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THE SEASONS, CAUSES, AND GEOGRAPHICAL DISTRIBUTION OF HAY FEVER AND HAY-FEVER RESORTS IN THE UNITED STATES.

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As hay fever is due to the inhalation of wind-borne pollens, the fecundating element of many plants varying in their geographical distribution and period of bloom, the seasons of hay fever, and its character, differ greatly in the various States of the Union.

Hay fever, in different individuals, varies not only in degree, but also in the character of the sensitization.¹ There are, for instance, subjects who are sensitive to the pollen of the ragweed, *Ambrosia*, and not to that of the grasses, and vice versa; others who react to the pollen of the wormwoods, species of *Artemisia*, but not to that of the grasses or ragweeds. Others again who react, in various degrees, to all of these pollens.

As a result of this the type of hay fever varies in different sections of the United States according to the distribution of the plants that cause the disease. For a similar reason the hay-fever seasons vary in different sections, being dependent upon the flowering season of these plants.

Classification.

Although hay fever is due to the pollen of hundreds of different (anemophilous) plants, our investigations have shown that biologically most of these may be divided into four groups, viz, Poaceæ, Ambrosiaceæ, *Artemisia*, and Chenopodiaceæ, any member or a combination of several of which may be used for immunizing purposes.²

A patient sensitive to the pollen protein of one of the several thousands of grasses, Poaceæ, for instance, is sensitive in various degrees to the others. This is an important matter, as the grass pollens are the principal cause of spring hay fever in most sections of the United States, and this biological similarity renders the immunizing treatment practicable.

The other most common cause of hay fever is the ragweed, and we have found that the pollen of the common ragweed, *Ambrosia elatior*,

¹ Hay Fever and Hay-Fever Pollens. W. Scheppegrell, M. D., Archives of Internal Medicine, June, 1917

² Classification of Hay-Fever Pollens from a Biological Standpoint. W. Scheppegrell, M. D., Boston Medical and Surgical Journal, July, 1917.

is representative not only of all the ragweeds, but also of the marsh-elders, *Iva*, bur ragweed, *Franseria*, and cockleburs, *Xanthium*, so that the pollen extract of *A. elatior* may be used for immunizing purposes for this group, Ambrosiaceæ.¹

In addition to these, we have segregated, from a biological standpoint, the *Artemisia* group, representing over 30 species of wormwoods, and the Chenopodiaceæ group, including true chenopods, *Chenopodium*; amaranths, *Amaranthus*; Russian thistle, *Salsola pestifer* and *kali*; and the docks, *Rumex crispus*, *acetosella*, etc. The names of the representative groups are therefore given for each State.

In addition to stating the groups that cause hay fever in the different States, the names of the most common plants are given. While a pollen extract representative of the group may be used in most cases, one prepared from the pollen of the plants directly responsible sometimes gives more satisfactory results and should be used when available. The ragweed, for instance, is also representative of the bush sandbur and bur ragweeds, *Franseria dumosa* and *acanthicarpa*, but when these are in excess of the ragweeds, *Ambrosia*, as they are in the Dakotas, Nebraska, Wyoming, New Mexico, and Arizona, it is advantageous to use the pollen of the species of *Franseria*.

The Cereals in Hay Fever.

The cereals, such as wheat, rye, oats, and corn, also have hay-fever pollens and should be added as a local cause of hay fever in most of the States. The pollen of corn, however, is so large (80 microns) that its potential area is very circumscribed.

The cereals are included in the Poaceæ group.

Hay-Fever Seasons.

In the following report the hay-fever seasons of both spring and fall hay fever for all the States are given. These are based on the reports of experienced rhinologists in each State. These seasons vary somewhat with different years (as they are influenced by weather conditions), and the dates given are the average for several years.

The hay-fever seasons of the subjects also vary, being influenced by the individual degree of sensitization. When this is high, the patient's attack commences as soon as there is in the air a small percentage of the pollen to which he reacts, while a less sensitive patient's attack commences only when the pollen infestation is high, which may be a week or more later. The same principle applies to the ending of the season.

¹ The Treatment of Hay Fever. W. Scheppegegrell, M. D., Public Health Reports, Aug. 1, 1919.

Hay-Fever Resorts.

There are few localities in the United States absolutely free from hay fever, as the pollen of most of hay-fever plants is very buoyant and will traverse 5 or 6 miles under favorable wind conditions. Those localities in the list reported, however, are relatively free, and will therefore be found useful in determining the nearest locality in which the patient may find relief.

ALABAMA.¹

Spring hay fever.—April 15 to July 15.

Principal cause: The grasses, Poaceæ group, the most common being the following: Johnson grass, *Holcus halepensis*; crabgrass, *Syntherisma sanguinalis*; yellow foxtail, *Chætochloa lutescens*; barnyard grass, *Echinochloa crus-galli*; goose grass, *Eleusine indica*; water grass, *Paspalum dilatatum*; and Bermuda grass, *Capriola dactylon*.

Minor cause: Curly dock, *Rumex crispus*, and spiny amaranth, *Amaranthus spinosus*—Chenopodiaceæ group.

Locally: Elms, *Ulmus americana* and *alata*; cottonwood, *Populus deltoides*, and oaks, species of *Quercus*.

Fall hay fever.—August 18 to October 10.

Principal cause: Common ragweed, *Ambrosia elatior*; the giant ragweed, *Ambrosia trifida*. Rough marsh-elder, *Iva ciliata*, and cocklebur, species of *Xanthium*, are less frequent causes. All belong to the Ambrosiaceæ group.

Hay-fever resorts.—The towns along Mobile Bay are resorts for people having asthma. The Sand Mountain region of the State, comprising the counties of Etowah, Marshall, Cherokee, Blount, Morgan, Colbert, and Marion, and also Talladega, Shelby, Clay, and Randolph, are comparatively free of asthmatics.

ARIZONA.

Spring hay fever.—May 5 to June 5.

Principal cause: The grasses, the most common being the following: Annual fescue, *Festuca octoflora*; six-weeks grama, *Bouteloua aristoides*; mesa grass, *Bouteloua rothrockii*; annual poverty grass, *Aristida bromoides*; blue grama, *Bouteloua gracilis*; silvertop, *Andropogon saccharoides*—Poaceæ group.

Locally: Cottonwood, *Populus macdougalii*, and Arizona ash, *Fraxinus attenuata*.

Fall hay fever.—July 15 to October 1.

Principal cause: The species of *Franseria*, some of which resemble the ragweeds and some the cocklebur. The most common are *Fran-*

¹ The author hereby expresses his appreciation of the United States Department of Agriculture and of the members of the Botanical Department of the American Hay-Fever Prevention Association for valuable assistance in preparing this report.

seria discolor, *deltoides*, *dumosa* (bush sandbur), *eriocentra*, *ambrosioides*, *ilicifolia*, and *cordifolia*.

The ragweeds, *Ambrosia*, are also found, although much less common, the species being *Ambrosia aptera* and *psilostachya*. The species of *Franseria* and the ragweeds both belong to the Ambrosiaceæ group.

The wormwoods are also a common cause of hay fever, the most common being prairie sage, *Artemisia gnaphalodes*, found at altitudes of from 3,500 to 6,000 feet; 'Indian wormwood,' *A. dracunculoides*; *A. filifolia*, in the southeastern part of the State; and sagebrush, *A. tridentata*, in the northern part—*Artemisia* group.

Hay-fever resorts.—The State board of health reports that there are no hay-fever resorts in Arizona.

ARKANSAS.

Spring hay fever.—June 10 to July 15.

Principal cause: The grasses, Poaceæ group, the following being the most common: Redtop, *Agrostis palustris*; yellow foxtail, *Chætochloa lutescens*; witch grass, *Panicum capillare*; crabgrass, *Syntherisma sanguinalis*; broom sedge, *Andropogon virginicus*, and blue grass, *Poa pratensis*.

Minor cause: Jerusalem oak and lamb's-quarters, *Chenopodium botrys* and *album*—Chenopodiaceæ group.

Locally: Red maple, *Acer rubrum*; swamp poplar, *Populus heterophylla*, and black willow, *Salix nigra*.

Fall hay fever.—August 10 to September 17.

Principal cause: Common ragweed, *Ambrosia elatior*, and the lance-leaf ragweed, *Ambrosia bidentata*. The giant ragweed, *Ambrosia trifida*, is common in moist localities. All these belong to Ambrosiaceæ group. The tall wormwood, *Artemisia caudata*, is prevalent in dry, stony places—*Artemisia* group.

Minor cause: Cockleburs, *Xanthium* species—Ambrosiaceæ group.

Hay-fever resorts.—Eureka Springs, Heber Springs, Sylvan Springs, and Winslow, all located in the Ozark Range.

CALIFORNIA.

Spring hay fever.—May 5 to July 5.

Principal cause: The grasses, the most common being rye grass, *Lolium perenne*; saltgrass, *Distichlis spicata*; Bermuda grass, *Cynodon dactylon*; broncho grass, *Bromus maximus*; wild oats, *Avena fatua*; and Johnson grass, *Holcus halepensis*.

Minor cause: Greasebush, *Hymenoclea salsola*; *Rumex conglomeratus*; sheep-sorrel, *Rumex acetosella*; lamb's-quarters or goosefoot, *Chenopodium album*; tumbleweed, *Amaranthus graecizans*, and salt-bushes, species of *Atriplex*—Chenopodiaceæ group.

Fall hay fever.—July 15 to September 10.

Principal cause: Sagebrush, *Artemisia tridentata*, mugwort, *Artemisia heterophylla*—*Artemisia* group.

Minor cause: Poverty weed, *Iva axillaris*; bush sandbur, *Franseria dumosa*; western ragweed, *Ambrosia psilostachya*, and (less common) cocklebur, *Xanthium*—*Ambrosiaceæ* group.

Hay-fever resorts.—Santa Cruz, Del Monte, Santa Barbara, and Coronado along the coast, and Lake Tahoe and other places among the high Sierras.

COLORADO.

Spring hay fever.—May 10 to July 5.

Principal cause: The grasses, *Poaceæ* group, the most common being short-awned chess, *Bromus brizæformis*; downy brome grass, *Bromus tectorum*; Colorado bluestem, *Agropyron smithii*; bluegrass, *Poa pratensis*; orchard grass, *Dactylis glomerata*; prairie June grass, *Koeleria cristata*; blue grama, *Bouteloua gracilis*; silk grass, *Agrostis hiemalis*; timothy, *Phleum pratense*; and squirrel-tail, *Hordeum jubatum*.

Minor cause: Chenopods and their allies, species of *Chenopodium*, and the Russian thistle, *Salsola pestifer*—*Chenopodiaceæ* group.

Locally: The cottonwoods, *Populus sargentii* and *angustifolia*; oaks, *Quercus* (in southern half of the State), and boxelder, *Acer negundo* (in the canyons).

Fall hay fever.—July 20 to September 15.

Principal cause: Sagebrush, *Artemisia tridentata*, which covers vast areas almost to the exclusion of other plants. Other sages are collectively common—*Artemisia* group. Also, the common ragweed, *Ambrosia elatior*, and prairie ragweed, *Iva xanthiifolia*, both of which are common roadside weeds—*Ambrosiaceæ* group.

Hay-fever resorts.—Silver Plume, and other mountains having an altitude of over 7,000 feet.

CONNECTICUT.

Spring hay fever.—June 1 to July 15.

Principal cause: The grasses, *Poaceæ* group, the most common being witch grass, species of *Panicum*; little bluestem, *Andropogon scoparius*; yellow foxtail, *Chætochloa lutescens*; barnyard grass, *Echinochloa crus-galli*; crabgrass, *Syntherisma serotina*; bluegrass, *Poa pratensis*; and beard grass, *Paspalum setaceum*.

Locally: Cottonwood, *Populus deltoides*; black walnut, *Juglans nigra*; and the oaks, species of *Quercus*.

Fall hay fever.—August 17 to October 1.

Principal cause: The common ragweed, *Ambrosia elatior*—*Ambrosiaceæ* group.

Minor cause: The cocklebur, species of *Xanthium*; marsh-elder, *Iva frutescens*—*Ambrosiaceæ* group.

Hay-fever resorts.—The Litchfield Hills, in the northwestern part of the State, afford relief in a certain class of cases along the coast; and the seaside resorts, especially in the New London district, afford relief to a class of inland cases.

DELAWARE.

Spring hay fever.—May 5 to July 10.

Principal cause: The grasses, Poaceæ group, the most common being timothy, *Phleum pratense*; wheat, *Triticum æstivum*; yellow foxtail, *Chætochloa lutescens*; broom sedge, *Andropogon virginicus*; little crabgrass, *Syntherisma serotina*; bluegrass, *Poa pratensis*; orchard grass, *Dactylis glomerata*.

Minor cause: Sheep-sorrel, *Rumex acetosella*; goosefoot, species of *Chenopodium*—Chenopodiaceæ group.

Locally: Elm, *Ulmus americana*; black willow, *Salix nigra*; and red maple, *Acer rubrum*.

Fall hay fever.—August 13 to September 20.

Principal cause: The common ragweed, *Ambrosia elatior*—Ambrosiaceæ group.

Minor cause: Giant ragweed, *Ambrosia trifida*, and the cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

DISTRICT OF COLUMBIA.

Spring hay fever.—May 20 to July 5.

Principal cause: The grasses, Poaceæ group, the most common being timothy, *Phleum pratense*; bluegrass, *Poa pratensis*; redbud, *Agrostis palustris*; orchard grass, *Dactylis glomerata*; brome sedge, *Andropogon virginicus*; crabgrass, *Syntherisma sanguinalis*; spreading witch grass, *Panicum dichotomiflorum*; chess, *Bromus secalinus*.

Minor cause: The docks, *Rumex crispus* and *obtusifolius*—Chenopodiaceæ group.

Locally: The cottonwood, *Populus deltoides*, and the oaks, *Quercus rubra*, *phellos*, and *alba*.

Fall hay fever.—August 17 to October 3.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group, the former being common in alleys, vacant lots, and roadsides generally. Occasionally also the wormwoods, *Artemisia caudata*, *annua*, and *vulgaris*—Artemisia group.

FLORIDA.

Spring hay fever.—May 1 to July 10.

