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LIGHTING FOR LOW COST HOUSING*

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INTRODUCTION

By the term "low cost housing," as used in this paper, is meant housing for families having incomes of less than $1,500 a year. At the present time from 60 to 70 percent of the families in the United States have incomes of less than this amount. Since the maximum monthly rent which a family in this group can afford to pay appears to be about $25, and the average number of persons in a family is 3 or 4, requiring a house or tenement of 4 or 5 rooms, the lighting, natural or artificial, must be of the simplest type which will fulfill the minimum hygienic requirements. It is also evident that, for the sake of economy, the greatest possible use should be made of natural lighting.

It is generally estimated that such a house, or tenement, should have, from the standpoint of hygienic considerations, a total cubic capacity of not less than 4,000 cubic feet, and should have a living room, kitchen, two or three bedrooms, and a bathroom. It is evident, however, that the space requirements must be more or less elastic and that allowance should be made for a possible increase in the size of the family. Assuming the height of the rooms to be 8 feet, a total cubic capacity of 4,000 cubic feet would give for a four-room house, or tenement, an average floor area of about 125 square feet per room. Such a house, or tenement, could house a family of four or five, consisting of two adults and three children. The number of bedrooms required would depend upon the age and sex of the children. The living room, for obvious reasons, should have a larger floor area than the kitchen or bedrooms.

Five reasons may be given why adequate illumination is desirable in a dwelling house: (1) For the protection of eyesight; (2) for promotion of cleanliness; (3) for prevention of accidents; (4) for a possible direct effect upon health; and (5) for its psychological effect. These reasons hold for both natural and artificial lighting.

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The question as to the least illumination allowable is debatable; but information now available appears to indicate that to protect the eyes from strain where ordinary visual tasks are being performed, the illumination on the object looked at should never be less than six foot-candles (*1*, *2*, *3*). For fine visual work, such as prolonged reading or sewing, it should also be possible to obtain at certain points an illumination of at least 10 foot-candles. In a dwelling house the intensity of the illumination on all working planes, such as stoves, sinks, and kitchen and study tables, must be sufficient, and glare from light sources must be reduced to a minimum.

NATURAL LIGHTING

To provide adequate natural lighting the area of the windows should be sufficient and the windows should be properly placed. The area of the windows should be as great as possible. The maximum area allowable will be determined by the need of wall space for furniture, and by the loss of heat through the window. The minimum area allowable will be determined by the area necessary to give sufficient illumination throughout the room.

The best all-round method of evaluating the sufficiency of the daylight illumination in a room appears to be by means of the ratio of the glass area of the window to the floor area. If this ratio is large enough, and the windows are properly placed, and the view of the sky is not obstructed, the room will be well lighted. A good rule appears to be that in every room in which persons live, sleep, or congregate the total area of the glass in the windows shall be not less than 15 percent of the floor area (*4*). This is probably a reasonable rule. Since the sash holding the glass and the framework of the window will perhaps take up 15 percent or more of the total area of the window, this would mean that the total window area, including both the glass and the wooden or metal framework holding the glass, should be not less than 17 percent of the floor area.

If, considering a specific case, we assume that the living room of the house is 13 by 15 feet, the area of the floor will be 195 square feet. Seventeen percent of this area would be about 33 square feet. If the window is 5 feet 6 inches wide and 6 feet high its total area will be 33 square feet, or equal to the recommended minimum area. If the ceiling is 9 feet high and the window sill is 2 feet 6 inches above the floor, a window opening 6 feet high would bring the top of the window 6 inches from the ceiling. If the ceiling is only 8 feet high the height of the window must be less and its width must be greater. In either case the total window area may be divided between two windows. It must be remembered, however, that for a window of the same area a high window gives greater illumination than a broad one. For the same area, therefore, to obtain the greatest illumination a window

should be made high rather than broad. The United States Public Health Service has shown (*5*), for instance, that doubling the height of a window approximately trebles the illumination at the middle or rear of a room, whereas doubling the width of a window does not even double the illumination. Increasing the height of a window rather than its width also gives more space for the use of furniture. The effect of glare from a window may also be considered; and we may ask in this connection, Is less glare produced by supplying the required window area with two windows rather than one, or by making a window broad rather than high?

To calculate the least permissible glass area of a window from the point of view of the least permissible illumination it is necessary to specify the least permissible illumination at a given hour of the day at a given time of the year. Thus we may ask what must be the glass area of a window to give a daylight illumination of six foot-candles, in a given locality, at a given distance from a window, at 4 p. m., on a clear day in midwinter, the ceiling and walls of the room being white. From the results of the studies made by the United States Public Health Service (*5*) the illumination coming from the sky, through a window of any given size, can be calculated. Thus it can be shown that, in Washington, D. C., at 4 p. m. on December 21, the illumination from a clear sky, on a horizontal plane 36 inches above the floor, from a window 5 feet 6 inches wide and 6 feet high, at a distance of 13 feet from the window, will be about 7 foot-candles, and that at a distance of 5 feet from the window it will be about 33 foot-candles. Since, in the latitude of Washington, 4 o'clock is about the time that artificial illumination is turned on in midwinter, a ratio of glass area to floor area of 15 percent may be considered to be sufficient if we adopt the criterion that six foot-candles is the minimum illumination allowable in the rear of the room at any time of the day or year.

The natural illumination in a room will, of course, vary with the time of day and time of year, and also with the condition of the sky, whether clear or cloudy. At noon in midsummer or midwinter the daylight within a building, due to the sky, in Washington, D. C., will be about twice as great as at 4 p. m. In midsummer, the illumination at 4 p. m. will be about twice, and at noon one and a half times as great, as in midwinter.

The orientation of the window with respect to the points of the compass will also make a difference. Windows facing north will not usually receive any direct sunlight; those facing east, west, or south will receive direct sunlight during some part of the day. In general, the entrance of direct sunlight into a room is desirable in winter, but not in summer. This is particularly true for the Southern States. Even in wintertime direct sunlight is not desirable if it falls upon the working plane. In this case window shades or awnings are used to

reduce or divert some of the sunlight, and the illumination is, in general, decreased. Window shades should always be provided. The most desirable form of window shade is probably the venetian blind, since it can be used not only to reduce the illumination from direct sunlight but also to increase the illumination in the rear of the room by reflection from the slats. If the cost of a venetian blind is too great, a translucent shade of a light buff color is very serviceable. There is at the present time a great need for a cheap form of venetian blind. When such a shade is developed, there will doubtless be a great demand for it.

The direction in which the windows of a house face will depend upon the orientation of the house. In the United States, windows having a southerly exposure will receive a large amount of sunlight in the winter and a relatively small amount in the summer. Henry Niccols Wright (*6*), who has recently studied the effect of the orientation of the house upon its heating for the John B. Pierce Foundation for Housing Research, states that, in the neighborhood of New York City, by making the windows of the living room face 25° west of south, the living room can be kept warmer in winter and cooler in summer, reducing the cost of heating and making the room more comfortable. The problem of lighting the house by daylight illumination is therefore bound up with the problem of heating it, and it is certainly desirable to orient the house so as to obtain the best results for both.

Casement windows are probably more desirable than sash windows, since they can be thrown completely open, allowing the entrance of direct sunlight with any antirachitic and germ-killing properties that it may have. In this connection it may be mentioned that it is very significant that, as the United States Public Health Service has shown (*7*), the incidence of tuberculosis is very much greater among the farmers of southern Tennessee than it is among the tenant farmers and share croppers of southern Alabama, although the latter are not as well off as the former, and in many cases live in poverty-stricken shacks with no glass in the windows and only wooden shutters to keep out the weather. The reason for this lesser incidence of tuberculosis is unknown, but it is possible that it may have something to do with the greater ingress of sunlight into the poorer houses. It is the belief of the writer that the greatest opportunity possible should be provided for the entrance of sunlight and air into the house. As a check, however, on an exaggerated estimate of the hygienic value of sunlight, it should always be remembered that sunlight is not absolutely essential for animal life. Many animals live away from sunlight most of the time and are healthy. On the other hand, plants cannot live without sunlight; under it chlorophyll is formed, and the carbon dioxide of the air is absorbed as food. Because sunlight is necessary

for the existence of plants it cannot be argued that it is essential for animals. The radiant energy of sunlight, however, does have an important effect upon the young child, and probably upon the adult.

In this connection may be considered the desirability of the use of ultraviolet-transmitting glass in the windows of dwellings. Such glass can now be obtained which transmits a large percentage of the antirachitic ultraviolet light. Ordinary window glass does not allow this ultraviolet light to pass. It may be pointed out, however, that the amount of ultraviolet light entering a window is very small, and that, unless he is very close to the window, a person will get as much ultraviolet in a few minutes out of doors as in a whole day indoors. However, the use of such glass is entirely a matter of expense; and if expense is not an important consideration, glass which transmits the ultraviolet rays may well be used.

Windows should, if possible, be placed in the middle of a wall, as this will give the best general illumination of a room. A sink in a kitchen should be so placed that the light from the window will come from the side rather than from the front, on account of the glare experienced when directly facing a window.

Window sills should be not less than 30 inches above the floor, since the upper part of the retina of the eye is more sensitive to light than the lower part, and bright light entering the eye from below this level fatigues it. The usefulness of the portion of the window below this level in providing illumination is also very small.

Porches should be so placed that they will not obstruct the daylight entering the windows. Trees and shrubs should be so planted that they will not obstruct daylight.

ARTIFICIAL LIGHTING

The maintenance of the illumination requirements specified above can be obtained only by the use of electricity. Electric light should therefore be considered a minimum requirement for the healthful American home. To provide the requisite lighting, the necessary electric current should be provided, with the necessary number of outlets, and all outlets should be placed in the most desirable positions. Convenience outlets should be so placed that floor or table lamps can be used to provide the light for reading, writing, or sewing. When the house is built, the electric wiring then installed should be heavy enough to carry all the current that may be needed for lighting or for any other purpose.

In a four-room house, No. 12 wire may be used throughout, with 15 outlets. There should be a central outlet in the ceiling of each room to provide general illumination. Besides the central outlet, there should be two convenience receptacles in the living room to supply

current for lamps for reading, writing, or sewing; two duplex receptacles in the kitchen, one over the sink and one on the wall; and one convenience receptacle in each bedroom by the dresser. In the bathroom, the outlet should be over the mirror. In the kitchen, shadows on the sink and work table should be avoided, if necessary, by installing a second outlet in the ceiling.

For economy, inside frosted lamps may be used in the ceiling outlets without the use of opal glass globes, although the use of such globes is desirable to reduce glare. The ceiling outlets in the living room and kitchen may be equipped with 100-watt inside-frosted lamps, and in the bedrooms with 60-watt inside-frosted lamps. A 100-watt lamp in the ceiling of the living room or kitchen would give about 10 foot-candles directly under the lamp 3 feet above the floor. A 60-watt lamp in the ceiling of a bedroom would give five or six foot-candles under the lamp 3 feet above the floor. Higher illumination for fine visual work, such as reading, writing, or sewing, should be provided in the living room and bedrooms by means of floor or table lamps. Wall switches should be provided in the living room and kitchen. Pull chains may be used in the bedrooms and bathrooms. A liberal number of outlets should be provided when the house is built, since the cost of a few extra outlets at that time is not great.

