14, Md. Inquiries should be addressed either to Dr. Appel or to Dr. William L. Fleming, Secretary of the American Venereal Disease Association, 750 Harrison Avenue, Boston 18, Mass.