Principal cause: The grasses, Poaceæ group, the following being the most common: Crabgrass, *Syntherisma sanguinalis*; Johnson grass, *Holcus halepensis*; yellow foxtail, *Chætochloa lutescens*; feather-

grass, *Leptochloa filiformis*; water grass, *Paspalum dilatatum*; marsh grass, *Panicum repens*; and barnyard grass, *Echinochloa crus-galli*.

Minor cause: Spiny amaranth *Amaranthus spinosus*; curly dock, *Rumex crispus*; wormseed, *Chenopodium ambrosioides*—Chenopodiaceæ group.

Locally: Black willow, *Salix nigra*, elm, *Ulmus americana*; cottonwood, *Populus deltoides*; and oaks, species of *Quercus*.

Fall hay fever.—August 18 to October 10.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group.

Minor cause: Marsh-elder, *Iva ciliata*; and cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—The coast of southern Florida affords partial relief.

GEORGIA.

Spring hay fever.—May 10 to July 5.

Principal cause: The grasses, Poaceæ group, the most common being Bermuda grass, *Capriola dactylon*; Johnson grass, *Holcus halepensis*; wild barley, *Hordeum pusillum*; annual fescue, *Festuca octoflora*; crabgrass, *Syntherisma sanguinalis*; yellow foxtail, *Chætochloa lutescens*; goose grass, *Elusine indica*.

Locally: Swamp poplar, *Populus heterophylla*; black willow, *Salix nigra*; red maple, *Acer rubrum*; and oaks, species of *Quercus*.

Fall hay fever.—August 18 to October 4.

Principal cause: The common and giant ragweeds, *Ambrosia elatior* and *trifida*, the latter being more common on bottom lands—Ambrosiaceæ group.

Minor cause: Marsh-elder, *Iva ciliata*, and cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—Brasstown, Bald Mountain.

IDAHO.

Spring hay fever.—May 5 to June 10.

Principal cause: The grasses, Poaceæ group, the most common being Hungarian brome grass, *Bromus inermis*; feather bunchgrass, *Stipa viridula*; dogtown grass, *Aristida longisetæ*; sleepy grass, *Stipa vaseyi*; false oat grass, *Trisetum spicatum*; Colorado bluestem grass, *Agropyron smithii*; bearded wheat grass, *Agropyron caninum*, and other tall wheat grasses.

Fall hay fever.—August 1 to September 15.

Principal cause: Sagebrush, *Artemisia tridentata*; Indian wormwood, *Artemisia dracunculoides*—*Artemisia* group. Poverty weed, and prairie ragweed, *Iva axillaris* and *xanthiifolia*—Ambrosiaceæ group.

Minor cause: Bur ragweed, *Franseria acanthicarpa*; giant and western ragweed, *Ambrosia trifida* and *psilostachya*—Ambrosiaceæ group. Greasewood, *Sarcobatus vermiculatus*; Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Hay-fever resorts.—None reported.

ILLINOIS.

Spring hay fever.—June 10 to July 20.

Principal cause: The grasses, the most common being yellow foxtail, *Chætochloa lutescens*; crabgrass, *Syntherisma sanguinalis*; witch grass, *Panicum capillare*; squirrel-tail, *Hordeum jubatum*; and love grass, *Eragrostis cilianensis*; also the cereals—Poaceæ group.

Minor cause: The amaranths, *Amaranthus retroflexus* and *graecizans*; sheep-sorrel and curly dock, *Rumex acetosella* and *crispus*; lamb's-quarters, *Chenopodium album*, and saltwort, *Salsola kali*—Chenopodiaceæ group.

Locally: Elm, *Ulmus americana*, black willow, *Salix nigra*, and oaks, species of *Quercus*.

Fall hay fever.—August 15 to September 20.

Principal cause: Common ragweed, *Ambrosia elatior*, cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Minor cause: Giant ragweed, *Ambrosia trifida*.

Hay-fever resorts.—The State board of health reports no location free from hay fever.

INDIANA.

Spring hay fever.—June 5 to July 15.

Principal cause: The grasses, Poaceæ group, the following being the most common: Bluegrass, *Poa pratensis*; timothy, *Phleum pratense*; foxtail, species of *Chætochloa*; crabgrass, *Syntherisma sanguinalis*; witch grass, *Panicum capillare*; stinking grass, species of *Eragrostis*; downy brome grass, *Bromus tectorum*; broom sedge, species of *Andropogon*.

Locally: Elm, *Ulmus americana*; black willow, *Salix nigra*; swamp poplar, *Populus heterophylla*; and oaks, species of *Quercus*.

Fall hay fever.—August 17 to September 25.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group. The latter is especially common on railroad embankments, and grows to a height of 12 to 15 feet along the sandy river bottoms. The green wormwood, *Artemisia biennis*, is also fairly common—*Artemisia* group.

Minor cause: Russian thistle, *Salsola pestifer*, and Jerusalem oak, *Chenopodium botrys*—Chenopodiaceæ group; poverty weed, *Iva axillaris*—Ambrosiaceæ group.

Hay-fever resorts.—The State board of health reports that no section is free from hay fever, and hay-fever sufferers wishing to secure relief go to northern Michigan.

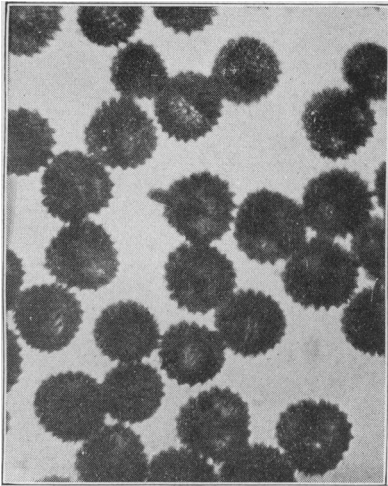


Fig. 1.—Pollen of common ragweed (*Ambrosia elatior*) $\times 500$ diameters; the principal cause of fall hay fever in the United States.

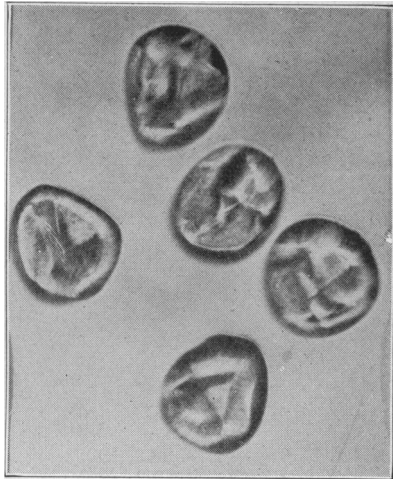


Fig. 2.—Pollen of water grass (*Paspalum larranagai*) $\times 500$ diameters. The grasses are the principal cause of spring hay fever, erroneously called "rose cold."

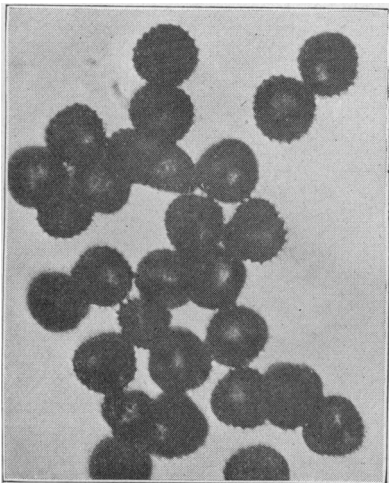


Fig. 3.—Pollen of bur ragweed (*Franseria tenuifolia*) $\times 500$ diameters. The *Franserias* replace the common ragweed in California, Arizona, and the neighboring States.

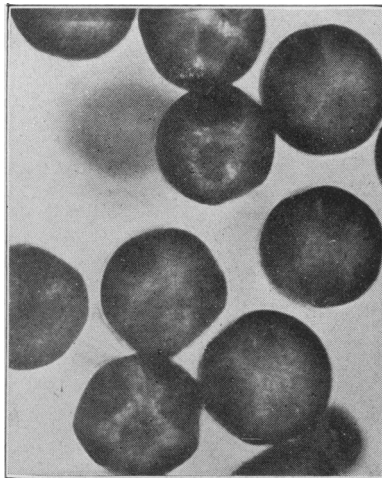


Fig. 4.—Pollen of red maple (*Acer rubrum*) $\times 500$ diameters. A local cause of early hay fever.



Fig. 5.—Pollen of black walnut (*Juglans nigra*) X500 diameters; a cause of early hay fever in some sections.

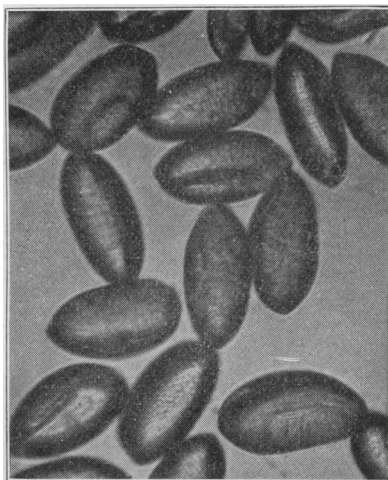


Fig. 6.—Pollen of live oak (*Quercus virens*) X500 diameters; a local cause of hay fever. The appearance of this pollen is characteristic of many tree pollens.

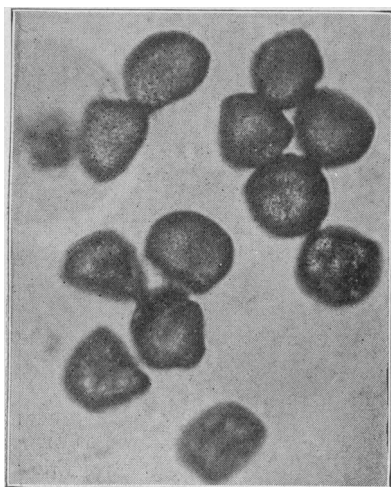


Fig. 7.—Pollen of bulrush (*Scirpus lacustris*) X500 diameters; harmless in hay fever.

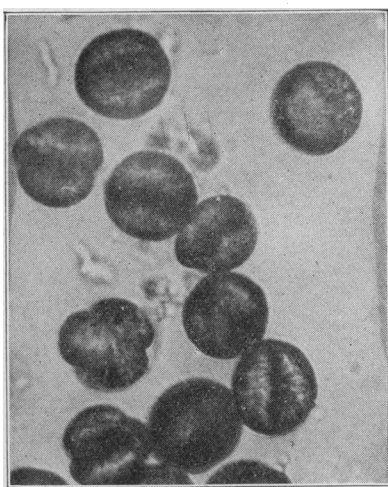


Fig. 8.—Pollen of mugwort (*Artemisia heterophylla*) X500 diameters. The *Artemisias* (wormwoods) are the principal cause of hay fever in the Pacific and Rocky Mountain States.

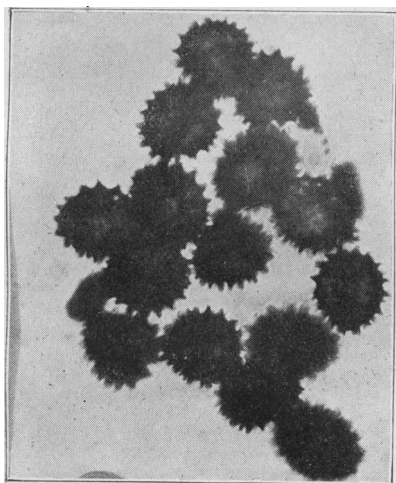


Fig. 9.—Pollen of goldenrod (*Solidago canadensis*) $\times 500$ diameters. In spite of the popular belief to the contrary, the goldenrod is insect-pollinated and, therefore, not a cause of hay fever.

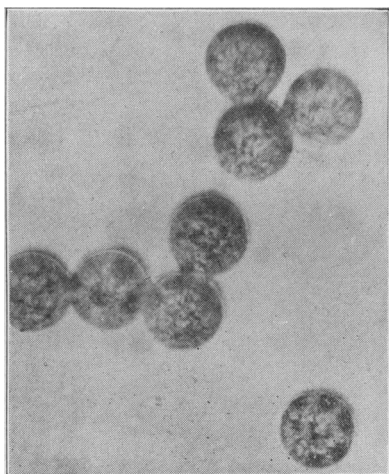


Fig. 10.—Pollen of spiny amaranth (*Amaranthus spinosus*) $\times 500$ diameters. The *Amaranthus* and the docks are a minor cause of hay fever in most sections of the United States.

IOWA.

Spring hay fever.—June 2 to July 16.

Principal cause: The grasses, Poaceæ group, the most common being spreading witch grass, *Panicum dichotomiflorum*; barnyard grass, *Echinochloa crus-galli*; crabgrass, *Syntherisma sanguinalis*; broom sedges, *Andropogon scoparius* and *furcatus*; timothy, *Phleum pratense*; bluegrass, *Poa pratensis*, and squirrel-tail, *Hordeum jubatum*.

Minor cause: Lamb's-quarters, *Chenopodium album*, and Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Local cause: White ash, *Fraxinus americana*; winged elm, *Ulmus alata*, and oaks, *Quercus macrocarpa*, *rubra*, and *alba*.

Fall hay fever.—August 13 to September 27.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*; the western ragweed, *Ambrosia psilostachya*, and prairie ragweed, *Iva xanthiifolia* being an occasional cause—Ambrosiaceæ group. The wormwoods, *Artemisia ludoviciana*, *canadensis*, *biennis*, *serrata*, and *caudata*—*Artemisia* group.

Hay-fever resorts.—The State board of health reports none known in the State.

KANSAS.

Spring hay fever.—May 16 to July 15.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Bluegrass, *Poa pratensis*; brome grass, *Bromus* species; yellow foxtail, *Chætochloa lutescens*; timothy, *Phleum pratense*; squirrel tail, *Hordeum jubatum*; quack grass, *Agropyron repens*; and wild rye, *Elymus glabriflorus*.

Locally: Cottonwood, *Populus sargentii*; black willow, *Salix nigra*; and red maple, *Acer rubrum*.

Fall hay fever.—August 16 to September 28.

Principal cause: The common, giant, and western ragweed, *Ambrosia elatior*, *trifida*, and *psilostachya*—Ambrosiaceæ group.

Minor cause: Saltweed, *Atriplex argentea* and *kastata*—Chenopodiaceæ group, and cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

KENTUCKY.

Spring hay fever.—June 1 to July 18.

Principal cause: The grasses, the most common being bluegrass, *Poa pratensis*; redtop, *Agrostis palustris*; timothy, *Phleum pratense*; crabgrass, *Syntherisma sanguinalis*; and yellow foxtail, *Chætochloa lutescens*—Poaceæ group.