The ceilings in all rooms should be mat white, so as to provide the greatest reflecting power and the least glare. The walls should have a mat finish and be of a light tint, having a reflecting power of at least 60 percent. A light buff or yellowish brown tint is suggested. A white ceiling and light walls increase very greatly the efficiency of a lighting unit.

To prevent accidents, an illumination of at least two foot-candles should be provided on passageways and stairways.

TENEMENTS

In the preceding discussion attention has been given primarily to the lighting of the small individual house of four or five rooms. For tenement or apartment houses, rules must also be laid down as to the minimum amount of sky visible at a window, as to the minimum width of light courts, as to the maximum height of buildings, and as to the least distance between buildings.

SUMMARY

1. A minimum illumination of six foot-candles should be provided on all working planes for general illumination. Provision should also be made for an illumination at certain points of at least 10 foot-candles for reading, writing, or sewing.

2. Glare from all light sources should be reduced to a minimum.

3. The total glass area of the windows in each room should be not less than 15 percent of the floor area of each room.

4. Windows should preferably be placed centrally in a wall.

5. Window sills should be not less than 30 inches above the floor.

6. Casement windows are to be preferred to double-hung windows.

7. Windows should be provided with shades, preferably with venetian blinds.

8. Ceilings should be mat white, and walls should be mat and of a light tint having a reflecting power of at least 60 percent. Light buff or yellowish brown is suggested for the walls.

9. Kitchen sinks should be so placed that light from a window comes from the side rather than from the front.

10. Consideration should be given to the direction, as to the points of the compass, in which windows face so as to give the most desirable conditions of lighting and heating throughout the year.

11. The electric wiring installed when the house is built should be heavy enough to carry all the current that may be needed for lighting or for any other purpose.

12. There should be an electric outlet in the center of the ceiling of each room, except in the bathroom where it should be over the mirror; two convenience outlets in the living room, and one in each bedroom, the convenience outlet in a bedroom being by the dresser; two duplex outlets in the kitchen, one over the sink and one on the wall.

13. Wall switches should be provided in the living room and in the kitchen.

14. An illumination of at least two foot-candles should be provided on passageways and stairways.

15. Porches should not be so placed as to obstruct the daylight entering windows; nor should trees and shrubs be so planted that they will have this effect.

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THE SANITATION OF ISOLATED DWELLINGS*

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INTRODUCTION

The information included in this report is applicable mainly to the isolated dwelling, although some of the principles may apply equally to large installations. Where a number of individual dwellings are grouped together, or where a single structure houses a number of families, a community water supply and sewerage system should be provided. The larger community installations deserve individual consideration and are not, therefore, included in the scope of this report; nevertheless, whether the water supply or the sewerage system be large or small, principles of design and construction should be followed which will assure reasonable health safeguards.

The material on screening and ratproofing includes a very brief statement of the principles that should be followed in the construction of dwellings with respect to making them insect and rodent proof.

In the development of housing facilities in any section of the country, the department of health that has jurisdiction here should be consulted in regard to the subjects considered. This should be done before any construction work is started so that structures will not be built that do not comply with health department requirements.

WATER SUPPLY

To be satisfactory for drinking, culinary, and other domestic purposes, water should be incapable of causing discomfort or disease, and should be clear, practically free from color and odor, pleasant to the taste, and devoid of toxic salts or an excessive amount of dissolved mineral substances. It should meet the standards of the United States Treasury Department for drinking water and, likewise, the standards of the State and local departments of health that have jurisdiction.

That a water supply may be made safe from a public health point of view, there are certain fundamental principles with regard to location, construction, and operation of the supply system that should be followed. Furthermore, it is highly desirable both from the standpoint of health and convenience that the water be supplied to and distributed in the dwelling under pressure. Where water is not distributed under pressure, there are health hazards associated with conveying it from the well or other source to the dwelling and with the manner in which it may be stored in the dwelling. It is also true that, if the entire water supply of a family must be carried from the

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source to the dwelling, its use for domestic purposes will be much restricted.

Well-water supplies are considered in greater detail in this report than other sources of supply because it is recognized that wells will be used most frequently as sources of water supply for isolated dwellings. Surface water from lakes and streams and water collected from the roofs of buildings should not be used unless it is treated to render it safe for drinking purposes. Few, if any, mechanical methods of water purification have been developed for the general water supply of an isolated dwelling that can be operated safely by the individual home owner. For this reason, if surface water is the only supply that is available, at least that which is used for drinking purposes should be boiled.

In safeguarding well-water supplies, it is recommended that the minimum sanitary standards contained in the Progress Report of the Committee on Ground Water Supplies, Conference of State Sanitary Engineers, 1936,[1] be followed.

SEWAGE DISPOSAL

It is highly desirable from the standpoint of both health and convenience that dwellings be equipped with a water-carriage sewerage system. If a public sewerage system is not available for the discharge of sewage from a dwelling, it becomes necessary to dispose of the sewage through an independent disposal system. In some localities, however, it is difficult and even impossible to construct a satisfactory independent system, and this condition makes it imperative that a careful investigation be made before the dwelling is erected to determine the feasibility of providing for a system.

The most commonly used system of sewage disposal for the isolated dwelling consists of a settling tank and soil absorption field. In the consideration of this method of sewage disposal, it is assumed that disposal on property adjacent to the dwelling is feasible and will be acceptable to health authorities that have jurisdiction. In the event that disposal by soil absorption is not feasible, and it becomes necessary to discharge the sewage into some drainage course, the proper health authorities should be consulted to ascertain whether this will be permitted, and if so, what requirements as to location, treatment, etc., must be complied with. Obviously, such requirements vary widely in different localities, hence it is impractical to suggest standards to satisfy all the possible situations.

Only domestic sewage and basement drainage should be allowed to enter the house sewer. Storm water from the roof and all surface drainage should be conducted in pipes which are not connected to

[1] Supplement No. 124 to the Public Health Reports.

those that carry domestic sewage, and such storm water should not be allowed to enter the sewage disposal system.[2]

The following general principles governing the location and the design of sewage-disposal systems are suggested for isolated dwellings where a settling tank and soil absorption system is used:

I. HOUSE SEWER

(*a*) *Location.*—(1) The sewer should be located at sufficient depth to protect it from damage caused by external forces such as heavy surface loadings or low temperatures.

(2) The sewer should be kept away from natural obstacles such as trees, shrubs, and basements so as to minimize difficulties caused by clogging with roots or by seepage.

(3) The sewer should be kept at sufficient distance away from, and be so constructed as to protect, adjacent water supplies or water distribution systems from contamination.

(4) The sewer should not penetrate ground-water strata.

(*b*) *Pipe sizes.*—The pipe should be of a size adequate for the purpose and should also be large enough to reduce the possibility of clogging to a minimum.

(*c*) *Material.*—The pipe should be of material which will resist the corrosive action of sewage and soil.

(*d*) *Joints.*—The pipe should be fitted together in such a way as to provide water-tight and root-tight joints.

(*e*) *Construction.*—The pipe lines should be laid straight and with sufficient fall to insure cleansing velocities. The pipe should be accessible at all changes of grade or alignment to facilitate repair or inspection.

II. SETTLING TANK

(*a*) *Location.*—(1) The tank should be a sufficient distance from, and at a lower elevation than, adjacent water-supply systems so as to insure their protection against contamination either underground or over the surface.

(2) The tank should be removed from dwellings a sufficient distance to prevent any possible seepage reaching the basements and to minimize the menace of flies and odors which might arise from the plant.

(3) The site should not be subject to flooding with surface water. It should be accessible so as to facilitate the periodic removal of digested solids and to facilitate inspection.

(*b*) *Capacity.*—(1) The tank should be provided with adequate capacity to obtain efficient removal of settleable solids and also to hold the solids during the digestion period.

[2] Recommendations concerning plumbing are given in the section of the report that deals with this subject.

(c) *Cover.*—The interior of the tank should be accessible for maintenance and inspection purposes.

(d) *Dimensions.*—The proportions of depth to width and length of the tank and the construction of the inlet and the outlet structures should be such as to facilitate both the sedimentation and sludge digestion processes.

III. SOIL ABSORPTION SYSTEM

(a) *Location.*—(1–3) The same principles apply as for settling tanks.

(4) A soil-absorption system should be used only where the soil, as demonstrated by tests, is favorable and will absorb water readily.

(5) When an absorption field is used, and climatic conditions will permit, the sewage should be distributed at depths where soil bacteria are most active.

(b) *Size.*—(1) The size of the system should be based upon absorption tests of the soil, preferably in place.

(c) *Construction.*—(1) Provision should be made for.—

(a) Circulation of air throughout the distribution system.

(b) Equal distribution of the sewage throughout the system.

(c) Openings for inspection purposes.

(See appended "Suggested Minimum Standards for the Location and Design of Sewage-Disposal Systems for Isolated Dwellings Where a Settling Tank and Soil Absorption System is Used.")

SCREENING

In localities where mosquitoes and flies are prevalent, all doors and windows and other openings should be screened with No. 16 wire mesh. The entire window or opening should be screened. Screening of the lower half only of a window is unsatisfactory.

Screen doors should always be made to open outward, and should be provided with self-closing devices.

RATPROOFING

Care should be taken to close effectively all openings through foundations and floors, such as openings around pipes and cracked walls. Such openings should be closed with metal sheeting or concrete. Basement windows should be covered with strong, durable screening, such as standard 8-mesh galvanized hardware cloth.

Ventilators and sewer opening should be provided with gratings. Doors should be equipped with self-closing devices.

The building foundation should be of concrete or masonry and should extend from a point at least 2 feet below ground to a point at least 2 feet above ground. In case the floor is closer to the ground than 2 feet, the space in the walls between the studding should be filled with concrete or other suitable material up to a point 2 feet above ground level.

TERMITES

In some sections of the country termites are a serious menace to buildings constructed of wood.

There are four principal ways by which subterranean termites enter buildings: (1) Through direct contact between wood and soil; (2) through cracks in masonry; (3) by means of covered runways or earthlike tubes connecting wood and soil; and (4) by storage of infested wood such as firewood in basements or under porches.

According to independent observers experienced in the control of termites, the most effective method of control has been to exclude termites from buildings by proper construction.

The recommended structural methods of control are as follows: Foundations should be built of impenetrable concrete or masonry; all stumps, chips, and other litter should be removed from beneath the house; adequate ventilation should be provided for the space beneath the house—vents should be screened, the clearance between the ground and woodwork should be at least 6 inches for the outside of the foundation and 18 inches inside, and for the most effective protection, shields of copper or other durable metal should be used to obstruct the passage of termites. For complete protection, termite shields should be continuous and extend entirely through the wall, should project 2 inches or more on either side, and be bent down at an angle of 45°. All posts, piers, pipes, and other structural members in contact with the ground should be shielded with projecting caps or collars. Surfaces that are difficult to inspect should be given the most thorough protection.