Minor causes: Curly and bitter dock, and sheep-sorrel, *Rumex crispus*, *obtusifolius*, and *acetosella*; spiny amaranth, *Amaranthus*

spinosus and *retroflexus*; lamb's-quarters and wormseed, *Chenopodium album* and *ambrosioides*—Chenopodiaceæ group.

Locally: Aspen, *Populus tremuloides*; black walnut, *Juglans nigra*; and the oaks, species of *Quercus*.

Fall hay fever.—August 15 to October 1.

Principal cause: Common ragweed, *Ambrosia elatior*, the giant ragweed, *Ambrosia trifida*, being common on low ground, and the lance-leaf ragweed, *Ambrosia bidentata*, being found in western Kentucky—Ambrosiaceæ group. The annual wormwood, *Artemisia annua*, is common on low ground and vacant lots about the outskirts of cities—*Artemisia* group.

Hay-fever resorts.—None reported.

LOUISIANA.

Spring hay fever.—May 7 to July 15.

Principal cause: The grasses, the most common being the following: Johnson grass, *Holcus halepensis*; Bermuda grass, *Capriola dactylon*; yellow foxtail, *Chætochloa lutescens*; feather grass, *Leptochloa filiformis*; marsh grass, *Panicum repens*; annual bluegrass, *Poa annua*; water grass, *Paspalum dilatatum* and *larranagai*; and smut grass, *Sporobolus berterioanus*—Poaceæ group.

Minor cause: Curley dock, *Rumex crispus*; spiny amaranth, *Amaranthus spinosus*; lamb's-quarters, *Chenopodium album*—Chenopodiaceæ group.

Locally: The oaks, *Quercus palustris*, *rubra*, and *virginiana*; swamp poplar, *Populus heterophylla*, and black willow, *Salix nigra*.

Fall hay fever.—August 10 to October 16.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*, the latter being common near the Gulf coast.

Minor cause: Marsh-elder, *Iva ciliata*, and the cocklebur, species of *Xanthium*. All belong to the Ambrosiaceæ group.

Hay-fever resorts.—Covington, Abita Springs, and Magnolia afford relief in the spring type of hay fever.

MAINE.

Spring hay fever.—June 5 to July 10.

Principal cause: The grasses, the most common being quack grass, *Agropyron repens*; barnyard grass, *Echinochloa crus-galli*; redbtop, *Agrostis palustris*; fescue grass, *Festuca elatior*; timothy, *Phleum pratense*; and bluegrass, *Poa pratensis*—Poaceæ group.

Minor cause: The docks, *Rumex crispus* and *obtusifolius*; pigweed, *Amaranthus retroflexus*; and lamb's quarters, *Chenopodium album*—Chenopodiaceæ group.

Locally: The aspens, *Populus grandidentata*, *tremuloides*, etc., and the oaks, *Quercus rubra* and *alba*.

Fall hay fever.—August 17 to September 24.

Principal cause: The common ragweed, *Ambrosia elatior*—Ambrosiaceæ group.

Minor cause: The wormwoods, *Artemisia caudata* and *stelleriana*, being common on the sand of Old Orchard, Scarborough, and Cape Elizabeth. *Artemisia biennis* is also becoming more common—*Artemisia* group.

Hay-fever resorts.—Rangeley Lakes; and Kineo, located on Moosehead Lake.

MARYLAND.

Spring hay fever.—May 15 to July 10.

Principal cause: The grasses, the following being the most common: Timothy, *Phleum pratense*; wheat; slough grasses, *Spartina*; wild rice, *Zizania palustris*; broom sedge, *Andropogon virginicus*; green foxtail, *Chætochloa viridis*; bluegrass, *Poa pratensis*; quack grass, *Agropyron repens*; and oats—Poaceæ group.

Minor cause: The curly and bitter docks, and sheep-sorrel, *Rumex crispus*, *obtusifolius*, and *acetosella*; pigweed, *Amaranthus retroflexus*; and lamb's quarters and wormseed, *Chenopodium album* and *ambrosioides*—Chenopodiaceæ group.

Fall hay fever.—May 15 to July 10.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*.

Minor cause: Marsh-elder, *Iva frutescens*, and cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

MASSACHUSETTS.

Spring hay fever.—June 5 to July 18.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Witch grass, *Panicum capillare*; little bluestem, *Andropogon scoparium*; green foxtail, *Chætochloa viridis*; quack grass, *Agropyron repens*; orchard grass, *Dactylis glomerata*; barnyard grass, *Echinochloa crus-galli*; and annual bluegrass, *Poa annua*.

Minor cause: Pigweed, *Amaranthus hybridus*, and Jerusalem oak, *Chenopodium botrys*—Chenopodiaceæ group.

Locally: Black willow, *Salix nigra*; aspen, *Populus tremuloides*; and oaks, species of *Quercus*.

Fall hay fever.—August 13 to September 25.

Principal cause: Common ragweed, *Ambrosia elatior*—Ambrosiaceæ group.

Minor cause: Russian thistle, *Salsola pestifer*—Chenopodiaceæ group, and cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—Commissioner of public health reports no known hay-fever resort.

MICHIGAN.

Spring hay fever.—June 8 to July 15.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Bull grass, *Tripsacum dactyloides*; broom beard-grass, *Schizachyrium scoparium*; forked beard-grass, *Andropogon furcatus*; Indian grass, *Sorghastrum nutans*; prairie grass, *Sporobolus cryptandrus*; Canada blue grass, *Poa compressa*; barnyard grass, *Echinochloa crus-galli*; witch grass, *Panicum capillare*.

Minor cause: Water-hemp, *Acnida tamariscina*; pigweed, *Amaranthus retroflexus*; and lamb's-quarters, *Chenopodium album*—Chenopodiaceæ group.

Locally: Aspens, *Populus grandidentata* and *tremuloides*; white elm, *Ulmus americana*; red maple, *Acer rubrum*; and oaks, *Quercus rubra*, *alba*, and *coccinea*.

Fall hay fever.—August 15 to September 25.

Principal cause: Common ragweed, *Ambrosia elatior*.

Minor cause: Cocklebur, species of *Xanthium*—Ambrosiaceæ group; and green wormwood, *Artemisia biennis*—*Artemisia* group.

Hay-fever resorts.—The northern part of Michigan is relatively free from hay fever.

MINNESOTA.

Spring hay fever.—June 25 to July 19.

Principal cause: The grasses, Poaceæ group, the most common being the following: Redtop, *Agrostis palustris*; timothy, *Phleum pratense*; quack grass, *Agropyron repens*; green foxtail, *Chætochloa viridis*; barnyard grass, *Echinochloa crus-galli*; and bluegrass, *Poa pratensis*.

Minor cause: Saltweed, *Atriplex argentea*—Chenopodiaceæ group.

Fall hay fever.—August 14 to September 26.

Principal cause: Common ragweed, *Ambrosia elatior*.

Minor cause: Giant ragweed, *Artemisia trifida*, and western ragweed, *Ambrosia psilostachya*—*Artemisia* group; Russian thistle, *Salsola pestifer*—Chenopodiaceæ group; and wormwoods, *Artemisia ludoviciana*, *dracunculoides*, and *caudata*—*Artemisia* group.

Hay-fever resorts.—Duluth is favorably reported.

MISSISSIPPI.

Spring hay fever.—May 10 to July 10.

Principal cause: The grasses, Poaceæ group, the most common being smut grass, *Sporobolus berteroanus*; Bermuda grass, *Capriola dactylon*; yellow foxtail, *Chætochloa lutescens*; crabgrass, *Syntherisma sanguinalis*; barnyard grass, *Echinochloa crus-galli*; marsh grass, *Panicum repens*; and water grass, *Paspalum dilatatum*.

Minor cause: Curly dock, *Rumex crispus*; spiny amaranth, *Amaranthus spinosus*; English plantain, *Plantago lanceolata*; and lamb's-quarters, *Chenopodium album*—Chenopodiaceæ group.

Locally: Elm, *Ulmus americana*; swamp poplar, *Populus heterophylla*; black willow, *Salix nigra*, and oaks, species of *Quercus*.

Fall hay fever.—August 18 to October 25.

Principal cause: Common and giant ragweed, *Ambrosia elatior* and *trifida*.

Minor cause: Cocklebur, species of *Xanthium* and marsh-elder, *Iva ciliata*.—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

MISSOURI.

Spring hay fever.—May 10 to July 26.

Principal cause: The grasses, Poaceæ group, the most common being yellow foxtail, *Chætochloa lutescens*; redtop, *Agrostis palustris*; bluegrass, *Poa pratensis*; chess or cheat, *Bromus secalinus*; wild barley, *Hordeum pusillum*; orchard grass, *Dactylis glomerata*; timothy, *Phleum pratense*; and barnyard grass, *Echinochloa crus-galli*.

Minor cause: Lamb's-quarters, *Chenopodium album*, and saltweed, *Atriplex argentea* and *hastata*—Chenopodiaceæ group.

Locally: Red maple, *Acer rubrum*; white ash, *Fraxinus americana*, and black willow, *Salix nigra*.

Fall hay fever.—August 12 to September 24.

Principal cause: Common and giant ragweed, *Ambrosia elatior* and *trifida*.

Minor cause: Western and lance-leaf ragweed, *Ambrosia psilostachya* and *bidentata*—Ambrosiaceæ group.

Locally: The wormwoods, *Artemisia biennis* and *caudata*—*Artemisia* group.

Hay-fever resorts.—None reported by the State board of health.

MONTANA.

Spring hay fever.—May 15 to July 15.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Wheat grass, *Agropyron dasystachyum*; blue grama *Bouteloua gracilis*; Colorado bluestem, *Agropyron smithii*; alkali bunch grass, *Sporobolus airoides*; Hungarian brome grass, *Bromus inermis*; feather bunch grass, *Stipa viridula*; and crabgrass *Syntherisma linearis*.

Fall hay fever.—August 5 to September 15.

Principal cause: Common and giant ragweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group; and common sagebrush, *Artemisia tridentata*; carpet sage, *Artemisia frigida*; and prairie wormwood, *Artemisia ludoviciana*—*Artemisia* group.

Hay-fever resorts.—None reported.

NEBRASKA.

Spring hay fever.—May 15 to July 15.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Downy brome grass, *Bromus tectorum*; bluegrass, *Poa pratensis*; Colorado bluestem, *Agropyron smithii*; quack grass, *Agropyron repens*; timothy, *Phleum pratense*; and squirrel-tail, *Hordeum jubatum*.

Locally: Cottonwoods, *Populus sargentii* and *angustifolia*.

Minor cause: Greasewood, *Sarcobatus vermiculatus*—Chenopodiaceæ group.

Fall hay fever.—August 8 to September 18.

Principal cause: In the eastern section of the State the common and giant ragweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group; in the western section the Indian wormwood, *Artemisia dracunculoides*; prairie sage, *Artemisia gnaphalodes*, and Canada wormwood, *Artemisia canadensis*—Artemisia group.

Minor cause: The species of *Franseria*, *discolor*, *tomentosa*, and *acanthicarpa*—Ambrosiaceæ group.

Hay-fever resorts.—The high, elevated areas of the western part of the State are of benefit to hay-fever sufferers.

NEVADA.

Spring hay fever.—May 1 to July 15.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Hungarian brome grass, *Bromus inermis*; feather bunch grass, *Stipa viridula*; dogtown grass, *Aristida longiseta*; sleepy grass, *Stipa vaseyi*; false oat grass, *Trisetum spicatum*; Colorado bluestem, *Agropyron smithii*; bearded wheat grass, *Agropyron caninum*.

Minor cause: Greasewood, *Sarcobatus vermiculatus*—Chenopodiaceæ group.

Fall hay fever.—August 12 to September 15.

Principal cause: Indian wormwood, *Artemisia dracunculoides*; California mugwort, *Artemisia heterophylla*, and sagebrush, *Artemisia tridentata*—Artemisia group.

Minor cause: Poverty weed, *Iva axillaris*; prairie ragweed, *Iva xanthiifolia*; bush sandbur, *Franseria dumosa*, and bur ragweed, *Franseria acanthicarpa*.—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

NEW HAMPSHIRE.

Spring hay fever.—June 10 to July 16.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Witch grass, *Panicum* species; redtop, *Agrostis palustris*; timothy, *Phleum pratense*; quack grass, *Agropyron repens*;

little bluestem, *Andropogon scoparius*; green foxtail, *Setaria viridis*; and annual bluegrass, *Poa annua*.

Minor cause: Lamb's-quarters, *Chenopodium album*; sheep-sorrel, *Rumex acetosella*; and saltweed, *Atriplex hastata*—Chenopodiaceæ group.

Fall hay fever.—August 16 to October 1.

Principal cause: Common ragweed, *Ambrosia elatior*.

Minor cause: Giant ragweed, *Ambrosia trifida* and cocklebur, *Xanthium* species—Ambrosiaceæ group. Elm, *Ulmus americana*, red ash, *Fraxinus pennsylvanica*, and oaks, species of *Quercus*.

Hay-fever resorts.—None reported.

NEW JERSEY.

Spring hay fever.—June 10 to July 24.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Little bluestem, *Andropogon scoparius*; beard grass, *Paspalum setaceum*; witch grass, *Panicum capillare* and *dichotomiflorum*; barnyard grass, *Echinochloa crus-galli*; yellow fox-tail, *Chætochloa lutescens*; nimble Will, *Muhlenbergia schreberi*; purpletop, *Tridens flavus*.

Minor cause: Curly dock and sheep-sorrel, *Rumex crispus* and *acetosella*; lamb's-quarters, *Chenopodium album*; pigweed, *Amaranthus retroflexus*; and English plantain, *Plantago lanceolata*—Chenopodiaceæ group.

Locally, aspen, *Populus tremuloides*; black willow, *Salix nigra*; and oaks, species of *Quercus*.

Fall hay fever.—August 17 to September 28.

Principal cause: Common and giant ragweeds, *Ambrosia elatior* and *trifida*, and cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Minor cause: Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Hay-fever resorts.—Partial relief at locations along the Atlantic coast and Beach Haven in Ocean County.

NEW MEXICO.

Spring hay fever.—May 3 to June 5.