Suggested Minimum Standards for the Location and Design of Sewage-Disposal Systems for Isolated Dwellings Where a Settling Tank and Soil Absorption System are Used

I. THE HOUSE SEWER

A. *Location.*—(1) Vitrified clay pipe which carries sewage should not be located nearer than 50 feet, horizontally, to any well, spring, or other source of water supply, or to pumping apparatus, suction pipe, filter, or other features of any water supply. In special cases where it is impossible or not practicable to obtain a 50-foot distance, special construction is necessary to provide additional safeguards. In no case should sewer pipe be nearer than 30 feet to a source of water supply or appurtenances thereto. All sewers that are more than 30 feet away from a water supply and less than 40 feet, horizontally, should be constructed of extra heavy cast-iron pipe with tested, watertight joints. In this zone, joints should be further protected against leakage by a substantial slip-over sleeve extending at least 6 inches from each side of the joint. The annular space between the pipe and the sleeve should be filled with asphalt or material such as sewer-joint compound, or closed with rubber gaskets. All sewers that lie between 40 and 50 feet of the source of water supply or its appurtenances should be constructed of extra heavy cast-iron pipe with tested, watertight joints.

(2) The sewer should not be laid in the same trench with water pipe and should not be nearer than 10 feet, horizontally, to any water pipe. Where necessary,

a sewer may cross a water pipe at an angle and the water pipe should be above the sewer. At the crossing, all that part of the sewer which lies within 10 feet, horizontally, of the water pipe should be constructed of extra heavy cast-iron pipe with watertight joints.

(3) Cast-iron pipe should be used where the earth formations are composed of loose-textured material, fissured rock, and limestone in which interstices form solution channels and provide little filtering action and allow the water to move through it rapidly.

B. *Material.*—The house sewer should be constructed of vitrified clay or extra heavy cast-iron pipe not less than 6 inches in diameter. The pipe should be of the bell-and-spigot type.

C. *Joints.*—The joints of sewer pipe should be constructed of a suitable material, and in such a manner as to insure a watertight joint. Special precautions should be observed to obtain watertight joints in areas where roots of trees or shrubs are likely to reach the sewer trench or where the sewer is laid below ground water level.

D. *Grades.*—The minimum grade for 6-inch pipe should be a 12-inch fall for each 100 feet, horizontally.

E. *Manholes.*—Manholes should be provided at all changes in grade or alinement and should not be more than 300 feet apart in any case.

II. THE SEWAGE-DISPOSAL SYSTEM

A. THE SETTLING TANK

(1) *Location.*—(*a*) The settling tank should be located at least 50 feet from any source of water supply or appurtenances thereto. The tank should be on lower ground where surface drainage will not run toward the water supply.

(*b*) The tank should be so located that it will not be subject to flooding by surface water.

(*c*) The tank should be as far away as practicable from any dwellings, stream, or lake, and in no case should it be nearer than 25 feet to a dwelling or 50 feet to a lake or stream.

(2) Construction.—(*a*) The minimum retention period should be 24 hours, based on the anticipated flow. The estimate of the flow should be based on the plumbing fixtures on the house-drainage system and should not be less than 25 gallons per capita.

(*b*) The capacity of the tank should provide for the retention volume plus 2.5 cubic feet per capita of tributary population for sludge storage. The minimum capacity of the tank should be 500 gallons. In computing the capacity of the settling tank, only that portion shall be included which is located between the vertical planes established by the inlet and outlet baffles or pipes and vertical planes perpendicular to these planes at the point they intersect the outside wall of the tank.

(*c*) Concrete or brick are suitable materials for the settling tank. Concrete slab, sheet-iron doors, or cast-iron manholes are suitable for entrance ways into the tank.

(*d*) The top of the tank should extend to the surface of the ground, and the openings in the top should be sufficient to provide the removal of scum and sludge from all parts of the tank.

(*e*) The floor of the tank should slope toward the entrance end 1 inch per foot.

(*f*) The liquid depth of the tank should be at least 5 feet at the inlet end.

(*g*) The invert of the inlet pipe should be 3 inches above the invert of the outlet pipe.

(*k*) The inlets and the outlets should be baffled. The inlet baffle should be from 12 to 18 inches from the wall, depending on the grade of the influent pipe, and should extend 18 inches below and 6 inches above the flow line. The outlet baffle should be 10 to 12 inches from the wall and should extend 18 inches below and 6 inches above the flow line. For smaller tanks not over 36 inches wide, sanitary tees may be used for inlet and outlet.

(*l*) The inlet should be at least 18 inches below ground surface.

B. THE SOIL ABSORPTION SYSTEM

1. The soil absorption system should be located under the same restrictions as apply to the septic tank.

2. Adequate means should be provided through which the sewage will be distributed intermittently throughout the length of the soil-absorption system as follows:

Dosing tank with capacity equal to 70 percent of tile absorption field and siphon of following size:

Septic tank—

For 5–15 persons, 3-inch siphon.
For 16 or more persons, 4-inch siphon.

Dosing tanks may be omitted for smaller absorption installations where soil conditions are favorable and where extended periods of freezing weather are not experienced.

3. The absorption system should be laid so as to facilitate the absorption of sewage into the soil, with the following provisions:

For drain tile:

1. Pipe system not less than 4-inch or 6-inch.
2. Joints between pipes, ¼ inch. Openings protected at top.
3. Tile surrounded by broken stone or gravel.
4. Maximum length of lateral, 100 feet.
5. Spacing between laterals not less than 8 feet.
6. Tile should be laid between 12 inches and 24 inches below the surface to obtain maximum benefit from bacteria in the soil. Greater depths may be used where favorable soil absorption conditions exist, using 10 percent additional length of tile.
7. Tile lines converge to inspection manhole at end.
8. Length of tile used based upon percolation test where soil conditions are not entirely favorable.
9. Tile should be laid with uniform grade of 4 inches per 100 feet.

Percolation test.—(1) Dig hole 12 inches square to a depth equal to the proposed tile drainage field. (2) Fill with water and allow to seep away. (3) Fill hole again to depth of 6 inches and observe time required to drop 1 inch.

Time for water to fall 1 inch:	*Rate of dosage per 24 hours per square foot of bottom area of tile trench*
1 minute	4. 0 gallons.
2 minutes	3. 2 gallons.
5 minutes	2. 4 gallons.
10 minutes	1. 7 gallons.
30 minutes	0. 8 gallons.
60 minutes	0. 6 gallons.

The foregoing rates are the maximum and the minimum that are allowable; soils which show a percolation rate of less than 1 inch per hour are unsuitable.

On the basis of the sewage flow of 50 gallons per person per day and a trench 1 foot wide, approximately the following lengths of tile will be required per person in the types of soil indicated:

Clean coarse sand or gravel	12 feet per person.
Fine sand	20 feet per person.
Fine sand with some clay or loam	30 feet per person.
Heavy clay	Unsuitable.

A FURTHER STUDY OF THE PURIFICATION AND TANNIC ACID PRECIPITATION OF SCARLET FEVER TOXIN[1]

By M. V. VELDEE, *Surgeon, United States Public Health Service*

In view of the fact that tannic acid precipitates proteins and most protein decomposition products, this form of precipitation is applicable to the precipitation of scarlet fever toxin only if the toxin is first rendered comparatively free from inert products falling in the above category, or if the toxin is of such high potency that the degree of dilution involved in preparing the individual immunizing doses will compensate for the bulkiness of the precipitate. The most suitable toxin would be one which is both of high potency and low in inert, tannic acid insoluble materials. The present study was undertaken because the methods described in the writer's previous report (*1*) did not entirely meet the above requirements. The report by Rane and Wyman (*2*) has been particularly helpful.

Experience has shown that the broth requirements for the production of toxin involve (*a*) an ample supply of the essential nitrogen containing compounds, the exact identity of which is unknown though experiments show that they are available in peptones and proteoses, (*b*) the presence throughout the growing period of only a trace of dextrose, and (*c*) the maintenance throughout the growing period of the optimum pH range for hemolytic streptococcus growth.

The exact chemical structure of scarlet fever toxin (erythrogenic toxin) is not known. However, certain physical properties are known, namely, that in its present state of purity it contains nitrogen, some of which is present as amino nitrogen, that it is water soluble, not coagulated by heat, heat labile (*3*), soluble in 2 percent acetic acid, insoluble in alcohol, and insoluble in the presence of 50 percent saturation with ammonium sulfate. Therefore in devising a suitable broth medium it is highly desirable to provide the essential nitrogen in a form which is soluble in 50 percent ammonium sulfate. Then the simple step of salting out with 50 percent saturated ammonium sulfate should give a highly purified product.

A wide variety of concentrations and combinations of meat infusion broths containing varying amounts of human serum was prepared

[1] From the Division of Infectious Diseases, National Institute of Health.

and also similar variations in broths made with Difco-peptone and Difco-proteose-peptone, each with the same composite salt solution base. During growth, dextrose was added equally to each culture. Difco-peptone supported good growth, whereas growth developed with more difficulty in a Difco-proteose-peptone broth. At the same time, toxin production seemed to be best in the presence of the proteose-peptone.

A single salting out with 50 percent ammonium sulfate removed 89 percent of the total nitrogen from a toxin grown in 3 percent peptone broth and eliminated 83 percent from a similar peptone-proteose-peptone broth. This step combined with tannic acid precipitation reduced the nitrogen by 91 percent and 87 percent, respectively. Estimating bacterial growth by the total nitrogen contained in the washed bacteria, plain tryptic digest veal broth without the aid of dextrose supported only 0.75 mg of growth, whereas the 3-percent peptone broth with the aid of dextrose supported 7.5 mg of growth, and a broth of the formula given below supported 15.2 mg of growth. Similarly the potencies of the three toxins were approximately of the order 20,000, 300,000 and 500,000 skin test doses per cc. The above figures are based on the use of the NY–5 strain, but trials with strains isolated from six other hemolytic streptococcus infections gave similar results.

Preparation of the broth.—In view of these experimental findings the following culture medium has been adopted (*a*) because of the uniformly high potency of the resulting toxins and (*b*) because of its suitability for the preparation of purified and tannic acid precipitated toxin. At first glance this broth is objectionable because of its high total nitrogen content. Actually, however, because of the high potency of the resulting toxin and the ease with which it lends itself to purification, the total nitrogen per skin test dose, either in the crude toxin, after ammonium sulfate purification, or as the final tannic acid precipitate, is considerably less than in any toxin heretofore released by the commercial laboratories either for the Dick test or for active immunization. For example, lot number HL–50 as a crude toxin contains 433.7 mg of total nitrogen per 100 cc, 72.8 mg after ammonium sulfate precipitation and dialysis, and 57.4 mg after ammonium sulfate and tannic acid precipitation. The potency of this lot is approximately 500,000 STD per cc without concentration.

	Grams per liter
Difco peptone	12.0
Difco proteose-peptone	21.0
Sodium chloride (NaCl)	8.0
Calcium chloride (anhyd. $CaCl_2$)	.27
Magnesium sulfate ($MgSO_4$, $7H_2O$)	.20
Dibasic potassium phosphate (K_2HPO_4, $3H_2O$)	1.5
Monobasic potassium phosphate (KH_2PO_4)	.5
Phenol red	.0075

Distilled water to make 1 liter of finished broth.