Principal cause: The grasses, Poaceæ group, the most common being, Hungarian brome grass, *Bromus inermis*; feather bunchgrass, *Stipa viridula*; dogtown grass, *Aristida longisetæ*; sleepy grass, *Stipa vaseyi*; false oat grass, *Trisetum spicatum*; Colorado blue-stem, *Agropyron smithii*; bearded wheat grass, *Agropyron caninum*.

Minor cause: Greasewood, *Sarcobatus vermiculatus*—Chenopodiaceæ group.

Locally: Cottonwood, *Populus wislizeni*.

Fall hay fever.—July 12 to September 28.

Principal cause: Sagebrush, *Artemisia tridentata*; carpet sage, *Artemisia frigida*, and other wormwoods—*Artemisia* group.

Minor cause: Poverty weed, *Iva axillaris*; bur ragweed, *Franseria acanthicarpa* and *Franseria tenuifolia*—Ambrosiaceæ group.

Hay-fever resorts.—Cloudcroft, Whitcom Springs, Albuquerque, Valley Rancho, Glorietta, Jemez Springs, Sulphur Springs, El Porvenir, and East Las Vegas.

NEW YORK.

Spring hay fever.—June 5 to July 19.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Little bluestem, *Andropogon scoparius*; witch or panic grass, *Panicum*; barnyard grass, *Echinochloa crus-galli*; fox-tail, *Chætochloa glauca* and *viridis*; reed canary grass, *Phalaris arundinacea*; quack grass, *Agropyron repens*; dropseed grass, *Muhlenbergia*; redtop, *Agrostis palustris*; blue-joint, *Calamagrostis canadensis*; wild oat-grass, *Danthonia spicata*; love grass, *Eragrostis*; orchard grass, *Dactylis glomerata*; annual bluegrass, *Poa annua*; manna grass, *Panicularia nervata*.

Minor cause: Curly dock, *Rumex crispus*; pigweed, *Amaranthus retroflexus* and *hybridus*; Jerusalem oak and lamb's-quarters, *Chenopodium botrys* and *album*—Chenopodiaceæ group.

Fall hay fever.—August 16 to September 28.

Principal cause: Common and giant ragweed, *Ambrosia elatior* and *trifida*.

Minor cause: Cocklebur, species of *Xanthium*—Ambrosiaceæ group; Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Locally: The wormwoods, the most common being *Artemisia biennis* and *stelleriana*—*Artemisia* group.

Hay-fever resorts.—The Adirondacks, Fire Island, Thousand Islands Park, Big Moose, and Old Forge Lake.

NORTH CAROLINA.

Spring hay fever.—May 13 to June 29.

Principal cause: The grasses, Poaceæ group, the most common being bluegrass, *Poa pratensis*; orchard grass, *Dactylis glomerata*; timothy, *Phleum pratense*; redtop, *Agrostis palustris*; Bermuda grass, *Capriola dactylon*; crabgrass, *Syntherisma sanguinalis*; crowfoot grass, *Dactyloctenium aegyptium*; and witch grass, *Panicum capillare*.

Locally: Elm, *Ulmus americana*; cottonwood, *Populus deltoides*; black willow, *Salix nigra*; and oaks, species of *Quercus*.

Fall hay fever.—August 20 to October 5.

Principal cause: The common and giant ragweeds, *Ambrosia elatior* and *trifida*, the latter being uncommon in the northwest (mountain) section—Ambrosiaceæ group.

Minor cause: Cocklebur, species of *Xanthium*, and marsh-elder, *Iva ciliata*—Ambrosiaceæ group.

Hay-fever resorts.—Eagle's Nest, Glen Ayre, Blackstock Knob, Black Dome, Mount Gibbs, Hall Back, and Mount Mitchell, in the Black Mountains; Double Springs, Richland Balsam, and Jones Knob, in the Balsam Range; Mount Buckley, Clingman's Drive, Mount Love, and Alexander, in the Smoky Mountains.

NORTH DAKOTA.

Spring hay fever.—May 20 to July 15.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Quack grass, *Agropyron repens*; squirrel tail, *Hordeum jubatum*; millet, *Chætochloa italica*; Hungarian brome grass, *Bromus inermis*; Colorado bluestem, *Agropyron smithii*; wild oats, *Avena fatua*; barnyard grass, *Echinochloa crus-galli*; green foxtail, *Chætochloa viridis*; bluegrass, *Poa pratensis* and *flava*.

Minor cause: White dock, *Rumex mexicanus*; pigweed, *Amaranthus retroflexus*, and lamb's-quarters, *Chenopodium album*—Chenopodiaceæ group.

Locally: Sargent cottonwood, *Populus sargentii*.

Fall hay fever.—August 10 to September 15.

Principal cause: Common, giant, and western ragweed, *Ambrosia elatior*, *trifida*, and *psilostachya*—Ambrosiaceæ group; carpet sage, *Artemisia frigida*; prairie wormwood, *Artemisia ludoviciana*; and green wormwood, *Artemisia biennis*—*Artemisia* group.

Hay-fever resorts.—The State board of health reports hay-fever patients benefited at Devils Lake.

OHIO.

Spring hay fever.—May 28 to July 13.

Principal cause: The grasses, Poaceæ group, the most common being, crabgrass, *Syntherisma sanguinalis*; witch grass, *Panicum capillare*; spreading witch grass, *Panicum dichotomiflorum*; barnyard grass, *Echinochloa crus-galli*; green foxtail, *Chætochloa viridis*; love grass, *Eragrostis cilianensis*.

Minor cause: Pigweed, *Amaranthus hybridus* and *retroflexus*, and waterhemp, *Acnida tuberculata*.

Locally: Black willow, *Salix nigra*, and swamp poplar, *Populus heterophylla*.

Fall hay fever.—August 13 to September 20.

Principal cause, common and giant ragweed (horseweed), *Ambrosia elatior* and *trifida*—Ambrosiaceæ group.

Minor cause: The southernwood, *Artemisia abrotanum*, and common wormwood, *Artemisia vulgaris*—*Artemisia* group; Russian thistle, *Salsola pestifer*, and Jerusalem oak and lamb's-quarters *Chenopodium botrys* and *album*—Chenopodiaceæ group.

Hay-fever resorts.—The State board of health reports no hay-fever resorts known in State.

OKLAHOMA.

Spring hay fever.—May 10 to June 24.

Common cause: The grasses, Poaceæ group, the most common being chess, *Bromus secalinus*; yellow foxtail, *Chætochloa lutescens*; redbtop, *Agrostis palustris*; crabgrass, *Chætochloa glauca*; feather bunch grass, *Stipa viridula*; and needle-and-thread grass, *Stipa comata*.

Minor cause: Saltweed, *Atriplex hastata*—Chenopodiaceæ group.

Fall hay fever.—July 25 to October 1.

Principal cause: The giant and common ragweeds, *Ambrosia trifida* and *elatio*r, the latter being less common—Ambrosiaceæ group; and the prairie wormwood, *Artemisia ludoviciana*—*Artemisia* group.

Minor cause: The cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—The State board of health reports that, while hay fever is less common in Oklahoma than in most sections of the country, there is no locality that is absolutely free from this disease.

OREGON.

Spring hay fever.—April 25 to May 29.

Principal cause: The grasses, Poaceæ group. Velvet grass, *Notholcus lanatus* is the most common in western Oregon. Others are, sweet vernal grass, *Anthoxanthum odoratum*; western brome grass, *Bromus carinatus*; orchard grass, *Dactylis glomerata*; rye grass, *Lolium perenne*, and bluegrass, *Poa pratensis*.

Minor cause: The docks, *Rumex crispus* and *occidentalis*; lamb's-quarters and red blite, *Chenopodium album* and *rubrum*—Chenopodiaceæ group.

Fall hay fever.—July 1 to September 10.

Principal cause: Sagebrush, *Artemisia tridentata*; prairie wormwood, *Artemisia ludoviciana*.

Minor cause: Carpet sage, *Artemisia frigida*, and Indian wormwood, *Artemisia dracunculoides*—*Artemisia* group; poverty weed, *Iva axillaris*, prairie ragweed, *Iva xanthiifolia*, and bur ragweed, *Franseria acanthicarpa*—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

PENNSYLVANIA.

Spring hay fever.—June 3 to July 24.

Principal cause: The grasses, Poaceæ group, the following being the most common: Timothy, *Phleum pratense*; redbtop, *Agrostis palustris*; bluegrass, *Poa pratensis*; quack grass, *Agropyron repens*; orchard grass, *Dactylis glomerata*; witch grass, *Panicum capillare*; yellow foxtail, *Chætochloa lutescens*.

Locally: Elms, *Ulmus americana* and *alata*; white ash, *Fraxinus americana*; and oaks, species of *Quercus*:

Fall hay fever.—August 16 to September 27.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*, the latter occurring in great thickets along the flood plains of the rivers, and even on the slopes and upland in great numbers—Ambrosiaceæ group.

Minor cause: Russian thistle, *Salsola pestifer*, and Jerusalem oak and lamb's quarters, *Chenopodium botrys* and *album*—Chenopodiaceæ group.

Hay-fever resorts.—Eaglesmere, the Pocono Mountains, the hills in the vicinity of Bradford, and the mountains near Mont Alto and Caledonia.

RHODE ISLAND.

Spring hay fever.—June 8 to July 22.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Redtop, *Agrostis palustris*; timothy, *Phleum pratense*; orchard grass, *Dactylis glomerata*; bluegrass, *Poa pratensis*. The most common grasses in old fields are sweet vernal grass, *Anthoxanthum odoratum*.

Locally: Aspen, *Populus tremuloides*; black willow, *Salix nigra*; and oaks, species of *Quercus*.

Fall hay fever.—August 15 to September 26.

Principal cause: The common ragweed, *Ambrosia elatior*—Ambrosiaceæ group.

Minor cause: Giant ragweed, *Ambrosia trifida*; marsh-elder, *Iva ciliata*; and cockleburrs, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—The State board of health reports that, while hay fever is not very prevalent, there is no part of Rhode Island free from hay fever.

SOUTH CAROLINA.

Spring hay fever.—May 10 to July 5.

Principal cause: The grasses, Poaceæ group, the following being the most common: Crabgrass, *Syntherisma sanguinalis*; Johnson grass, *Holcus halepensis*; yellow foxtail, *Chætochloa lutescens*; Bermuda grass, *Capriola dactylon*; redtop, *Agrostis palustris*; goose grass, *Eleusine indica*; and water grass, *Paspalum dilatatum*.

Minor cause: Lamb's-quarters, *Chenopodium album*; curly dock, *Rumex crispus*; spiny amaranth, *Amaranthus spinosus*; and plantain, *Plantago major*—Chenopodiaceæ group.

Locally: Elm, *Ulmus americana*; red maple, *Acer rubrum*; swamp poplar, *Populus heterophylla*; and oaks, species of *Quercus*.

Fall hay fever.—August 18 to October 10.

Principal cause: The common and giant ragweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group.

Minor cause: Cockleburs, species of *Xanthium*; horseweed, *Eri-geron canadensis*; and marsh-elder, *Iva imbricata*—Ambrosiaceæ group.
Hay-fever resorts.—Caesar's Head, Greenville County.

SOUTH DAKOTA.

Spring hay fever.—May 13 to July 10.

Common cause: The grasses, Poaceæ group, the most common being blue grama, *Bouteloua gracilis*; wheat grass, *Agropyron dasy-stachyum*; green foxtail, *Chætochloa viridis*; squirrel-tail, *Hordeum jubatum*; crabgrass, *Syntherisma linearis*; bluegrass, *Poa pratensis*; bluejoint, *Andropogon furcatus*; and porcupine grass, *Stipa spartea*.

Locally: Narrow leaf cottonwood, *Populus angustifolia*.

Fall hay fever.—August 8 to September 22.

Principal cause: Prairie wormwood, *Artemisia ludoviciana*; green wormwood, *Artemisia biennis*; and Canada wormwood, *Artemisia canadensis*—*Artemisia* group. These are more common in the country. In the cities the principal causes are the common and giant ragweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group.

Minor cause: Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Hay-fever resorts.—Hot Springs.

TENNESSEE.

Spring hay fever.—June 5 to July 22.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Crabgrass, *Syntherisma sanguinalis*; broom sedge *Andropogon virginicus*; redtop, *Agrostis palustris*; barnyard grass, *Echinochloa crus-galli*; yellow foxtail, *Chætochloa lutescens*; goose grass, *Eleusine indica*; purpletop, *Tridens flavus*; bluegrass, *Poa pratensis*.

Locally: Elms, *Ulmus americana* and *alata*; cottonwood, *Populus deltoides*; and oaks, species of *Quercus*.

Fall hay fever.—August 15 to October 5.

Principal cause: The common and giant gweed, *Ambrosia elatior* and *trifida*—Ambrosiaceæ group. The annual wormwood, *Artemisia annua*, is common in the middle and western sections of the State—*Artemisia* group.

Minor cause: Cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—Roan Mountain, altitude 6,310 feet, has long been noted for its relief to hay-fever sufferers.

TEXAS.

Spring hay fever.—May 15 to July 15.

Principal cause: The grasses Poaceæ group, the most common being the following: Yellow foxtail, *Chætochloa lutescens*; Johnson

grass, *Holcus halepensis*; Bermuda grass, *Capriola dactylon*; water grass, *Paspalum larranagai*; smut grass, *Sporobolus berterioanus*; brome grass, *Bromus inermis*; and feather bunchgrass, *Stipa viridula*.

Minor cause: Jerusalem oak and lamb's-quarters, *Chenopodium botrys* and *album*—Chenopodiaceæ group.

Locally: Elm, *Ulmus americana*, narrow leaf cottonwood, *Populus angustifolia*, oaks, species of *Quercus*, and *Juniperus sabinoides*, mountain cedar (Northwestern section).

Fall hay fever.—August 18 to October 15.

Principal cause: In the eastern section, the giant, common, and western ragweed, *Ambrosia trifida*, *elatior*, and *psilostachya*—Ambrosiaceæ group. In the western portion of the State, the ragweeds are replaced by the wormwoods, the most common being, Indian wormwood, *Artemisia dracunculoides*; carpet sage, *Artemisia frigida*; and prairie wormwood, *Artemisia ludoviciana*—*Artemisia* group.

Minor cause: Bur ragweed, *Franseria acanthicarpa*, horseweed, *Erigeron canadensis*, and marsh-elder, *Iva ciliata*—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

UTAH.

Spring hay fever.—June 22 to July 27.

Principal cause: The grasses, Poaceæ group, the most common being, Hungarian brome grass, *Bromus inermis*; feather bunchgrass, *Stipa viridula*; dogtown grass, *Aristida longiseta*; sleepy grass, *Stipa vaseyi*; false oat grass, *Trisetum spicatum*; Colorado bluestem, *Agropyron smithii*; bearded wheat grass, *Agropyron caninum*.

Minor cause: Greasewood, *Sarcobatus vermiculatus*; saltweed, *Atriplex argentea* and *hastata*—Chenopodiaceæ group; bush sandbur, *Franseria dumosa*—Ambrosiaceæ group.

Fall hay fever.—August 5 to September 15.

Principal cause: Common ragweed, *Ambrosia elatior*—Ambrosiaceæ group; and sage brush and prairie sage, *Artemisia tridentata* and *gnaaphalodes*—*Artemisia* group.

Minor cause: Giant ragweed, *Ambrosia trifida*, and poverty weed, *Iva axillaris*—Ambrosiaceæ group.

Hay-fever resorts.—There are a number of places in various parts of this State, having an altitude of over 6,000 feet, which afford relief to hay-fever subjects; also several canyon resorts, such as Brighton and Ogden, where comparative freedom from hay fever exists. Many persons from Salt Lake City, which has an elevation of 4,300 feet, visit these places and obtain relief.

VERMONT.

Spring hay fever.—June 10 to July 22.

Principal cause: The grasses, Poaceæ group, the following being the most common: yellow foxtail, *Chætochloa lutescens*; barnyard

grass, *Echinochloa crus-galli*; redtop *Agrostis palustris*; little bluestem, *Andropogon scoparius*; timothy, *Phleum pratense*; spreading witch grass, *Panicum dichotomiflorum*; and crab-grass, *Syntherisma sanguinalis*.

Minor cause: Sheep sorrel, *Rumex acetosella*; lamb's-quarters and goosefoot, species of *Chenopodium*—Chenopodiaceæ group.

Locally: White ash, *Fraxinus americana*; red maple, *Acer rubrum*; and oaks, species of *Quercus*.

Fall hay fever.—August 14 to September 24.

Principal cause: The common ragweed, *Ambrosia elatior*—Ambrosiaceæ group.

Minor cause: Giant ragweed, *Ambrosia trifida*; cocklebur, species of *Xanthium*—Ambrosiaceæ group; Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Hay-fever resorts.—Green Mountains (4,430 feet).

VIRGINIA.

Spring hay fever.—May 15 to June 29.

Principal cause: The grasses, Poaceæ group, the most common being broom sedge, *Andropogon virginicus*; redtop, *Agrostis palustris*; timothy, *Phleum pratense*; crabgrass, *Syntherisma sanguinalis*; bluegrass, *Poa pratensis*; green foxtail, *Chætochloa viridis*; and barnyard grass, *Echinochloa crus-galli*.

Minor cause: Sheep-sorrel, *Rumex acetosella*; wormseed, *Chenopodium ambrosioides*, and horseweed, *Erigeron canadensis*.

Locally: Black willow, *Salix nigra*; black walnut, *Juglans nigra*; red maple, *Acer rubrum*, and oaks, species of *Quercus*.

Fall hay fever.—August 18 to October 3.

Principal cause: Common ragweed, *Ambrosia elatior*.

Minor cause: Giant ragweed, *Ambrosia trifida*, and marsh-elder, *Iva ciliata*—Ambrosiaceæ group.

Hay-fever resorts.—None reported.

WASHINGTON.

Spring hay fever.—June 12 to July 1.

Principal cause: The grasses, Poaceæ group, the most common being velvet grass, *Nothololcus lanatus*; early hair-grass, *Aira præcox*; rye grass, *Lolium perenne*; squirrel-tail, *Hordeum jubatum*; chess, *Bromus secalinus*, and other species of *Bromus*.

Fall hay fever.—July 5 to October 7.

Principal cause: The bur ragweeds, *Franseria chamissonis* and *bipinnatifida* (east of Cascade Mountains); poverty weed and prairie ragweed, *Iva axillaris* and *xanthiifolia*, and giant, common, and western ragweed, *Ambrosia trifida*, *elatior* and *psilostachya*—Ambrosiaceæ group.

Minor cause: Jerusalem oak, *Chenopodium botrys*, and Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Hay-fever resorts.—Although there is the usual percentage of hay fever east of the Cascade Range, there is practically none in any part of the State west of this range, which locality is therefore favorable to hay-fever subjects.

WEST VIRGINIA.

Spring hay fever.—May 15 to June 29.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Spreading witch grass, *Panicum dichotomiflorum*; crabgrass, *Syntherisma sanguinalis*; green foxtail, *Chætochloa viridis*; love grass, *Eragrostis cilianensis*; bluegrass, *Poa pratensis*; chess, *Bromus secalinus*, and timothy, *Phleum pratense*.

Minor cause: Curly dock, *Rumex crispus*; Jerusalem oak, *Chenopodium botrys*; and pigweed, *Amaranthus retroflexus*—Chenopodiaceæ group.

Locally: Red maple, *Acer rubrum*; swamp poplar, *Populus heterophylla*; black willow, *Salix nigra*; and oak, species of *Quercus*.

Fall hay fever.—August 12 to September 28.

Principal cause: Common ragweed, *Ambrosia elatior*.

Minor cause: Giant ragweed, *Ambrosia trifida*; the cocklebur, species of *Xanthium*—Ambrosiaceæ group.

Hay-fever resorts.—Terra Alta, Marlinton, and Webster Springs are favorably reported, although their altitude (2,500 feet) is not sufficient to afford marked relief.

WISCONSIN.

Spring hay fever.—June 7 to July 18.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Oats; bluegrass, *Poa pratensis*; timothy, *Phleum pratense*; redtop, *Agrostis palustris*; and quack grass, *Agropyron repens*.

Minor cause: The curly dock, *Rumex crispus*, and lamb's-quarters, *Chenopodium album*—Chenopodiaceæ group.

Locally: Aspen, *Populus tremuloides*, and the oaks, *Quercus alba*, *velutina*, *rubra*, and *macrocarpa*.

Fall hay fever.—August 17 to September 28.

Principal cause: Common ragweed, *Ambrosia elatior*.

Minor cause: Giant ragweed, *Ambrosia trifida*, and prairie ragweed, *Iva xanthiifolia* (in western part)—Ambrosiaceæ group; green wormwood, *Artemisia biennis*—*Artemisia* group; Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Hay-fever resorts.—Two Rivers, located on a peninsula extending 7 miles into Lake Michigan.

WYOMING.

Spring hay fever.—May 1 to June 15.

Principal cause: The grasses, Poaceæ group, the most common being as follows: Colorado bluestem, *Agropyron smithii*; alkali, bunchgrass, *Sporobolus airoides*; bluegrass, *Poa pratensis*; timothy, *Phleum pratense*; prairie June grass, *Koeleria cristata*; squirrel-tail, *Hordeum jubatum*; tall manna grass, *Panicularia grandis*; fescue grass, *Festuca elatior*; western wild rye, *Elymus condensatus*, and tufted hair grass, *Deschampsia cæspitosa*.

Fall hay fever.—August 5 to September 15.

Principal cause: Prairie ragweed, *Iva xanthiifolia*—Ambrosiaceæ group; and sagebrush, *Artemisia tridentata*—*Artemisia* group.

Minor cause: Giant and western ragweed, *Ambrosia trifida* and *psilostachya*—Ambrosiaceæ group; northern and aromatic wormwood, *Artemisia borealis* and *aromatica*, and the prairie sage, *Artemisia gnaphalodes*—*Artemisia* group; greasewood, *Sarcobatus vermiculatus*, and Russian thistle, *Salsola pestifer*—Chenopodiaceæ group.

Hay-fever resorts.—The State board of health reports that there is no locality free from hay fever.

QUANTITATIVE STUDIES IN CHEMOTHERAPY.

I. THE TRYPANOCIDAL ACTION OF ARSENIC AND ANTIMONY COMPOUNDS.

By CARL VOEGTLIN, Senior Pharmacologist (R), and HOMER W. SMITH, Assistant Pharmacologist, with the cooperation of MARIAN M. CRANE, Assistant Chemist, and KATHERINE D. WRIGHT and MABEL A. CONNELL, Scientific Assistants, Hygienic Laboratory, United States Public Health Service.

The methods used for the elaboration of new drugs with specific action upon the parasites of infectious diseases are essentially empirical in nature. They consist in testing hundreds of chemicals in the hope of finding an effective drug. It is not surprising that under such circumstances progress is retarded principally by an almost complete lack of information regarding the fundamental mechanism by means of which the drug kills the parasite within the host. The present study was undertaken in anticipation of elaborating methods which would yield quantitative information as regards the chemotherapeutic value of certain drugs and which would afford an opportunity of studying the mechanism involved in the process of sterilization of an infected animal. For this purpose no new drugs have been synthesized or studied, but our attention has been confined to a few drugs which are known to possess specific action. We shall report in this paper the principal results obtained in a study of certain antimony and arsenic compounds which are of importance in the treatment of syphilis, relapsing fever, sleeping sickness, and similar protozoal diseases. The details of the work will be published in the *Journal of Pharmacology and Experimental Therapeutics* during 1920.

Experimental.

The selection of the disease for this investigation was of considerable importance. In order to simplify the work as much as possible; albino rats infected with *Trypanosoma equiperdum* were chosen for the following reasons: First, the disease is essentially an infection of the blood and not of the tissues, a fact which renders possible, by means of an intravenous injection, the bringing of the drug into immediate contact with the parasites; second, the disease is easily propagated in rats and runs a regular course which leads to death within a few days; third, the course of the disease can be accurately followed by counting the number of parasites in the blood according to the method of Kolmer (1915). A rat showing from 600,000 to 800,000 parasites per cubic millimeter of blood is bled without special aseptic precautions into 1.5 to 2 c. c. of saline solution containing 1 per cent of sodium citrate. This suspension is then injected intraperitoneally into rats, using 0.25 to 0.5 c. c. per animal. Twenty-four hours later the rats so injected show 50,000 to 100,000 trypanosomes per cubic millimeter of blood, and die as a rule within three days.

Toxicity.—As a prerequisite for the chemotherapeutic study of the compounds, it was essential to determine first their toxicity. This was established on albino rats weighing from 80 to 150 gms. An aqueous solution of the drug was injected into the saphenous vein. The minimal dose at which the majority of a series of animals died was considered the *minimal lethal dose* (M. L. D.). The next lower dose at which the majority of the animals survived will be referred to as the maximum tolerated dose (M. T. D.).

The dosage is always expressed on an arsenic or antimony equivalent basis. The data referring to the toxicity of these compounds are given in Table I.

TABLE I.—*Minimum lethal dose and minimum effective dose of preparations expressed in cubic centimeters of a 1/100 antimony or arsenic equivalent solution per kilo body-weight.*

	Preparation.	M. L. D.	M. T. D.	M. L. D. M. T. D.
R.As=O	Phenylglycine-p-arsonic acid.....	750.0	375.0	2
	N-phenylglycine amide-p-arsonic acid.....	750.0	75.0	10
	Arsacetine.....	750.0	37.5	20
	P-oxy-m-amino phenylarsonic acid.....	225.0	37.5	6
	P-aminophenylarsonic acid (arsanilic acid).....	150.0	37.5	4
R.As=As.R...	Arsenic acid.....	50.0	37.5	1+
	Neoarsphenamine.....	100.0	3.0	33
	Arsenophenylglycine.....	75.0	4.5	16
	Arsphenamine.....	75.0	2.0	37
	Arsenious acid.....	7.0	7.0	1
R.As=O	Phenylarsenoxide.....	3.75	0.75	5
	P-oxy-m-aminophenylarseniousoxide (arsenoxide).....	10.0	0.75	13
R.Sb=O	Antimonylactate.....	10	2	5
R.Sb=O	Antimonyl-potassium-tartrate.....	15	4	4
R.Sb=O	Antimonic-potassium-tartrate.....	400	(1)	.....
R.Sb=O	Antimonythioglycollate.....	500(?)	75	.....

¹ Ineffective.

Trypanocidal action.—For the determination of the minimum effective dose it is essential to make trypanosome counts on the blood of the infected animals before the drug is injected, in order to secure animals of the desired degree of infection. It will be shown later that there exists a definite relation between the degree of the infection (the absolute number of parasites present) and the amount of the drug necessary to kill all of the parasites. On account of the practical difficulties of obtaining a large number of rats with exactly the same degree of infection, we have allowed ourselves a certain margin in choosing animals showing 100,000 to 300,000 trypanosomes per cubic millimeter.

The time of disappearance of the parasites from the blood stream after the intravenous injection of the drug varies with the type of drug studied. No standard interval for blood examinations can be established for work of this kind. In order to keep the results uniform we have made at least two counts on the day of the injection and the last count at the end of 24 hours. In this time the slowest-acting drug so far studied by us will have reduced the number of parasites to a minimum, so that inspection of the blood of the animals will show which doses have proved effective.

Discussion.

This investigation represents the first detailed study of the phenomena of sterilization *in vivo* and for that reason is especially interesting. The difficulties encountered in most biological work of securing sharply defined end points are in evidence in this problem. Individual variations attributable to the host, such as differences in blood volume, variations in the rate of excretion and ability to transform the injected compound, as well as errors attributable to the technique, may account for a large part of the variations in the results. Taken as a whole, however, the results are surprisingly consistent, and this method of testing the trypanocidal value of drugs has proved thoroughly reliable.

A comparison of our results with those obtained by various observers through *in vitro* experiments shows a striking similarity. The principal difficulties encountered in *in vitro* work with bacteria, red blood cells, are diminished here to a minimum. The uniformity of the individual curves shows that the experimental error is slight, and considering the rapidity of the process, the frequency with which counts may be made is of considerable advantage. Once the blood is withdrawn from the rat and diluted, the destruction of the trypanosomes is checked, and, unlike hemolytic experiments, the counts may be made in a more leisurely fashion.

The process of death with trypanosomes *in vivo* is as regular as similar processes *in vitro* involving bacteria or red blood cells. This

process appears to proceed in each case according to some law which obtains in the mechanism of the reaction, *drug v. parasite*.