Place the water in a suitable container and add all of the ingredients except the phenol red. Heat in streaming steam for 1 hour and then adjust the pH to 7.4. Return to streaming steam for 20 minutes, make up to volume, readjust the pH if necessary, add the phenol red (this may be added advantageously as a 0.25 percent alcoholic solution if small quantities of broth are being prepared), and then filter through paper. Distribute the broth into suitable flasks (2 liters in a 4-liter Erlenmyer flask is convenient). The flask should be provided with a stopper fitted with a bent cotton-stoppered vent tube and a straight open tube through which later ingredients may be added. Cover this tube with an inverted agglutination tube, tie the stopper securely in place, cover the entire top of the flask with a heavy paper cap, and then sterilize in the autoclave for 30 minutes at 15 pounds pressure.

Toxin production.—Prior to culturing, place the flasks of broth at 37° C. for 24 hours as a check on sterility and also in order to warm the broth. Now add 0.25 percent of dextrose through the feed tube (this is added in the form of a 50 percent sterile solution) and then inoculate with an 8- to 12-hour culture of the desired hemolytic streptococcus strain, using at least 5 cc of culture per liter of broth. (An acclimated culture will start growing more promptly. This is obtained by previously culturing in the above-described broth to which has been added 0.02 percent dextrose.) Growth starts slowly so that the reaction does not become acid until after about 12 hours' growth, as indicated by the color change in the phenol red. Because of the deep color of the broth, the first color changes are difficult to read but become easy to read later. Beginning at the end of this initial 12-hour period, add 0.05 percent of dextrose regularly every hour until a total of 1.0 percent has been added, including the 0.25 percent added in the beginning. From this point make the dextrose additions every half hour until the entire amount of dextrose added is 1.5 percent. The dextrose should be thoroughly mixed throughout the culture as soon as added. As frequently as indicated by the color change adjust the pH to approximately 7.2 with the aid of a 15-percent sodium hydroxide solution (at the height of growth this may be necessary as often as every 10 minutes). The alkali must be added slowly through the feed tube with constant agitation of the culture so as to avoid its destructive action on the toxin.

As soon as the color changes cease after the addition of the last portion of the 1.5 percent of dextrose (approximately 1 hour), remove the culture flask from the warm room, filter the toxin free from bacteria, adjust the pH to 7.0, add 0.5 percent of phenol, and finally store at 5° C. for aging before testing for potency and sterility.

Purification of the toxin.—Add to the cold toxin enough ammonium sulfate to give 65 percent saturation (467 grams per liter at 5° C.),

agitate until solution is complete, and then place overnight at 5° C. The degree of saturation purposely was raised from 50 percent as a margin of safety, since it does not significantly increase the amount of inert material thrown down. Collect the precipitate by filtering through a thin layer of paper pulp over filter paper in a Buchner funnel. Wash the precipitate with a small amount of 65 percent saturated ammonium sulfate solution and continue the suction until all possible liquid is removed. Return the contents of the funnel to the original flask, so as not to lose the adherent toxin, add the same volume of sterile, phenolized, buffered saline of pH 6.6 (10 percent phosphate buffer, 89.6 percent normal saline, and 0.4 percent phenol) as of crude toxin used, and agitate until solution is complete. Concentration may be accomplished at this point by redissolving in a smaller volume of diluent if desired. Again filter through filter paper in a Buchner funnel and finally through a Berkfeld candle. Store at 5° C. until needed and check for sterility and potency before using.

Precipitation of the purified toxin.—(From this point forward the sterility of the product must be maintained at all times.) Dilute 1,000 cc of the cold toxin with at least an equal volume of the above-described diluent. Dissolve 7.5 grams of tannic acid in 1,500 cc of buffered saline and filter through a Berkfeld. Of this freshly prepared and sterile tannic acid solution take one volume (1,000 cc) and pour it very slowly into the diluted toxin, accompanied by very vigorous rotation of the flask so as to insure prompt mixing. There has now been added 0.5 percent of tannic acid to the original 1,000 cc of toxin. Pour into a graduated cylinder, or other graduated container, and add buffered saline until the total is four volumes (4,000 cc), mix thoroughly, and then place at 5° C. until the precipitate has settled to a volume approximately equal to the original toxin volume and until the supernatant liquid is free from precipitate. Syphon off the supernatant, replace with an equal volume of the same diluent, mix, and allow to stand at 5° C. until the volume of the precipitate is 800 cc or less. Discard the supernatant as before, add 40 cc of a 25-percent sterile solution of acacia (this gives a final 1 percent solution), and make up to the original toxin volume with the same type of buffered saline. Mix thoroughly. The presence of the acacia causes the precipitate to retain its original light, flocculent character. Store at 5° C. and test for sterility before using.

This is the finished purified and tannic acid precipitated scarlet fever parent toxin. Its potency, within titratable limits, is the same as that of the purified soluble toxin or the crude toxin from which it was made. From this parent toxin the individual immunizing doses are prepared by diluting with the same diluent to which has been added 1 percent of acacia in the form of a sterile 25-percent solution.

As stated in the previous report, doses of 750, 3,000, and 10,000 skin test doses with a 2-week interval are tolerated very well by children of grammar-school age or younger. For the protection of pupil nurses, or persons of similar ages, 500, 2,000, 6,000, and 10,000 skin test doses are given. Children may also be given a fourth dose if desired, either repeating the third dose or giving a still larger one.

REFERENCES

(1) Veldee, M. V.: Pub. Health Rep., 52: 819 (June 25, 1937).
(2) Rane, L., and Wyman, L.: J. Immunol., 32: 321 (April 1937).
(3) Green, C. A.: J. Hyg., 35: 93 (February 1935).

NUMBER AND LENGTH OF NURSING VISITS AS INDICES OF NURSING SERVICE[1]

By HELEN BEAN, *Associate Public Health Nursing Analyst, United States Public Health Service*

Most of the criteria for the evaluation of public health nursing have been stated in terms of volume of service. The number of field nursing visits, the number of patients served in the clinic and office, the number of school inspections, or combinations of these quantitative measures, in their relation to the population or to some other suitable base, are the indices ordinarily used for judging the adequacy of a nursing program. In fact, such measures are so universally employed that a number of standards for an adequate volume of service have been suggested.

The most widely known are those put forth by the Committee on Administrative Practice of the American Public Health Association.[2] The criteria set up by the committee were stated in terms of visits or inspections that should be made under given circumstances. No attempt was made in their standards to take into consideration the number of nurses that would be needed to render the required amount of service. Hiscock[3] used the standards proposed by the committee for urban areas in conjunction with data on the amount of time required to make nursing visits of various types and proposed a standard expressed in terms of the size population one nurse may be expected to serve. Randall,[4] approaching the problem from the standpoint of the nurse, and using empirical determinations of the amount rural nurses have been able to do, has suggested a standard for rural nursing in terms of the volume of work to be expected of a nurse

[1] From the Division of Public Health Methods, National Institute of Health, in cooperation with the Division of Domestic Quarantine.

[2] Appraisal form for rural health work, second edition, 1932. The American Public Health Association, New York City.

[3] Hiscock, Ira V.: Community health organization. The Commonwealth Fund, New York City, 1932.

[4] Randall, Marian: How much work can a rural public health nurse do? Milbank Memorial Fund Quarterly, vol. XIV, No. 2, p. 167, April 1936.

during a period of one year. Although these three recommendations seem to be quite different, the fundamental basis of each is the amount of nursing service rendered.

The employment of these varying quantitative standards has been widespread. The criteria suggested by the committee have been used frequently in the evaluation of the nursing service of health departments, and Hiscock's proposal has often been quoted as a basis for employing more nurses in a given situation. Recently, with certain modifications, the standards of the Committee on Administrative Practice have served as one of the criteria for awarding certificates of merit to health departments that most nearly reached the level of performance laid down in the Appraisal Form.

In spite of the fact that volume of service has been widely used as a measure of public health work, this index has been criticized frequently as giving no indication of the quality of the service. The proponents of the volume measures admit this limitation, but point out that no satisfactory index of quality has been proposed and that there can be no quality unless some service has been rendered.

An index of nursing work seldom used in evaluating nursing programs is the average amount of time spent on a visit. Of course, it is recognized that a long visit does not imply adequate service, but certainly a nurse who habitually spends 10 to 15 minutes on a visit and the intervening travel cannot be rendering the quality of service that characterizes good public health nursing. Therefore, in the lower ranges this index does reflect to some extent the quality of the service.

This paper presents an analysis of the public health nursing work performed for a period of 1 year by the nurses of two counties; first, in terms of volume of service (a strictly quantitative evaluation) and second, in terms of length of time spent per home visit (a more qualitative type of evaluation). A comparison of these two indices for the two counties should reveal some of the limitations of such measures and point out errors of interpretation that may arise from the use of either of the indices alone.

The daily records of the nursing work in two of the counties which were included in the study of rural health department practice by the United States Public Health Service provided the data for the analyses. The counties from which the records were taken were fairly similar in type of population, economic status, and social conditions.[5] County B had an area of 521 square miles and a population of approximately 55,000.[6] County C covered an area of approximately 375 square miles[7] and had a population of approximately 41,000.[7] County C employed

[5] Mountin, Joseph W.: Effectiveness and economy of county health department practice. Pub. Health Rep., vol. 49, No. 42, October 19, 1934.

[6] Estimated for the study year.

[7] Exclusive of the one county seat which had a separate health administrator. The population is estimated for the study year.

five regular nurses during the entire study year; county B added the fifth nurse to its staff during the latter half of the study. Both counties received additional assistance, equivalent to the full time of one nurse, from local nurses engaged from the unemployment rolls. The nurses in county B each had a potential population load of approximately 10,000, while those in county C averaged about 7,000 individuals per nurse. Thus, neither county approximated one nurse per 2,000 population, the standard proposed by Hiscock.

A partial description of the record keeping procedure in these counties has already been presented.[8] Each day the nurse prepared a report showing her activities for that day. Although she made no entry to show the amount of time devoted to each visit, she did record the time spent in the field and the number of visits made during the day. From these data the average amount of time spent in the field per visit was determined.

NURSING ACHIEVEMENTS IN TERMS OF VOLUME OF WORK

The volume of field work which nurses can accomplish will depend in part on the way in which they distribute their time between field services and clinic or office duties. In county C, 67 percent of the nurse's time was spent in home visiting, school health activities, and other field work. The remainder was spent in the office or clinic. In contrast, the nurses in county B spent a smaller proportion of time in the field and devoted more time to clinic and office duties. The percentages for county B for field and for clinic and office duties were 54 and 46, respectively.

Despite the fact that a smaller proportion of the nurses' time in county C was spent in the clinic and office, the volume of clinic service rendered with the aid of the nurses in that county was almost four times the amount given with the nurses' assistance in county B. Furthermore, the nurses in county C made over twice as many home visits and twice as many school examinations as the nurses in county B. In terms of gross volume, the nurses of county C accomplished much more than the nurses of county B. Furthermore, they far exceeded the standards proposed by Randall on the basis of her study of a number of rural health departments (see table 1). In contrast, county B falls considerably below Randall's standards, with the exception of the item "clinic visits."