The most significant feature brought out by the experiments with subeffective doses is the sharply defined threshold concentration, which must be maintained in order to kill all of the parasites. This threshold is dependent to some extent upon the number of parasites present. It is necessary that a certain concentration of the drug be maintained in the blood stream throughout the time required for the process to reach completion, i. e., until all of the parasites are dead. If absorption by the tissues of the host has lowered the amount of drug in the blood stream below this concentration before this time, the dose will be subeffective. Thus various subeffective doses of antimonylactate cease to act not when a certain number of parasites have been killed, but after a certain period of time has elapsed, during which time absorption by the tissues of the host has lowered the concentration of the drug in the blood below the minimum-effective threshold. Therefore, the effectiveness of a compound will depend to a considerable extent upon the rapidity with which it is withdrawn from the blood stream, provided that we are dealing with a blood infection and a curative agent which acts directly upon the parasites.

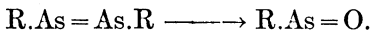
From a study of Table I it will be seen that the trivalent arsenic and antimony compounds are much more toxic than the pentavalent arsenicals for both the host (rats) and the parasites. The pentavalent antimony derivative studied was devoid of any action on the trypanosomes and also possessed a very low toxicity for the rat. This difference in toxicity of the two groups is furthermore emphasized by the time which is required for the appearance of toxic symptoms following the intravenous injection of these drugs. In the case of the compounds containing arsenic (or antimony), in the $R.As=O$ form, symptoms appear within a few minutes after the injection, whereas with the arseno ($R.As=As.R$) and

pentavalent $\left(R.As \begin{array}{c} \nearrow OH \\ = O \\ \searrow OH \end{array} \right)$ compounds a much longer time is re-

quired for any signs of intoxication to manifest themselves. As the work of previous investigators has shown that arsenic is reduced in the body, it is reasonable to explain the latent period in the case of the pentavalent compounds by assuming that this time is required for the reduction of a sufficient amount of the drug to the trivalent form to constitute a toxic threshold. This explanation is further strengthened by certain observations of the trypanocidal action of pentavalent arsenicals about to be discussed.

A most important point which has been brought out by this work is the great difference in the rate of chemotherapeutic action of the

various drugs studied. If the minimal effective dose of a drug belonging to the "arsenoxide" ($R.As=O$) group is injected, it is found that the number of trypanosomes at once decreases until all of the parasites have been killed; this may require from 10 to 60 minutes, depending on the degree of the infection. The rate of disappearance of the parasites is fairly regular throughout the process, as will be seen from an examination of Charts I and II. The immediate onset of the reaction and the great regularity by which it proceeds, show that the compounds of the arsenoxide type act directly on the parasites. It will also be seen that the injection of twice or even several times a minimal effective dose of the arsenobenzol derivatives and the pentavalent arsenicals does not produce a material change in the trypanosome count for a considerable period of time, i. e., one to six hours. Though a small fraction of the parasites may be killed in the first hour, the drug exerts its main action at a remote period of time. The process-curve, once started down, continues very rapidly until all the parasites are gone. The preliminary period during which the trypanosome count is not materially changed, may be considered as a latent period, and its explanation is of the utmost importance from both a theoretical and a practical viewpoint. We believe that the latent period observed with the arsenobenzol derivatives and the pentavalent arsenicals is due to the fact that these compounds do not possess any trypanocidal properties *per se*, but must be converted into active substances before they can injure the parasites. The change which is required in the case of the arsenobenzol derivatives very probably consists in an oxidation to the corresponding "oxide":



This conception is strengthened by the following facts. Ehrlich (1913) has shown that the toxicity of a slightly alkaline aqueous solution of arsphenamine or an aqueous solution of neoarsphenamine increases rapidly when kept in contact with air. This increase in toxicity he attributes to the oxidation of the drug to p-oxy-m-aminophenylarsenoxide, which, according to our toxicity experiments is seven times as toxic for the rat as arsphenamine, and exerts a direct action on the parasites, as evidenced by the absence of a latent period. We have, furthermore, found that an aqueous solution of the sodium salt of arsphenamine which has been incubated for approximately three hours at $37^{\circ}C$. exerts a much greater trypanocidal action than solutions which are freshly prepared. Such a solution shows no latent period, but the trypanocidal action is immediate, as is that of arsenoxide. (See Chart II.)

A further proof of the assumption that the arsenoxide is the active trypanocidal agent generated from arsphenamine is to be

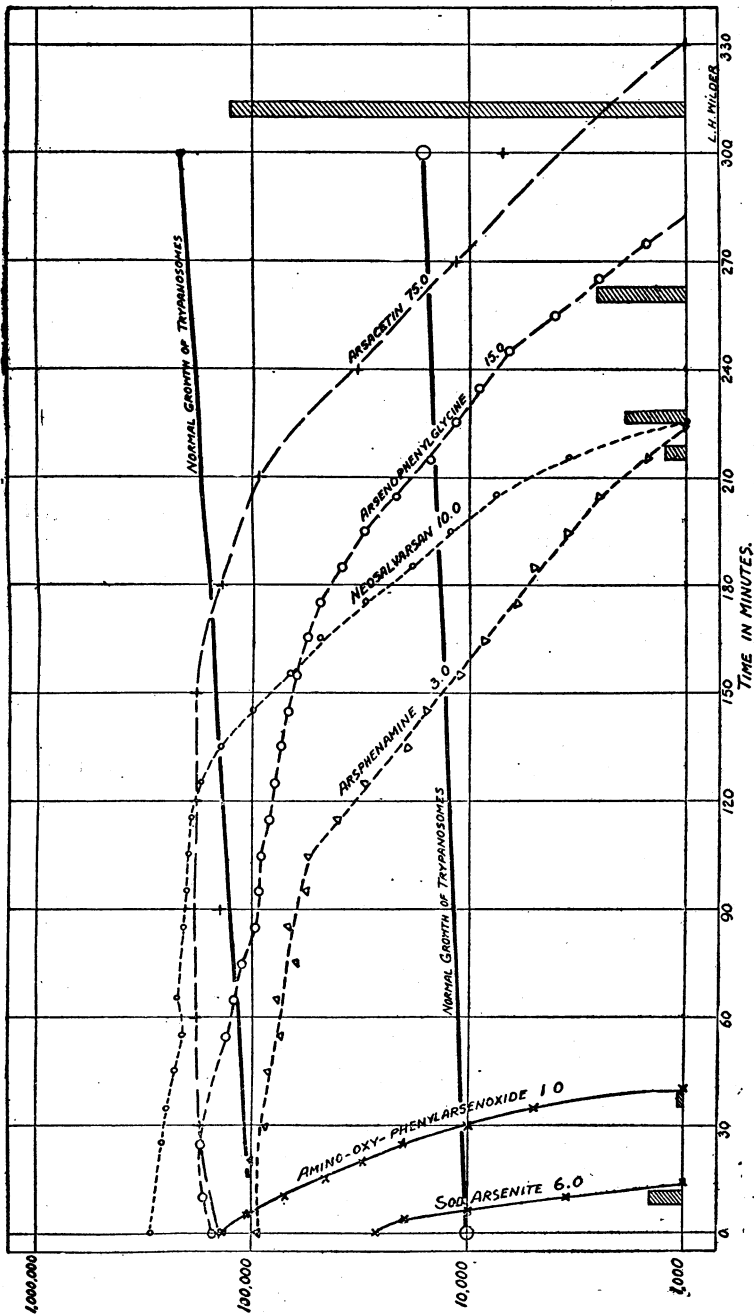


CHART I.—This chart illustrates the difference in the rate of the trypanocidal action of various arsenicals. The ordinates represent the number of trypanosomes per c.c. of blood, the abscissa, the time in minutes following the injection of the drug, the shaded blocks the relative amount of arsenic injected. It will be noted that arspenamine and the pentavalent arsenicals show a marked latent period during which the trypanosomes are not reduced in number, whereas in the case of the oxidation product of arspenamine (aminoxyphenylarsenous oxide) and sodium arsenite the trypanosomes are rapidly killed. The former type of compounds have to be changed (oxidized) in the body before they can exert an action on the parasites. It will be noted that the absolute amount of arsenic to bring about the death of the parasites is ever so much larger in the case of the pentavalent arsenicals than with arspenamine and its oxidation product.

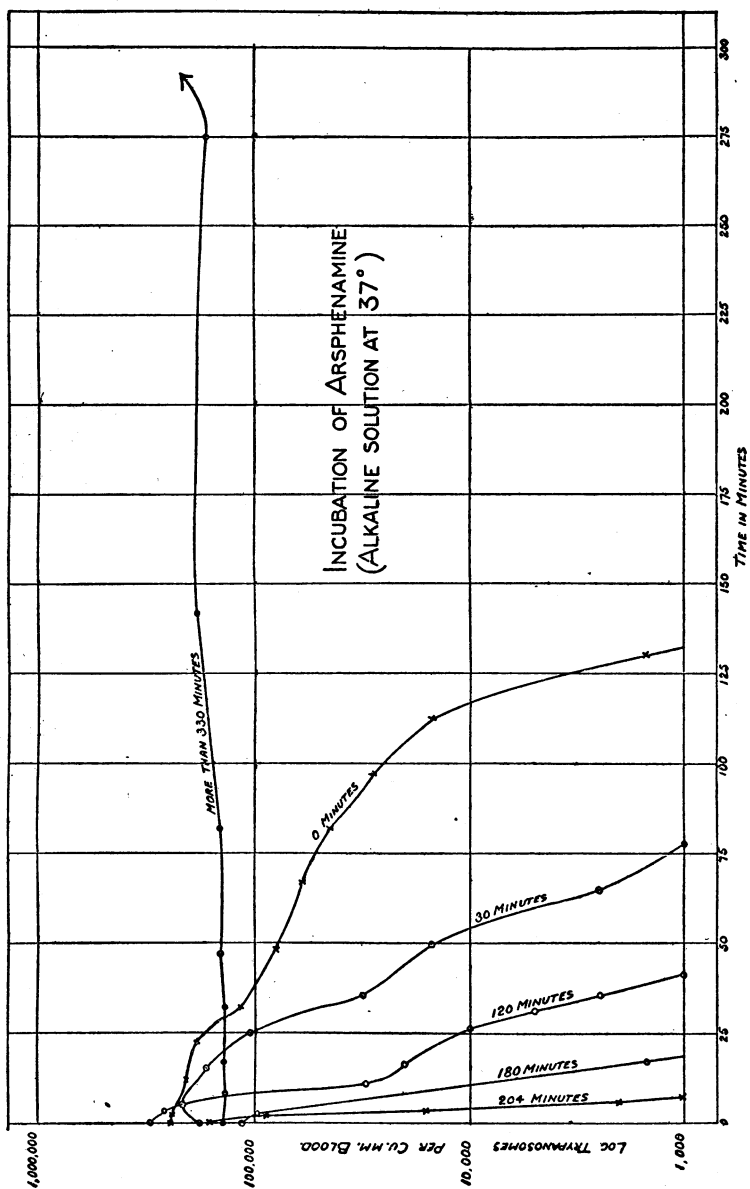


CHART II.—This chart shows how the standing of an alkaline solution of arspenamine causes first a marked increase in the rate of parasitocidal action, due to conversion of the arspenamine into the corresponding highly toxic "oxide", $R \cdot As = O$. On further standing, the activity is completely lost on account of complete oxidation to pentavalent arsenic. This same process occurs in the body.

found in the results obtained in test-tube experiments, where trypanosomes or spirochetes are brought in contact with arsphenamine or neoarsphenamine. According to Hata (1910), arsphenamine does not kill the spirochetes of relapsing fever in the test tube even in very high concentration. Plaut (1910) and Truffi and Sabbia (1911) found that the *Spirocheta pallida* is not killed by high concentrations of arsphenamine. This evident discrepancy between the action of arsphenamine *in vitro* and *in vivo* has given rise to much confusion in regard to the explanation of the therapeutic action of this drug. It has been assumed by some writers that arsphenamine stimulates the production of immune bodies which favorably influence the disease. This explanation of the action of the drug is obviously erroneous, as it is impossible to conceive how enough antibodies to have any effect could be produced in the short time which is required to kill the parasites in the infected animal.

After having seen the manner in which the oxides ($R.As=O$) act upon the parasites both *in vitro* and *in vivo*, and after considering the nontoxicity *in vitro* and the marked latent period *in vivo* of arsphenamine ($R.As:As.R$) and neoarsphenamine ($R.As:As.R$), one is forced to the conclusion that the last two compounds are not of themselves trypanocidal. We know that the oxidation of arsphenamine and neoarsphenamine takes place even on contact with the air, and when we recall that the first logical step in this oxidation would be the breaking down of the arseno grouping to the oxide grouping, it is selfevident that it must be these oxides which are responsible for the trypanocidal activity of these compounds.

We encounter a similar situation with the pentavalent arsenicals. Friedberger and Joachimaglu (1917) have shown that pentavalent arsenic and pentavalent antimony are nontoxic for bacteria, yeast, and protozoa. Many observers have pointed to the inertia of these compounds, particularly the arsenicals, for trypanosomes, spirochetes, and spirilla *in vitro*. Ehrlich and his collaborators have shown that reduction products of atoxyl exhibit a powerful trypanocidal action *in vitro*, whereas atoxyl does not. On the basis of this observation Ehrlich advanced the idea that the pentavalent arsenicals must be reduced by the animal body in order to exert their action on the parasites. Terry (1915) observed that if atoxyl is incubated with whole blood it becomes trypanocidally active. Reduction would obviously lead to the same $As:O$ grouping as is formed on the oxidation of the arsenic grouping. But the arseno grouping is known to be readily oxidized, and oxidative processes are known to be the predominant type in the body; reduction, on the other hand, would probably be less easily effected. We would therefore expect a much longer latent period with the pentavalent type than with the arseno type. This is actually the case if we consider equiva-

lent doses on a reactive basis. It has been impractical to show the true relationship graphically in Chart I, where we have given an experiment with pentavalent arsenic much above the minimum effective dose. At the minimum effective dose 12 to 18 hours elapse before the trypanosome count is materially reduced. With arsphe-namine this latent period is from one to three hours, and with arsen-oxide there is no latent period.

While both oxidation and reduction are going on, a certain amount of the compound is of course being excreted or fixed in the tissues. It is therefore not surprising that the minimum effective dose of these compounds, which must be changed before they can exert any trypanocidal action, should be higher than the minimum effective dose of those compounds which act immediately.