[8] Bean, Helen, and Hankla, Emily: Case records as an index of the public health nurse's work. Pub. Health Rep., 52: 1077 (1937). (Reprint No. 1845.)

TABLE 1.—*Average number of home visits, clinic visits, and school examinations and inspections made per nurse per year in 2 counties compared with Randall's standard*[1]

Activities of nurse	County B	County C	Randall's standard
Home visits	1,017	2,126	1,400
Clinic visits	826	3,043	200
School examination and inspection	512	1,193	1,000

[1] Randall, Marian: How much work can a rural public health nurse do? Milbank Memorial Fund Quarterly, vol. 14, No. 2, April 1936.

In the Appraisal Form, standards for nursing work are largely confined to the number of home visits which the nurse makes. No criteria are available for the efforts that nurses devote to making community contacts, organizing lay committees, attending meetings, obtaining volunteer assistance, and many other important community activities. Standards are limited to nursing visits largely because home visiting is the major activity which the nurse carries on alone.[9] When the visits made by the nurses for the various types of service were compared for the two counties, the differences were even more striking than was shown for the total volume. The two most outstanding differences as shown in table 2 were the unusually high number of visits made for communicable disease in county C and the relatively large number of tuberculosis visits made in county B. Of lesser degree were the differences in visits for postpartum service and for infant care. In both of the counties approximately the same number of visits were made for prenatal care and preschool hygiene. Relative to the total amount of service rendered, the visits were more evenly distributed among the different types of services in county B than in county C. In the latter county the major emphasis is on acute communicable diseases.

TABLE 2.—*Number and percentage of nursing visits according to type of service in 2 counties*

Type of service	Nursing visits			
	Number		Percentage	
	County B	County C	County B	County C
All types[1]	5,131	10,551	100.0	100.0
Communicable disease	975	7,356	19.0	69.7
Tuberculosis	1,773	477	34.5	4.5
Prenatal	285	337	5.6	3.2
Postpartum	405	205	7.9	2.0
Infant hygiene	676	1,069	13.2	10.1
Preschool hygiene	1,017	1,107	19.8	10.5

[1] Since there are no standards given in the Appraisal Form for visits to cases of venereal disease, all visits to such cases have been excluded from table 2 and table 3. The number of such visits was 140 for county B and 69 for county C.

[9] Bean and Hankla, cited in footnote 8.

When the number of visits for each type of service was related to the standards in the Appraisal Form, the relative emphasis on the different activities in the two counties was shifted. The outstanding difference is the excessive proportion of tuberculosis visits made in county B. In terms of the standards, the tuberculosis work in this county was far more intensive than is ordinarily found. It is interesting to note in this connection that the tuberculosis problem in county B was not as great as in county C, if the average number of deaths for the preceding 5 years may be used as an index of the extent of tuberculosis in the two counties. The average annual number of deaths was 21 in county B and 36 in county C. On the other hand, what seemed to be an excessive proportion of communicable disease visiting in county C, as shown in table 2, represented very closely the volume of service specified in the Appraisal Form (see table 3). The large number of visits for communicable disease required by the standard was due to a relatively high incidence of measles in each county. In county B it was the basis for 40 percent of the visits recommended for communicable disease and in county C it accounted for 90 percent of the expected visits for control of contagion. The policies relative to communicable disease visiting varied in the two counties. In county C it was the policy to visit each case of measles, while in county B no routine visits to cases of measles were planned.

TABLE 3.—*Number of nursing visits expected* [1] *and percentage of visits actually made according to type of service*

Type of service	Number of visits expected [1]		Percentage of visits made of those expected	
	County B	County C	County B	County C
All types	8,603	13,262	59.6	79.6
Communicable disease	[2] 2,480	[2] 7,236	[3] 39.3	[3] 101.7
Tuberculosis	[4] 315	[4] 540	562.9	88.3
Prenatal care	[5] 745	[5] 677	38.3	49.8
Postpartum care	[6] 497	[6] 451	81.5	45.5
Infant hygiene	[7] 1,224	[7] 1,115	55.2	95.9
Preschool hygiene	[8] 3,342	[8] 3,243	30.4	34.1

[1] Using criteria set up in the Appraisal Form for Rural Health Work.
[2] Based on 4 visits per case of typhoid and paratyphoid, 2 visits per case of measles, 2 visits per case of scarlet fever, 2 visits per case of whooping cough, 3 visits per case of diphtheria, 1 visit per case of poliomyelitis, and 1 visit per case of meningococcus meningitis.
[3] Visits to contacts and suspects have been included, but the number of such visits is small.
[4] 15 visits per tuberculosis death.
[5] 15 percent of the total births times 5 visits per case. Since the resident neonatal death rate could not be obtained, the minimum standard was used.
[6] 1 visit for every 2 births.
[7] 1,500 visits per 1,000 live births since average infant mortality rate for past 3 years was 59 in county B and 55 in county C.
[8] 20 percent of preschool population times 3 visits per case.

The nurses in each county rendered the required volume of visits for one type of service only—for tuberculosis in county B and communicable disease in county C. However, those in county C approximated the standard in infant hygiene and tuberculosis, and the

nurses in county B performed about 80 percent of the expected postpartum visits and 55 percent of the infant hygiene visits. For the remaining activities, the number of visits made was less than one-half of the standard.

In terms of total volume, the performance in county C was 80 percent of the expected visits, while for county B the performance was only 60 percent of the standard.

In addition to gross volume, the Appraisal Form suggests criteria for evaluating nursing work in terms of the intensity of the service rendered to the individuals reached. The nurses of both counties visited tuberculosis cases more frequently than the standard given in the Appraisal Form required, but for all other cases the visiting was below standard. As judged by frequency of visiting, the service rendered in county C was more intensive than that rendered in county B for all cases other than tuberculosis (see table 4).

TABLE 4.—*Number of visits per case carried as suggested in the Appraisal Form for Rural Health Work and as performed by nurses in 2 counties according to type of case*

Type of case[1]	Number of visits per case carried		
	As suggested in the Appraisal Form	As rendered by nurses in—	
		County B	County C
Tuberculosis	10	17.9	15.4
Prenatal care	5	2.1	3.0
Postpartum care	3	1.2	2.0
Infant hygiene	4	1.5	2.5
Preschool hygiene	3	1.5	2.1

[1] Communicable disease was omitted from this table because of the lack of uniformity in standards among the different diseases.

The foregoing data present a strictly quantitative evaluation of the nursing service rendered in the two counties. Such a measure of the nursing work indicates that county C seemed to receive better service from its nurses than county B. With the one exception of tuberculosis, the nurses of county C rendered more service for each type of case that was included in their program. According to the Appraisal Form for Rural Health Work, county C would be given credit for carrying on a better public health nursing program than county B.

NURSING ACHIEVEMENTS IN TERMS OF LENGTH OF VISIT

When the average amount of time spent by the nurses in making their visits is compared for the two counties, it is found that the nurses from county B exceeded those from county C in the length of their visits. The average time for each visit in county B was 30

minutes, while for county C it was 25 minutes. Although the absolute difference of 5 minutes for each individual visit may appear to be small, it represents a 20-percent increment in the length of the visits.

It should be remembered in this connection that the time given included travel as well as the time spent in actual contact with the patient. The available data do not permit a computation of the time devoted to travel; but since the average mileage between each individual visit in county B was 4.2 miles and in county C was 4.7 miles, it may be safely assumed that the additional length of the visits in county B represents more time spent with the client.

A more detailed analysis of the length of visits in the two counties by months of the study year revealed that, for 9 months of the year, there was little or no difference between the two counties in the amount of time devoted to a visit. For 7 of these 9 months the average length of visits in county C was longer than in county B. The 3 months in which there were exceptions were January, February, and March. During these 3 months the visits in county C were unusually short. Also during these 3 months the nurses of county C made almost half of the total number of visits that are recorded for the entire year. Since it may be safely assumed that excessively short visits cannot be very effective in their instruction of the family, many of the visits in county C were not of the best quality. Nevertheless, in an evaluation based on volume alone, these brief visits are given equal credit with the more extended contacts.

TABLE 5.—*Percentage of the total home visits made each month by the nurses in 2 counties and the length of time spent per visit*

Month	County B		County C	
	Percent of total home visits	Minutes spent per visit	Percent of total home visits	Minutes spent per visit
January	10.6	28	22.2	16
February	4.9	42	14.8	17
March	7.2	34	9.8	21
April	5.9	27	4.4	31
May	10.1	28	5.8	32
June	10.1	29	6.7	36
July	5.8	30	6.0	31
August	7.0	30	3.8	40
September	7.5	27	4.5	33
October	10.7	34	5.6	32
November	9.8	27	7.3	32
December	10.4	27	9.1	23
Mean	----------	30	----------	25

The average amount of time spent on a visit was further analyzed by individual nurse. As shown in table 6, there were wide differences in the length of visits. The variations were more extreme in county C than in county B. In county C nurse *a* spent, on the average, twice as much time for each visit as nurse *e*, the one who made the

shortest calls. Although one cannot assume that the visits made by nurse *a* were of better quality than those made by nurse *e*, it is almost certain that not much could be accomplished during a visit of 15 minutes when part of that time was devoted to travel.

TABLE 6.—*Average length of time spent on each home visit by nurse*

Individual nurse	Average number of minutes per visit	
	County B	County C
Nurse *a*	29	30
Nurse *b*	28	27
Nurse *c*	25	22
Nurse *d*	21	18
Nurse *e*	20	15

The evaluation of the nursing work of these two counties made on the basis of the length of the visits showed that the visits in county B tended to be longer than those made by the nurses in county C, thus making it possible for the nurses in county B to render more service than those in county C. In this sense the service in county B was superior to that in the other county. This finding is contradictory to the evaluation based on number of visits irrespective of the time spent in making them.

Such conflicting results from two indices of the nursing work emphasize the need for measures of service that focus on the actual accomplishments rather than on the number of efforts made or on the length of time it took to make them.

SUMMARY

Two measures of activity were applied to the nursing work of two counties fairly similar in area and health problems. One of these measures, a strictly quantitative index, considered only the volume of service. The other, a somewhat more qualitative index, measured the average length of the visit. When applied to the work of the two counties, these two indices produced conflicting results; the county with the better nursing service, as judged by the number and distribution of nursing visits, was shown to have a poorer service if length of visit was used as a basis for evaluation.

The disagreement in the conclusions derived from the application of these two types of measures to the nursing activities of two counties clearly portrays the inadequacy of either index in evaluating a public health nursing program.

Neither measure gives any indication of the results accomplished, such as imparting health information, changing the behavior of those reached, or rendering nursing service to those needing it. Since these

are the true objectives of nursing programs, it is suggested that attention be given to developing valid indices of accomplishment rather than continuing the widespread use of quantitative measures, the chief value of which is their objective character.

DEATHS DURING WEEK ENDED MAY 14, 1938

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 14, 1938	Corresponding week, 1937
Data from 87 large cities of the United States:		
Total deaths	7,973	[1] 8,441
Average for 3 prior years	8,707	
Total deaths, first 19 weeks of year	166,583	186,803
Deaths under 1 year of age	518	[1] 491
Average for 3 prior years	577	
Deaths under 1 year of age, first 19 weeks of year	10,274	11,478
Data from industrial insurance companies:		
Policies in force	68,329,739	69,645,048
Number of death claims	12,494	13,447
Death claims per 1,000 policies in force, annual rate	9.5	10.1
Death claims per 1,000 policies, first 19 weeks of year, annual rate	10.0	11.2

[1] Data for 86 cities.

PREVALENCE 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

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (----) indicate that cases or deaths may have occurred although none were reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 21, 1938, and May 22, 1937

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937
New England States:								
Maine	1	0	1	--------	103	21	0	0
New Hampshire	0	0	--------	--------	42	34	0	0
Vermont	0	1	--------	--------	138	1	0	0
Massachusetts	1	6	--------	--------	272	716	1	9
Rhode Island	0	1	--------	--------	1	150	0	1
Connecticut [1]	7	2	3	3	53	189	0	0
Middle Atlantic States:								
New York	26	28	[2] 7	[2] 7	3,351	1,693	8	10
New Jersey	7	16	3	7	845	1,800	2	0
Pennsylvania	29	22	--------	--------	4,597	1,728	5	8
East North Central States:								
Ohio	6	12	--------	24	1,114	586	1	6
Indiana	35	10	5	12	462	653	0	2
Illinois [3]	25	37	16	38	1,319	346	4	4
Michigan [4]	15	18	--------	--------	3,140	168	0	0
Wisconsin	4	1	8	57	2,585	63	1	1
West North Central States:								
Minnesota	1	2	--------	1	370	13	0	2
Iowa	6	6	--------	--------	290	3	1	0
Missouri	19	10	9	36	198	48	0	1
North Dakota	0	0	3	3	96	2	0	2
South Dakota	0	0	--------	--------	--------	5	0	0
Nebraska	1	0	--------	1	234	10	0	3
Kansas	5	7	9	2	407	22	1	1
South Atlantic States:								
Delaware	3	0	--------	--------	14	24	0	0
Maryland [4]	4	6	3	2	55	408	2	1
District of Columbia [3]	3	29	--------	--------	14	107	1	2
Virginia [3]	12	6	--------	--------	413	502	3	5
West Virginia	4	4	24	20	267	78	2	4
North Carolina	11	16	3	3	1,695	272	1	2
South Carolina	2	1	47	69	68	--------	0	0
Georgia [1]	9	3	--------	--------	154	--------	1	1
Florida [1]	1	5	2	3	78	--------	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 21, 1938, and May 22, 1937—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937
East South Central States:								
Kentucky	6	7	1	8	158	292	9	11
Tennessee [1]	2	4	24	42	113	138	1	2
Alabama [1]	16	5	17	49	304	28	0	8
Mississippi [1] [4]	5	1	----	----	----	----	1	1
West South Central States:								
Arkansas	5	2	23	26	184	2	0	0
Louisiana	5	10	14	6	37	7	0	1
Oklahoma	3	5	51	34	161	86	1	1
Texas [1]	34	46	176	298	260	1,003	1	5
Mountain States:								
Montana [3]	2	0	----	21	62	29	0	0
Idaho [3]	0	2	7	15	23	25	0	0
Wyoming	0	0	----	----	26	5	0	0
Colorado [3] [5]	6	3	----	----	319	20	0	0
New Mexico [3]	1	0	12	1	114	82	1	0
Arizona	4	0	27	25	18	46	0	1
Utah [4]	0	0	----	----	317	52	0	0
Pacific States:								
Washington	0	1	----	----	28	55	0	1
Oregon [3]	1	3	27	17	58	16	0	1
California	26	32	44	41	978	281	2	4
Total	353	370	566	871	25,538	11,809	50	102
First 20 weeks of year	10,388	9,628	40,899	269,849	638,672	164,931	1,592	3,212

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fever		Whooping cough
	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938
New England States:									
Maine	0	0	26	21	0	0	0	1	55
New Hampshire	0	0	21	11	0	0	1	0	----
Vermont	0	1	8	13	0	0	4	0	73
Massachusetts	0	0	398	259	0	0	1	0	115
Rhode Island	0	0	15	58	0	0	0	1	21
Connecticut [1]	0	0	86	149	0	0	1	0	97
Middle Atlantic States:									
New York	1	1	714	774	0	0	5	8	463
New Jersey	0	1	101	181	0	0	4	1	----
Pennsylvania	0	1	665	413	0	0	13	5	254
East North Central States:									
Ohio	0	0	202	209	5	0	5	5	141
Indiana	0	1	76	115	39	19	3	1	21
Illinois [3]	1	1	402	570	17	16	7	5	141
Michigan [4]	2	2	384	790	7	9	2	5	255
Wisconsin	0	0	139	309	3	2	0	0	208
West North Central States:									
Minnesota	0	0	127	137	10	17	0	0	22
Iowa	0	0	96	156	28	20	1	0	34
Missouri	0	0	127	155	24	61	0	3	23
North Dakota	0	0	24	23	14	7	1	1	23
South Dakota	0	0	12	59	11	4	0	0	9
Nebraska	0	0	24	57	9	4	0	0	16
Kansas	0	0	98	210	6	4	0	3	139
South Atlantic States:									
Delaware	0	0	10	3	0	0	0	1	6
Maryland [4]	0	0	78	41	0	0	5	2	62
District of Columbia [3]	0	0	14	14	0	0	0	2	3
Virginia [3]	1	1	17	10	0	0	4	7	117
West Virginia	0	0	35	73	1	2	5	3	32
North Carolina	1	0	17	38	3	0	6	3	345
South Carolina	0	0	----	1	0	0	2	3	28
Georgia [1]	0	0	16	14	0	0	10	5	91
Florida [1]	3	0	4	4	0	0	3	7	19

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 21, 1938, and May 22, 1937—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fever		Whooping cough
	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938	Week ended May 22, 1937	Week ended May 21, 1938
East South Central States:									
Kentucky	0	0	25	51	1	1	3	5	84
Tennessee [1]	0	1	21	11	3	0	4	7	56
Alabama [1]	1	0	3	5	9	0	2	6	54
Mississippi [1] [4]	0	2	5	4	1	0	9	2	----
West South Central States:									
Arkansas	0	0	4	11	6	1	5	1	21
Louisiana	2	1	7	11	0	0	7	19	44
Oklahoma	0	0	14	29	14	4	8	4	37
Texas [1]	1	1	74	225	11	16	9	16	364
Mountain States:									
Montana [3]	0	0	11	17	5	19	1	0	29
Idaho [3]	0	0	5	21	10	5	0	3	4
Wyoming	0	0	2	5	0	2	0	0	1
Colorado [2] [3]	0	0	58	30	6	2	1	0	38
New Mexico [3]	0	0	6	16	8	0	3	0	7
Arizona	0	0	7	10	3	0	7	5	50
Utah [4]	0	0	15	16	0	0	0	1	45
Pacific States:									
Washington	0	0	25	42	14	7	1	1	174
Oregon [3]	0	1	22	35	16	7	3	2	23
California	2	2	166	210	70	23	20	2	608
Total	15	17	4,406	5,616	354	252	166	146	4,452
First 20 weeks of year	390	412	113,890	134,892	10,159	6,239	2,540	2,265	85,571

[1] Typhus fever, week ended May 21, 1938, 28 cases as follows: Connecticut, 1; Georgia, 14; Florida, 3; Tennessee, 1; Alabama, 3; Mississippi, 1; Texas, 5.
[2] New York City only.
[3] Rocky Mountain spotted fever, week ended May 21, 1938, 13 cases as follows: Illinois, 1; District of Columbia, 2; Virginia, 1; Montana, 1; Idaho, 2; Colorado, 3; New Mexico, 1; Oregon, 1.
[4] Period ended earlier than Saturday.
[5] Colorado tick fever, week ended May 21, 1938, Colorado, 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April 1938										
Alabama	27	36	268	113	3,668	31	2	38	26	7
Florida	11	58	11	25	2,395	9	1	39	6	20
Georgia	3	28	171	164	2,112	92	5	34	2	23
Illinois	7	124	59	5	13,538	1	3	2,152	132	16
Indiana	6	95	48	----	5,745	----	0	597	351	29
Maryland	4	23	34	1	400	3	0	281	0	7
Minnesota	4	13	15	----	905	----	0	598	65	5
Mississippi	3	25	2,825	2,408	1,755	406	2	12	8	17
Missouri	7	74	199	28	2,879	----	2	834	155	18
Nebraska	2	2	27	----	598	----	0	152	37	1
New Mexico	0	27	23	----	374	2	0	52	1	3
New York	30	136	----	7	16,021	----	4	3,815	0	18
Ohio	16	60	90	5	9,905	----	4	1,311	30	24
Oklahoma	4	28	409	59	646	32	4	105	72	13
Pennsylvania	22	155	----	----	21,001	1	2	2,220	0	32
Rhode Island	1	0	1	----	14	----	0	96	0	0
Vermont	0	7	----	----	365	----	0	54	0	0
West Virginia	22	33	148	2	2,565	1	2	171	1	20

Summary of monthly reports from States—Continued

April 1938

	Cases
Anthrax:	
New York	1
West Virginia	1
Chickenpox:	
Alabama	294
Florida	413
Georgia	246
Illinois	1,855
Indiana	311
Maryland	595
Minnesota	596
Mississippi	623
Missouri	263
Nebraska	198
New Mexico	120
New York	3,789
Ohio	2,026
Oklahoma	174
Pennsylvania	3,677
Rhode Island	64
Vermont	114
West Virginia	207
Conjunctivitis:	
Georgia (infectious)	3
New Mexico	2
Oklahoma	1
Dengue:	
Florida	9
Diarrhea:	
Maryland	6
New Mexico	2
Ohio (under 2 years; enteritis included)	19
Dysentery:	
Alabama (amoebic)	1
Florida (amoebic)	3
Georgia (amoebic)	14
Georgia (bacillary)	27
Illinois (amoebic)	10
Illinois (amoebic carriers)	14
Illinois (bacillary)	26
Maryland (bacillary)	6
Minnesota (amoebic)	2
Mississippi (amoebic)	121
Mississippi (bacillary)	725
Missouri (bacillary)	5
New Mexico (amoebic)	3
New Mexico (bacillary)	1
New Mexico (unspecified)	1
New York (amoebic)	9
New York (bacillary)	22
Ohio (bacillary)	1
Oklahoma	1
Pennsylvania (amoebic)	1
Encephalitis, epidemic or lethargic:	
Alabama	3
Florida	3
Illinois	9
Maryland	1
Missouri	1
New York	18
Ohio	1
Oklahoma	1
Pennsylvania	3
West Virginia	2
German measles:	
Alabama	44
Florida	2
Illinois	117
Maryland	31
New Mexico	4
New York	348
Ohio	75
Pennsylvania	262