The therapeutic value of any compound, from a clinical point of view, is to a large extent expressed by the ratio, toxic dose to cura-tive dose. It is conceivable that a pentavalent arsenical might be elaborated that would show a greater ratio than any of those studied here. But in considering the actual killing dose for the host, we must not lose sight of the secondary dangers incident to the giving of such large quantities of arsenic. The most favorable ratio shown in this work is that of arsphe-namine (37 to 1), and next, neoarsphe-namine (33 to 1).

We do not believe that the study of the trypanocidal activity of any compound by this method will give an absolutely accurate index of its clinical value, but we do believe that a quantitative comparison of its experimental value *in vivo* can thus be made with other com-pounds. It is significant, however, that the results so obtained check in the order and degree of efficiency with the curative dose for spirochete infections as determined by Ehrlich and Hata (1910),¹ and as accepted from practical trial.

From the work done with antimonyllactate, it is evident that the rate of disappearance of a compound from the bloodstream is impor-tant, as well as the actual or potential trypanocidal activity. We have found that antimonyllactate was quickly withdrawn from the bloodstream, and that the minimum effective dose was in reality a dose large enough to maintain an effective threshold concentration in the blood for a time sufficient to kill all of the parasites. If we could block this removal, we would undoubtedly lower the minimum effective dose to a great extent. We found also that "arsenoxide" is not withdrawn as rapidly, the second half of the minimum effective dose sufficing to supplement the first half one hour or more after the

¹In syphilitic rabbits the curative dose for arsenophenylglycine, arsphe-namine, and arsenoxide was 0.15 gm., 0.005-0.015 gm., and 0.003 gm. per kilo body weight.

For chicken spirillosis the curative dose was as follows: Atoxyl 0.03 gm., arsacetin 0.03 gm., arseno-phenylglycine 0.12 gm., arsphe-namine 0.0035 gm., arsenoxide 0.0015 gm. (arsenophenylglycine falls out of order).

Similar figures are given for the curative dose of relapsing fever in mice.

first half had been given. By injecting half of the minimum effective dose of arsenoxide, and half of the minimum effective dose of antimonylactate, neither half by itself sufficing to effect any change in the trypanosome count, the two together prove to be effective. From this we reason that arsenic and antimony are trypanocidally complementary, an assumption which does not agree with Ehrlich's theory of the "chemo-receptor specificity." The aspect of the entire problem, in fact, turns the attention from this conception, and points the way to a reaction between the ultimate active form arising from all arsenicals, the arsenoxide form, and the stability of the trypanosome molecular-aggregate—a reaction which, when ultimately explained, will probably prove extremely simple.

Summary.

1. A method for the rapid and accurate determination of the trypanocidal power of drugs (minimum effective dose) is recommended.

2. A sharply defined threshold (minimum effective dose) is observed, below which the drug has no appreciable effect upon the parasites. This threshold is in part due to the nature of the reaction between the drug and the parasites, and in part to absorption of the drug by the tissues of the host.

3. Differences in the toxicity and parasitocidal activity of various arsenic and antimony preparations have been explained on the hypothesis that they must be changed to one type, namely, the oxides

R. As:O or R. Sb:O

before exerting their principal toxic action. Arsphenamine and neoarsphenamine have to be oxidized in the body before they can act upon the parasites.

FURTHER NOTE ON OUTBREAK OF TYPHOID FEVER AT HOPEWELL, VA.¹

By J. P. LEAKE, Passed Assistant Surgeon, United States Public Health Service, RICHARD MESSER, Sanitary Engineer, and AUBREY STRAUS, Bacteriologist, Virginia State Department of Health.

In the Public Health Reports of September 17 there was published a notice of an outbreak of typhoid fever among persons who participated in a dinner at Hopewell, Va. There have been no further fatalities and no new cases have developed except in two children who did not attend the banquet. An older sister of these two children did attend and had typhoid fever early in the outbreak, and her younger brother and sister took the disease about a month later, presumably from direct or indirect contact with their sister.

¹See Public Health Reports, Sept. 17, 1920, pp. 2197-2199.

Further experiments with infected mayonnaise dressing have shown that under laboratory conditions typhoid bacilli will probably not proliferate but will gradually decrease in number at 31° C. In one experiment, judging by the number of colonies on Endo plates, the content of 1 cubic centimeter of the salad dressing immediately, 2, 4, and 24 hours after infection was 10,000,000, 5,000,000, 500,000, and 2,500 typhoid bacilli, respectively. There remain, therefore, three possibilities: that the mayonnaise dressing was so heavily infected that enough organisms remained a few hours after its preparation to cause the intense incidence of the disease; that the veal, chicken, and celery used in the salad were similarly infected in chopping and mixing just before the dinner; or that the infection took place in some other manner at the banquet.

The feature of chief importance in the outbreak was the great variability in symptoms exhibited, from those of the classical picture of the disease. This variability is a characteristic which typhoid fever shares with many infections; but the intensity of prevalence from a sharply limited infection is seldom such as to show this clearly.

YELLOW FEVER AT THE NEW ORLEANS QUARANTINE STATION.

In view of the rarity of the occurrence of yellow fever in the United States, the following account of a case detected on an incoming vessel at the New Orleans quarantine station is of interest.

The vessel, upon arrival at the quarantine station, was three days out from Vera Cruz, where yellow fever was known to be prevailing. At the time of inspection at quarantine, the patient's temperature was 40.3° C., pulse 80, respiration 30, eyes bright and suffused, the ocular conjunctivæ being distinctly congested and yellowish; the skin of the face and neck was hot, dry, and congested; the lips were somewhat puffy and congested; and the saliva appeared chocolate-colored. The lungs and heart were apparently normal, and the spleen and liver were not enlarged. Just prior to removal to the quarantine hospital the patient vomited a quantity of chocolate-colored fluid containing partially digested blood. A specimen of urine obtained by catheterization showed, when treated by appropriate reagents, a large precipitate of serum albumen. The patient became unconscious soon after removal to the hospital and, in the night, collapsed and died. This was on September 3.

The history of the case prior to arrival, as elicited from the master of the vessel, was to the effect that the patient complained of a headache on the evening of August 31, with some nausea and pain in the extremities. He had no chill and was constipated. At that time

the temperature of the patient, as taken by the master, was 39.6° C. On September 2, the temperature registered 40.7° C. The pulse was not examined by the master. The patient in the meantime had vomited several times.

This case, therefore, presented a classical picture of yellow fever, viz, black vomit, heavy albuminuria, congested facies, and yellowish conjunctivæ, disproportion of temperature and pulse, and jaundice of the skin.

Appropriate treatment was taken against the vessel and contacts.

PRINCIPAL CAUSES OF DEATH, JUNE AND JULY, 1920.

The accompanying table is reprinted, by permission, from the Statistical Bulletin of the Metropolitan Life Insurance Co. for August, 1920. The figures are based on the strength of approximately 13,000,000.

Although these rates apply to a selected group, they give comparative mortality conditions for the periods covered.

Compared with the month of June and the year 1919, the death rate for July is exceedingly low. The rate, 8.2 per 1,000, represents a decline of 15 per cent from the figure for June.

Death rates per 100,000 for principal causes, June and July, 1920, and year 1919.

[Industrial Department, Metropolitan Life Insurance Co.]

Cause of death.	Rate per 100,000 lives exposed.			Cause of death.	Rate per 100,000 lives exposed.		
	July, 1920.	June, 1920.	Year 1919.		July, 1920.	June, 1920.	Year 1919.
Total, all causes.....	815.5	959.0	1,063.0	Other respiratory diseases..	11.4	16.4	17.0
Typhoid fever.....	5.6	5.2	7.3	Diarrhea and enteritis.....	18.0	13.3	16.9
Measles.....	7.5	12.7	3.5	Bright's disease.....	63.7	71.8	73.5
Scarlet fever.....	2.7	5.9	3.9	Puerperal state.....	19.3	21.2	20.0
Whooping cough.....	4.8	6.9	3.2	Suicides.....	6.1	7.5	6.8
Diphtheria.....	12.4	16.7	20.9	Homicides.....	5.3	6.2	6.9
Influenza.....	8.2	15.7	96.9	Other external causes (ex- cluding suicides and hom- icides).....	72.9	60.6	80.4
Tuberculosis (all forms).....	132.5	154.3	158.5	Traumatism by auto- mobile.....	13.5	12.4	10.7
Cancer.....	67.8	73.8	67.0	War deaths.....	(1)	(1)	16.6
Meningitis (all forms).....	5.7	7.0	6.4	All other causes.....	188.9	213.2	184.9
Cerebral hemorrhage.....	48.3	61.5	59.8				
Organic diseases of heart.....	100.7	116.8	113.9				
Pneumonia (all forms).....	34.0	72.3	117.2				

¹ Less than 0.05 per 100,000.

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 STATE SUMMARIES.

Telegraphic Reports for Week Ended September 18, 1920.

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

	ALABAMA.	Cases.		CONNECTICUT.	Cases.
Chicken pox.....		4	Cerebral meningitis.....		1
Diphtheria.....		39	Chicken pox.....		2
Hookworm.....		40	Diphtheria:		
Malaria.....		22	Bridgeport.....		10
Measles.....		6	New Haven.....		8
Pellagra.....		2	Scattering.....		31
Scarlet fever.....		18	Dysentery.....		1
Smallpox.....		4	German measles.....		1
Tuberculosis.....		25	Malaria.....		2
Typhoid fever.....		52	Measles.....		9
Whooping cough.....		7	Mumps.....		7
			Pneumonia (lobar).....		1
	ARKANSAS.		Polio-myelitis.....		1
Chicken pox.....		17	Scarlet fever.....		23
Diphtheria.....		31	Tetanus.....		1
Hookworm.....		3	Tuberculosis (all forms).....		26
Influenza.....		4	Typhoid fever:		
Malaria.....		295	Enfield.....		9
Measles.....		3	Hartford.....		8
Pellagra.....		6	Scattering.....		19
Polio-myelitis.....		1	Whooping cough.....		69
Scarlet fever.....		16			
Smallpox.....		10		DELAWARE.	
Tuberculosis.....		8	Chicken pox.....		1
Typhoid fever.....		43	Diphtheria.....		1
Whooping cough.....		28	Pneumonia.....		1
			Scarlet fever.....		3
	CALIFORNIA.		Tuberculosis.....		2
Cerebrospinal meningitis:			Typhoid fever.....		1
Monterey.....		1	Whooping cough.....		1
San Francisco.....		2			
Dysentery.....		3		GEORGIA.	
Lethargic encephalitis:			Cerebrospinal meningitis.....		1
Alameda.....		1	Chicken pox.....		4
Polio-myelitis:			Diphtheria.....		54
Klink.....		1	Dysentery (amebic).....		2
Smallpox:			Dysentery (bacillary).....		2
Dinuba.....		7	Hookworm.....		14
Scattering.....		33	Influenza.....		18
Typhoid fever:			Malaria.....		236
Inyo County.....		10	Measles.....		19
Scattering.....		26	Mumps.....		2

¹ Week ended Friday.

MISSISSIPPI—continued.	Cases.	NORTH CAROLINA.	Cases.
Poliomyelitis.....	1	Chicken pox.....	1
Scarlet fever.....	10	Diphtheria.....	129
Smallpox.....	3	Measles.....	12
Typhoid fever.....	9	Poliomyelitis.....	1
		Scarlet fever.....	44
		Septic sore throat.....	6
		Smallpox.....	6
		Typhoid fever.....	20
		Whooping cough.....	95
		SOUTH DAKOTA.	
		Diphtheria.....	6
		Scarlet fever.....	5
		Smallpox.....	8
		Tuberculosis.....	5
		Whooping cough.....	3
		TEXAS.	
		Diphtheria.....	27
		Malaria.....	50
		Pneumonia.....	5
		Scarlet fever.....	25
		Tuberculosis.....	12
		Typhoid fever.....	21
		Whooping cough.....	4
		VERMONT.	
		Chicken pox.....	3
		Diphtheria.....	5
		Measles.....	3
		Mumps.....	3
		Scarlet fever.....	7
		Smallpox.....	1
		Typhoid fever.....	5
		Whooping cough.....	56
		WASHINGTON.	
		Chicken pox.....	11
		Diphtheria.....	14
		German measles.....	1
		Measles.....	8
		Mumps.....	1
		Pneumonia.....	1
		Scarlet fever.....	18
		Smallpox.....	19
		Tuberculosis.....	12
		Typhoid fever.....	28
		Whooping cough.....	5
		WEST VIRGINIA.	
		Diphtheria.....	11
		Measles.....	2
		Scarlet fever.....	6
		Smallpox.....	1
		Typhoid fever.....	4
		WISCONSIN.	
		Milwaukee:	
		Cerebrospinal meningitis.....	2
		Chickenpox.....	2
		Diphtheria.....	13
		Measles.....	6

WISCONSIN—continued.

Milwaukee—Continued.	Cases.
Rubella.....	1
Scarlet fever.....	19
Smallpox.....	5
Tuberculosis.....	25
Whooping cough.....	14
Scattering:	
Chicken pox.....	13
Diphtheria.....	38

WISCONSIN—continued.

Scattering—Continued.	Cases.
Influenza.....	13
Measles.....	70
Poliomyelitis.....	1
Scarlet fever.....	74
Smallpox.....	31
Tuberculosis.....	41
Typhoid fever.....	11
Whooping cough.....	174

Kentucky Report for Week Ended Sept. 11, 1920.

	Cases.		Cases.
Chicken pox.....	3	Pellagra.....	1
Cholera infantum.....	1	Pneumonia.....	8
Continued fever.....	6	Scarlet fever.....	30
Diphtheria.....	66	Septic sore throat.....	9
Dysentery.....	17	Smallpox.....	26
Influenza.....	10	Tonsillitis.....	1
Malaria.....	3	Trachoma.....	13
Measles.....	12	Tuberculosis.....	21
Mumps.....	1	Typhoid fever.....	87
Paratyphoid fever.....	1	Whooping cough.....	35

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

Tables showing by counties the reported cases of cerebrospinal meningitis, influenza, malaria, pellagra, poliomyelitis, smallpox, and typhoid fever are published under the names of these diseases. (See names of these and other diseases in the table of contents.)

The following monthly State reports include only those which were received during the current week. These reports appear each week as received.