April 1938—Continued

	Cases
Hookworm disease:	
Florida	1,115
Georgia	2,219
Mississippi	432
Impetigo contagiosa:	
Illinois	15
Maryland	10
Oklahoma	1
Lead poisoning:	
Ohio	3
Leprosy:	
Florida	1
Mumps:	
Alabama	200
Florida	222
Georgia	218
Illinois	917
Indiana	131
Maryland	161
Mississippi	290
Missouri	356
Nebraska	111
New Mexico	37
Ohio	841
Oklahoma	29
Pennsylvania	5,346
Rhode Island	5
Vermont	333
West Virginia	57
Ophthalmia neonatorum:	
Illinois	2
Indiana	1
Maryland	1
Mississippi	6
New Mexico	1
New York	8
Ohio	63
Pennsylvania	7
Paratyphoid fever:	
Georgia	5
Illinois	1
New York	6
Ohio	4
Puerperal septicemia:	
Georgia	5
Mississippi	22
New Mexico	2
Ohio	2
Rabies in animals:	
Alabama	79
Florida	9
Illinois	39
Indiana	54
Maryland	2
Minnesota	9
Mississippi	24
Missouri	16
New York [1]	2
Rhode Island	4
Rabies in man:	
Indiana	2
Rocky Mountain spotted fever:	
Illinois	1
Maryland	1
Scabies:	
Maryland	1
Oklahoma	2
Septic sore throat:	
Florida	9
Georgia	70
Illinois	6
Maryland	31
Minnesota	15
Missouri	70
New Mexico	9
New York	148

April 1938—Continued

	Cases
Septic sore throat—Contd.	
Ohio	132
Oklahoma	82
Rhode Island	20
West Virginia	5
Tetanus:	
Alabama	7
Florida	3
Georgia	1
Illinois	4
Maryland	1
New York	4
Ohio	3
Trachoma:	
Illinois	39
Indiana	15
Mississippi	10
Missouri	61
Oklahoma	1
Pennsylvania	1
Trichinosis:	
New York	14
Tularaemia:	
Alabama	1
Georgia	10
Illinois	4
Indiana	1
Maryland	2
Minnesota	1
Missouri	2
Oklahoma	6
Pennsylvania	1
Typhus fever:	
Alabama	15
Florida	6
Georgia	24
New York	1
Undulant fever:	
Alabama	3
Florida	5
Georgia	6
Illinois	14
Indiana	11
Maryland	3
Minnesota	4
Mississippi	1
Missouri	7
New Mexico	3
New York	24
Ohio	16
Oklahoma	115
Pennsylvania	8
Vermont	5
Vincent's infection:	
Florida	51
Illinois	14
Maryland	6
New York [1]	105
Oklahoma	4
Whooping cough:	
Alabama	228
Florida	104
Georgia	280
Illinois	463
Indiana	128
Maryland	237
Minnesota	112
Mississippi	1,171
Missouri	202
Nebraska	57
New Mexico	104
New York	1,929
Ohio	700
Oklahoma	483
Pennsylvania	1,054
Rhode Island	76
Vermont	113
West Virginia	323

[1] Exclusive of New York City.

PLAGUE INFECTION IN FLEAS FROM GROUND SQUIRRELS IN BAKER COUNTY, OREG.

Under date of May 17, 1938, Senior Surgeon C. R. Eskey, in charge of plague suppressive measures, San Francisco, Calif., reported that plague infection had been proved, by animal inoculation, in 51 fleas collected May 2, 1938, from 88 *Citellus oregonus* shot 4 to 7 miles northwest of Hereford, Baker County, Oreg.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 14, 1938

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	171	126	48	6,745	669	2,294	18	423	27	1,410	----
Current week [1]	126	49	18	6,679	467	1,596	13	362	38	1,281	----
Maine:											
Portland	0	1	1	13	2	2	0	0	0	19	23
New Hampshire:											
Concord	0	----	1	0	2	1	0	0	0	0	10
Manchester	0	----	0	0	2	4	0	0	0	0	16
Nashua	0	----	0	0	0	0	0	0	1	0	6
Vermont:											
Barre	0	----	0	0	0	0	0	0	0	0	1
Burlington	0	----	0	13	0	1	0	0	0	1	8
Rutland	0	----	0	0	0	0	0	0	0	0	3
Massachusetts:											
Boston	0	----	0	192	16	148	0	14	1	16	195
Fall River	0	----	0	0	4	4	0	0	0	7	36
Springfield	0	----	0	26	4	3	0	1	0	10	34
Worcester	0	----	0	1	6	27	0	0	0	18	56
Rhode Island:											
Pawtucket	0	----	0	0	0	1	0	0	0	1	11
Providence	0	----	0	1	9	10	0	0	0	27	70
Connecticut:											
Bridgeport	0	----	0	1	3	16	0	0	1	3	25
Hartford	0	----	0	0	4	22	0	0	0	2	41
New Haven	1	1	0	1	3	0	0	0	0	10	31
New York:											
Buffalo	1	----	0	4	6	42	0	3	0	11	113
New York	32	4	2	2,123	71	326	0	79	4	237	1,392
Rochester	1	1	0	23	3	15	0	2	2	3	69
Syracuse	0	----	0	42	3	7	0	1	0	7	63
New Jersey:											
Camden	2	----	0	15	3	2	0	2	1	0	26
Newark	0	1	0	9	6	7	0	5	0	24	92
Trenton	0	----	0	3	4	4	0	6	0	0	37
Pennsylvania:											
Philadelphia	5	4	1	676	18	94	0	32	3	52	488
Pittsburgh	8	2	2	44	15	42	0	7	0	15	146
Reading	0	----	0	9	1	2	0	1	0	1	25
Scranton	0	----	----	6	----	4	0	----	0	2	----
Ohio:											
Cincinnati	2	----	0	10	10	6	0	12	0	8	125
Cleveland	2	6	0	249	14	45	0	12	0	57	199
Columbus	0	----	0	36	9	8	0	4	0	11	98
Toledo	0	1	1	106	0	6	1	4	2	11	65
Indiana:											
Anderson	0	----	0	41	2	1	0	0	0	4	12
Fort Wayne	0	----	0	9	3	16	0	0	0	0	25
Indianapolis	0	----	0	177	10	17	0	1	0	0	89
South Bend	0	----	0	63	1	1	0	0	1	2	15
Terre Haute	0	----	0	10	0	4	0	0	0	0	25

[1] Figures for Tacoma, Washington, estimated; report not received.

City reports for week ended May 14, 1938—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Illinois:											
Alton	0	------	0	0	1	3	0	0	0	0	8
Chicago	9	2	2	375	39	205	0	34	6	65	654
Elgin	0	------	0	1	3	3	0	0	0	0	11
Moline	0	------	0	7	1	4	0	1	0	1	15
Springfield	0	------	0	17	2	6	0	0	0	0	15
Michigan:											
Detroit	8	------	2	326	9	137	0	15	0	138	222
Flint	0	------	0	99	7	20	0	1	0	5	19
Grand Rapids	1	------	0	179	2	8	0	6	0	7	28
Wisconsin:											
Kenosha	0	------	0	144	0	3	0	0	0	1	13
Madison	0	------	0	202	2	0	0	1	0	9	25
Milwaukee	0	------	0	51	6	30	0	3	0	66	97
Racine	0	------	0	304	0	3	0	1	0	19	17
Superior	0	------	0	7	0	0	0	0	0	3	10
Minnesota:											
Duluth	0	------	0	13	0	6	0	2	1	3	23
Minneapolis	0	------	0	154	2	14	5	1	1	1	111
St. Paul	1	------	0	0	1	14	0	1	0	2	51
Iowa:											
Cedar Rapids	0	------	--------	4	-------	0	0	-------	0	5	--------
Davenport	0	------	--------	1	-------	4	0	-------	0	0	--------
Des Moines	1	------	0	30	0	24	4	0	0	0	31
Sioux City	1	------	--------	31	-------	8	0	-------	0	4	--------
Waterloo	0	------	--------	0	-------	9	0	-------	0	1	--------
Missouri:											
Kansas City	1	------	0	13	6	16	0	5	0	2	92
St. Joseph	0	------	0	3	1	1	0	0	0	0	18
St. Louis	2	------	2	6	12	51	3	5	0	4	223
North Dakota:											
Fargo	0	------	0	1	0	0	0	1	0	4	5
Grand Forks	0	------	--------	45	-------	1	0	-------	0	0	--------
Minot	0	------	0	2	0	0	3	0	0	1	9
South Dakota:											
Aberdeen	2	------	--------	0	-------	0	0	-------	0	12	--------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	10
Nebraska:											
Lincoln	1	------	--------	21	-------	6	0	-------	0	6	--------
Omaha	0	------	0	153	3	2	0	4	0	0	46
Kansas:											
Lawrence	0	1	0	59	0	0	0	0	0	0	9
Topeka	0	------	1	129	1	0	0	0	0	36	17
Wichita	1	------	0	24	1	4	0	0	0	12	21
Delaware:											
Wilmington	1	------	0	6	5	1	0	1	0	4	36
Maryland:											
Baltimore	4	3	0	36	16	50	0	7	1	43	203
Cumberland	0	------	0	5	2	1	0	1	0	1	18
Frederick	0	------	0	0	0	0	0	0	2	0	6
Dist. of Col.:											
Washington	2	------	0	15	9	18	0	9	1	11	144
Virginia:											
Lynchburg	2	------	0	0	0	3	0	1	0	2	10
Norfolk	0	5	0	0	0	3	0	2	0	2	17
Richmond	1	------	0	105	5	4	0	1	0	0	50
Roanoke	0	------	0	7	2	0	0	1	0	6	12
West Virginia:											
Charleston	0	------	0	3	1	0	0	1	1	0	22
Huntington	1	------	--------	0	-------	7	0	-------	0	0	--------
Wheeling	0	------	0	74	1	2	0	1	0	2	19
North Carolina:											
Gastonia	0	------	--------	31	-------	0	0	-------	0	7	--------
Raleigh	0	------	0	69	6	0	0	1	0	5	19
Wilmington	1	------	0	16	1	0	0	0	0	18	9
Winston-Salem	0	------	0	22	1	1	0	1	0	25	17
South Carolina:											
Charleston	0	4	0	0	1	1	0	2	0	0	20
Florence	0	------	0	3	0	1	0	0	0	0	12
Greenville	0	------	0	18	3	0	0	1	0	4	26
Georgia:											
Atlanta	0	1	0	6	6	3	0	7	0	18	70
Brunswick	0	------	0	19	1	0	0	2	0	0	3
Savannah	0	2	--------	15	1	0	0	0	0	0	22
Florida:											
Miami	1	3	0	2	1	0	0	4	0	2	38
Tampa	2	1	0	36	0	0	0	1	0	0	22

City reports for week ended May 14, 1938—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Kentucky:											
Ashland	0	----	0	1	3	1	0	0	0	7	6
Covington	0	1	0	0	3	2	0	2	1	1	16
Lexington	0	----	0	0	1	3	0	2	0	0	20
Louisville	0	----	0	125	3	16	0	3	0	20	65
Tennessee:											
Knoxville	3	----	0	19	2	1	0	2	1	1	34
Memphis	1	----	0	10	6	4	0	2	0	3	75
Nashville	1	----	1	28	3	5	0	3	0	4	43
Alabama:											
Birmingham	1	2	0	19	4	0	0	5	1	1	70
Mobile	1	3	0	2	0	0	0	0	0	0	21
Montgomery	0	----	----	70	----	0	0	----	0	0	----
Arkansas:											
Fort Smith	0	----	----	1	----	0	0	----	0	0	----
Little Rock	0	----	0	1	4	0	0	2	0	3	----
Louisiana:											
Lake Charles	0	----	0	0	1	0	0	1	2	0	6
New Orleans	6	3	2	5	8	8	0	6	0	44	128
Shreveport	0	----	0	4	4	1	0	3	1	0	33
Oklahoma:											
Oklahoma City	0	----	0	2	2	4	0	1	0	1	41
Tulsa	0	----	----	152	----	3	0	----	0	10	----
Texas:											
Dallas	1	----	0	6	3	5	0	3	1	4	59
Fort Worth	2	----	0	1	2	3	0	5	0	1	40
Galveston	1	----	0	0	1	0	0	1	0	1	10
Houston	4	----	0	1	5	4	1	6	1	0	82
San Antonio	1	----	1	0	7	0	0	7	0	1	67
Montana:											
Billings	0	----	0	2	1	0	0	0	0	3	4
Great Falls	0	----	0	0	0	2	0	0	0	8	7
Helena	0	----	0	2	0	1	0	0	0	2	1
Missoula	0	----	0	0	2	0	0	0	0	0	10
Idaho:											
Boise	0	----	0	0	0	3	2	1	0	0	4
Colorado:											
Colorado Springs	0	----	0	0	3	1	1	0	0	6	8
Denver	12	----	0	62	9	14	0	1	0	11	76
Pueblo	0	----	0	61	3	1	0	1	0	8	11
New Mexico:											
Albuquerque	0	----	0	1	0	2	0	2	0	3	12
Utah:											
Salt Lake City	0	----	0	216	0	5	0	2	1	10	30
Washington:											
Seattle	0	----	0	1	7	5	0	4	1	37	100
Spokane	0	----	0	1	2	3	1	0	0	10	29
Tacoma	----	----	----	----	----	----	----	----	----	----	----
Oregon:											
Portland	2	----	0	3	6	17	0	1	0	5	76
Salem	0	1	----	0	----	3	0	----	0	0	----
California:											
Los Angeles	7	6	0	47	9	39	0	14	5	22	287
Sacramento	0	----	0	33	2	1	0	2	0	19	33
San Francisco	0	2	0	6	4	16	0	7	1	41	156

City reports for week ended May 14, 1938—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Alabama:			
Worcester	1	0	0	Birmingham	7	0	0
New York:				Arkansas:			
Buffalo	2	0	0	Fort Smith	1	0	0
New York	0	1	0	Louisiana:			
Illinois:				New Orleans	1	0	0
Chicago	3	1	0	Texas:			
Wisconsin:				Dallas	0	1	0
Superior	1	0	0	Colorado:			
Missouri:				Denver	1	0	0
St. Louis	0	1	0	Washington:			
Maryland:				Seattle	0	1	0
Baltimore	1	1	0	California:			
Kentucky:				Los Angeles	1	0	0
Louisville	1	0	0				
Tennessee:							
Nashville	1	0	0				

Encephalitis, epidemic or lethargic.—Cases: New York, 4; Philadelphia, 1; Baltimore, 1.
Pellagra.—Cases: Charleston, S. C., 1; Florence, 1; Atlanta, 3; Savannah, 1; Birmingham, 5; Montgomery, 1; New Orleans, 1; Dallas, 2.
Typhus fever.—Cases: Birmingham, 1; Los Angeles, 1.

FOREIGN AND INSULAR

BERMUDA

Vital statistics—Year 1937.—Following are vital statistics for Bermuda for the year 1937:

Number of live births	762	Deaths from—Continued.	
Number of live births per 1,000 population	23. 1	Cirrhosis of the liver	2
Number of stillbirths	34	Diabetes mellitis	7
Deaths, including stillbirths	363	Diarrhea and enteritis	9
Deaths, including stillbirths, per 1,000 population	11. 08	Homicide	1
Deaths under 1 year of age	52	Leprosy	1
Deaths under 1 year of age per 1,000 live births	71	Malaria	1
Deaths from:		Nephritis	24
Appendicitis	2	Pneumonia	8
Cancer and other malignant tumors	24	Septicemia	4
Cerebral hemorrhage, embolism and thrombosis	35	Suicide	1
		Syphilis	1
		Tuberculosis	10

CANADA

Provinces—Communicable diseases—2 weeks ended April 23, 1938.—During the 2 weeks ended April 23, 1938, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia [1]	New Brunswick [2]	Quebec [3]	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				3	5	1	1	1		11
Chickenpox		6	5	619	365	88	48	18	147	1,296
Diphtheria		6	5	115	7	6	1		2	142
Dysentery				1	4					5
Erysipelas				28	7	4	3		5	47
Influenza		3		6	150	13	1		48	221
Lethargic encephalitis						1				1
Measles		20	10	574	1,041	14	60	15	72	1,806
Mumps		25	118		164	159	4	14	14	498
Paratyphoid fever					1					1
Pneumonia		4			64		7		20	95
Poliomyelitis				2		1				3
Scarlet fever		44	14	408	201	42	81	42	47	879
Smallpox								2		2
Trachoma							1		12	13
Tuberculosis	4	1	26	230	82	5	8	2	52	410
Typhoid fever		2	6	58	7		1	3	3	80
Undulant fever				2	7				1	10
Whooping cough		5		254	151	31	1	6	178	626

[1] 2 weeks ended Apr. 27, 1938. [2] 3 weeks ended Apr. 23, 1938. [3] 4 weeks ended Apr. 23, 1938.

CUBA

Habana—Communicable diseases—4 weeks ended May 7, 1938.—During the 4 weeks ended May 7, 1938, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	13	1	Tuberculosis	9	3
Malaria	[1] 2		Typhoid fever	[1] 24	3
Scarlet fever	2				

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended April 30, 1938.—During the 4 weeks ended April 30, 1938, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Beriberi				3			3
Cancer		1	2	6		2	11
Chickenpox		12	4	64	20	11	111
Diphtheria		23		1	1	3	28
Dysentery (bacillary)		1		1			2
Hookworm disease		1	1				2
Leprosy		1	2	1			4
Lethargic encephalitis		1	1				2
Malaria	18	6	3	51	10	81	169
Measles	1	16	63	3	2	1	86
Poliomyelitis			1		1	2	4
Scarlet fever		2					2
Trachoma			1			35	36
Tuberculosis	23	40	33	47	14	41	198
Typhoid fever	19	58	12	43	7	70	209
Whooping cough				1			1
Yaws						5	5

CZECHOSLOVAKIA

Communicable diseases—February 1938.—During the month of February 1938 certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	3		Paratyphoid fever	12	1
Cerebrospinal meningitis	40	8	Poliomyelitis	2	
Chickenpox	190		Puerperal fever	31	8
Diphtheria	2,642	129	Scarlet fever	1,603	22
Dysentery	24	1	Trachoma	71	
Influenza	1,094	20	Typhoid fever	420	31
Lethargic encephalitis		2	Typhus fever	2	
Malaria	122				

FINLAND

Communicable diseases—March 1938.—During the month of March 1938, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	249	Poliomyelitis	4
Dysentery	1	Scarlet fever	883
Influenza	11,920	Typhoid fever	42
Paratyphoid fever	19	Undulant fever	2

YUGOSLAVIA

Communicable diseases—4 weeks ended April 24, 1938.—During the 4 weeks ended April 24, 1938, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	17	2	Paratyphoid fever	19	3
Cerebrospinal meningitis	103	30	Poliomyelitis	1	----
Diphtheria and croup	464	37	Scarlet fever	196	3
Dysentery	20	1	Sepsis	10	3
Erysipelas	170	4	Tetanus	27	10
Favus	6	----	Typhoid fever	182	25
Leprosy	3	----	Typhus fever	151	7

Communicable diseases—1936.—During 1936 certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	771	79	Paratyphoid fever	373	19
Cerebrospinal meningitis	151	64	Poliomyelitis	110	13
Diphtheria and croup	9,995	909	Puerperal sepsis	124	48
Dysentery	1,796	208	Rabies	32	32
Erysipelas	3,337	136	Scarlet fever	5,881	114
Kala-azar	11	1	Tetanus	452	207
Leprosy	8	4	Typhoid fever	7,017	667
Lethargic encephalitis	15	5	Typhus fever	775	50
Measles	10,235	160			

Population: 15,061,580.

Smallpox.—According to a recent report for the year 1936, issued by the Central Department of Health of Yugoslavia, no case of smallpox had been reported in that country since 1930. The numbers of cases and deaths reported from 1919 to 1930 were as follows:

Year	Cases	Deaths	Year	Cases	Deaths
1919	5,278	1,100	1925	14	3
1920	4,156	941	1926	4	2
1921	2,119	483	1927	3	0
1922	728	165	1928	0	0
1923	1,042	198	1929	0	0
1924	330	64	1930	1	0

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for May 27, 1938, pages 880-893. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

China.—Cholera has been reported in China as follows: Shanghai, May 23, 1938, 1 case; Swatow, week ended April 30, 1938, 1 case.

India—Jodhpur.—During the week ended May 14, 1938, 3 cases of cholera were reported in Jodhpur, India.

India (Portuguese)—Noroli.—During the week ended March 26, 1938, 7 cases of cholera were reported in Noroli, Portuguese India.

Indochina (French).—During the week ended May 14, 1938, cholera was reported in Indochina as follows: Annam Province, 85 cases; Tonkin Province, 542 cases; Hanoi, 58 cases.

Plague

Bolivia—Chuquisaca Department—Tomina Province.—For the period April 4–10, 1938, 3 cases of plague were reported in Tomina Province, Department of Chuquisaca, Bolivia.

Peru.—During the month of March 1938, plague has been reported in Peru as follows: Libertad Department, 2 cases; Lima Department, 5 cases, 3 deaths.

United States—Oregon.—A report of plague infection in Oregon appears on page 926 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Dutch East Indies—Batavia.—During the week ended May 7, 1938, 3 cases of smallpox were reported in Batavia, Dutch East Indies.

Honduras—Tela.—During the week ended May 14, 1938, 1 case of smallpox was reported in Tela, Honduras.

Typhus Fever

Bolivia.—During the period April 4–17, 1938, typhus fever was reported in Bolivia as follows: La Paz Department—La Paz, 1 case, Camacho Province, 6 cases; Oruro, Oruro Department, 2 cases; Potosi, Potosi Department, 3 cases.

China—Shanghai.—During the week ended May 14, 1938, 94 cases of typhus fever were reported in Shanghai, China.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Minas Geraes State, May 1–3, 1938, 2 deaths; Rio de Janeiro State, May 1, 1 death; Santa Catharina State, April 15–18, 1938, 3 deaths.

Colombia—Santander Department—Velez.—On April 19, 1938, 1 death from yellow fever was reported in Velez, Santander Department, Colombia.

Gold Coast—Keta.—During the week ended May 14, 1938, 1 suspected case of yellow fever was reported in Keta, Gold Coast.

Sierra Leone—Kailahun.—On May 9, 1938, 1 suspected case of yellow fever was reported in Kailahun, Sierra Leone.

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