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles.	Pellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
1920.										
Arizona (August).....		3	2		2			3		13
California (August).....	14	208	19	44	170	2	10	127	159	156
District of Columbia (August).....		35			21	1		19		19
Massachusetts (August).....	12	428	10	9	452	4	94	213		117
Nebraska (August).....	3	35			71		1	16	66	12
Pennsylvania (July).....	8	723			3,004		20	605	27	272
Vermont (August).....		10			83			21		10
West Virginia (August).....	6	66	8		107		3	72	99	106
Wisconsin (August).....	5	189	8		264		12	227	268	28

ANTHRAX.

California, Massachusetts, Montana, and Pennsylvania.

During July, 1920, there was one case of anthrax reported in Pennsylvania, and one at Merced, Calif. During August one case was reported in Massachusetts. During the week ended September 4, 1920, one case was reported at Butte, Mont.

CEREBROSPINAL MENINGITIS.
State Reports for July and August, 1920.

Place.	New cases reported.	Place.	New cases reported.
California (August):		Nebraska (August):	
Alameda County—		Colfax County.....	1
Berkeley.....	1	Lancaster County.....	1
Oakland.....	1	Saunders County.....	1
Contra Costa County.....	1	Total.....	3
Los Angeles County.....	1		
Long Beach.....	1	Pennsylvania (July):	
Los Angeles.....	4	Allegheny County.....	1
Orange County—		Chester County.....	1
Santa Ana.....	1	Erie County.....	1
Sacramento County—		Luzerne County.....	1
Sacramento.....	2	Philadelphia County.....	2
San Francisco.....	1	Schuylkill County.....	1
San Joaquin County—		Westmoreland County.....	1
Stockton.....	1	Total.....	8
Total.....	14		
Massachusetts (August):		West Virginia (August):	
Essex County—		Boone County.....	1
Salem.....	1	Harrison County.....	1
Lawrence.....	1	Kanawha County.....	1
Franklin County—		Mercer County.....	1
Greenfield (town).....	1	Ohio County.....	1
Hampden County—		Raleigh County.....	1
Chicopee.....	1	Total.....	6
Middlesex County—			
Frammingham (town).....	1	Wisconsin (August):	
Lowell.....	1	Clark County.....	1
Norfolk County—		Manitowoc County.....	3
Quincy.....	2	Milwaukee County.....	1
Weymouth (town).....	1	Total.....	5
Suffolk County—			
Boston.....	2		
Worcester County—			
Leominster.....	1		
Total.....	12		

City Reports for Week Ended Sept. 4, 1920.

The column headed "Average cases," gives the average number of cases reported during the corresponding week of the years 1915 to 1919, inclusive. In instances in which the information is not available for the full five years, the average includes from one to four years.

Place.	Average cases.	1920		Place.	Average cases.	1920	
		Cases.	Deaths.			Cases.	Deaths.
California:				Massachusetts:			
Los Angeles.....	(1)	2	.....	Boston.....	(1)	2	4
San Francisco.....	0	.....	1	Michigan:			
Colorado:				Detroit.....	0	3	1
Pueblo.....	.....	.....	1	Missouri:			
Connecticut:				St. Louis.....	0	1	.....
New Haven.....	(1)	.....	1	New Jersey:			
Georgia:				Bloomfield.....	0	.....	1
Atlanta.....	0	1	.....	Elizabeth.....	0	1	.....
Illinois:				West New York.....	0	.....	1
Aurora.....	.....	.....	1	North Carolina:			
Chicago.....	2	2	.....	Greensboro.....	0	.....	1
Indiana:				Ohio:			
Bedford.....	0	.....	1	Steubenville.....	0	1	.....
Indianapolis.....	0	.....	2	Pennsylvania:			
Kentucky:				Philadelphia.....	3	1	.....
Louisville.....	0	.....	1	Virginia:			
Maryland:				Richmond.....	0	1	1
Baltimore.....	(1)	1	.....				

¹ Average less than 1.

DIPHTHERIA.

See Telegraphic weekly reports from States, p. 2276; Monthly summaries by States, p. 2279; and Weekly reports from cities, p. 2292.

INFLUENZA.**California and Wisconsin Reports for August, 1920.**

Place.	New cases reported.	Place.	New cases reported.
California.....	19	Wisconsin—Continued.	
Wisconsin:		Waupaca County.....	1
Pierce County.....	4	Total.....	8
Rock County.....	3		

City Reports for Week Ended Sept. 4, 1920.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Alabama:			Montana:		
Montgomery.....		1	Butte.....		1
California:			New Jersey:		
Los Angeles.....	1	1	East Orange.....	1	
Illinois:			New York:		
Chicago.....	3	1	Cohoes.....	1	
Maryland:			New York City.....	18	2
Baltimore.....	1		Ohio:		
Massachusetts:			Cleveland.....	2	
Boston.....	2		Dayton.....	1	
Haverhill.....	2		Virginia:		
			Roanoke.....	1	

LEPROSY.**New York, N. Y.—Week Ended Sept. 4, 1920.**

During the week ended September 4, 1920, two cases of leprosy were reported at New York, N. Y.

LETHARGIC ENCEPHALITIS.**California and Pennsylvania.**

During the month of July, 1920, seven cases of lethargic encephalitis were reported in Pennsylvania. During August eight cases were reported in California. During the week ended September 4, 1920, two cases, with one death, were reported at San Francisco, Calif.

MALARIA.**California and Massachusetts Reports for August, 1920.**

Place.	New cases reported.	Place.	New cases reported.
California:		California—Continued.	
Alameda County—		Tehama County—	
Oakland.....	1	Red Bluff.....	1
Butte County—		Tulare County—	
Gridley.....	1	Exeter.....	1
Colusa County.....	1	Total.....	44
Glen County—			
Orland.....	1	Massachusetts:	
Fresno County—		Bristol County—	
Kingsburg.....	1	Taunton (town).....	1
Kern County.....	1	Hampden County—	
Bakersfield.....	1	Holyoke.....	1
Los Angeles County—		Middlesex County—	
Los Angeles.....	1	Cambridge.....	2
Placer County.....	1	Plymouth County—	
Lincoln.....	1	Breckten.....	2
Sacramento County—		Suffolk County—	
Sacramento.....	8	Boston.....	1
San Francisco.....	2	Worcester County—	
San Mateo County.....	1	Northbridge (town).....	2
Shasta County.....	13	Total.....	9
Redding.....	7		
Sutter County.....	1		

MALARIA—Continued.**City Reports for Week Ended Sept. 4, 1920.**

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Alabama:			Louisiana:		
Anniston.....	1		Alexandria.....	29	
Birmingham.....	1		New Orleans.....	3	
Arkansas:			New Jersey:		
Fort Smith.....	1		Paterson.....	1	
Georgia:			New York:		
Brunswick.....	1		New York.....		1
Rome.....	1		Pennsylvania:		
Savannah.....	9		Philadelphia.....	1	
Indiana:			Texas:		
Indianapolis.....		1	Corpus Christi.....	1	
Kentucky:			Dallas.....	17	
Louisville.....	1				

MEASLES.

See Telegraphic weekly reports from States, p. 2276; Monthly summaries by States, p. 2279; and Weekly reports from cities, p. 2292.

PELLAGRA.**State Reports for August, 1920.**

Place.	New cases reported.	Place.	New cases reported.
California:		Massachusetts—Continued.	
Sonoma County.....	2	Middlesex County—	
District of Columbia.....	1	Waltham.....	1
Massachusetts:		Norfolk County—	
Essex County—		Wrentham (town).....	1
Lynn.....	1	Total.....	4
Swampscott (town).....	1		

City Reports for Week Ended Sept. 4, 1920.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Alabama:			Louisiana:		
Birmingham.....		1	Baton Rouge.....	1	
Mobile.....	1		New Orleans.....		1
Georgia:			North Carolina:		
Atlanta.....		2	Durham.....		1
Savannah.....		1	Tennessee:		
			Nashville.....		1

PLAGUE.**Human Cases of Plague Reported.**

Place.	Period covered.	Cases.	Deaths.	Remarks.
Florida:	1920.			
Pensacola.....	May 31 to Aug. 31.....	10	4	
	Sept. 1 to 18.....	0	0	
Louisiana:	1919.			
New Orleans.....	Oct. 22 to Dec. 31.....	12	4	
	1920.			
	Jan. 1 to Apr. 30.....	0	0	
	May 1 to Aug. 31.....	7	3	
	Sept. 1 to 21.....	0	0	
Texas:				
Beaumont.....	June 19 to Aug. 20.....	14	5	
	Aug. 21 to Sept. 17.....	0	0	
Galveston.....	June 8 to Sept. 7.....	11	8	
	Sept. 8 to 16.....	0	0	
Port Arthur.....	July 7.....	1	1	From Galveston.

PLAGUE—Continued.
Plague-Infected Rodents.

Place.	Period covered.	Rodents found plague infected.
Florida:	1920.	
Pensacola.....	June 28 to Sept. 12.....	31
	Sept. 13 to 19.....	
Louisiana:	1919.	
New Orleans.....	Nov. 1 to Dec. 31.....	276
	1920.	
	Jan. 1 to July 31.....	285
	Aug. 1 to Sept. 11.....	0
	Sept. 12 to 18.....	1
Texas:		
Beaumont.....	July 1 to Sept. 12.....	122
	Sept. 13 to 19.....	0
Galveston.....	June 21 to Sept. 12.....	55
	Sept. 13 to 17.....	1

Rodents Examined for Plague Infection.

Place.	Period covered.	Rodents examined.	Found infected.
Florida:	1920.		
Pensacola.....	Week ended Sept. 11.....	256	1
Hawaii:			
Honolulu—			
Mus norvegicus.....	Week ended Aug. 21.....	67	0
Mus rattus.....	do.....	35	0
Mus alexandrinus.....	do.....	75	0
Mus musculus.....	do.....	118	0
Mongoose.....	do.....	2	0
Louisiana:			
New Orleans—			
Mus norvegicus.....	Two weeks ended Sept. 11.....	5,315	0
Mus rattus.....	do.....	608	0
Mus alexandrinus.....	do.....	559	0
Wood rats.....	do.....	9	0
Putrid.....	do.....	393	0
Philippine Islands:			
Manila.....	Month of July.....	8,331	0
Texas:			
Beaumont—			
Mus norvegicus.....	Week ended Sept. 4.....	361	1
Mus rattus.....	do.....	39	0
Mus alexandrinus.....	do.....	300	0
Mus musculus.....	do.....	628	0
Wood rats.....	do.....	486	0
Putrid.....	do.....	79	0
Galveston—			
Mus norvegicus.....	Aug. 27 to Sept. 3.....	597	1
Mus rattus.....	do.....	136	0
Mus alexandrinus.....	do.....	38	0
Wood rats.....	do.....	13	0
Putrid.....	do.....	36	0

PNEUMONIA (ALL FORMS).

City Reports for Week Ended Sept. 4, 1920.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Alabama:			California—Continued.		
Mobile.....	1	1	San Diego.....	1	1
Arizona:			San Francisco.....	2	5
Tucson.....		3	Colorado:		
California:			Denver.....		2
Eureka.....		1	Pueblo.....		2
Los Angeles.....	10	3	Connecticut:		
Oakland.....	1	2	Bridgeport.....		1
Riverside.....		1	Hartford.....		1
Sacramento.....		1	Manchester.....	1	

PNEUMONIA (ALL FORMS)—Continued.
City Reports for Week Ended Sept. 4, 1920—Continued.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Connecticut—Continued.			Missouri:		
New Britain.....		1	Independence.....	1	1
New Haven.....		1	Jefferson City.....		1
Norwalk.....		1	Kansas City.....	10	10
Delaware:			Nebraska:		
Wilmington.....		1	Beatrice.....		1
District of Columbia:			Omaha.....		5
Washington.....		4	Nevada:		
Georgia:			Reno.....	1	1
Atlanta.....	1	3	New Hampshire:		
Illinois:			Nashua.....		1
Chicago.....	58	13	New Jersey:		
Decatur.....		1	Atlantic City.....	1	1
East St. Louis.....		1	Irvington.....	1	
Peoria.....		1	Jersey City.....	1	
Rock Island.....	1		Kearny.....	1	
Springfield.....	2	1	Paterson.....	1	
Indiana:			Perth Amboy.....		1
East Chicago.....		2	Trenton.....	1	1
Fort Wayne.....		1	West New York:		
Gary.....		1			2
Indianapolis.....		4	New York:		
Kansas:			Albany.....	1	
Wichita.....		1	Auburn.....	1	1
Kentucky:			Binghamton.....		1
Louisville.....		2	Buffalo.....		1
Louisiana:			Lockport.....	1	
Baton Rouge.....	1		Mount Vernon.....	1	
New Orleans.....	1	3	New York.....	72	42
Maine:			Rochester.....	1	1
Biddeford.....		1	Syracuse.....	2	5
Maryland:			Troy.....	2	1
Baltimore.....	10	4	White Plains.....		1
Cumberland.....	1		North Carolina:		
Massachusetts:			Charlotte.....		2
Arlington.....		1	Rocky Mount.....		1
Boston.....	2	3	Ohio:		
Cambridge.....		1	Chillicothe.....	1	
Chicopee.....		1	Cincinnati.....		4
Holyoke.....		2	Cleveland.....	4	8
Lawrence.....	1	1	Dayton.....	2	
Leominster.....		1	Toledo.....		3
Lowell.....		1	Zanesville.....	1	1
Lynn.....	1	1	Oregon:		
Malden.....		1	Portland.....		1
Medford.....	2	1	Pennsylvania:		
Pittsfield.....		1	Philadelphia.....	18	17
Plymouth.....		1	Rhode Island:		
Taunton.....	1	1	Providence.....		2
Waltham.....	1		Tennessee:		
Michigan:			Nashville.....		2
Detroit.....	11	10	Texas:		
Flint.....		2	Beaumont.....		1
Ishpeming.....	1		Corpus Christi.....	1	1
Marquette.....	1		Dallas.....		1
Minnesota:			El Paso.....		2
Duluth.....		1	Galveston.....		1
Minneapolis.....		3	West Virginia:		
St. Paul.....		1	Wheeling.....	1	1
			Wisconsin:		
			Milwaukee.....		3

POLIOMYELITIS (INFANTILE PARALYSIS.)

State Reports for July and August, 1920.

Place.	New cases reported.	Place.	New cases reported.
California (August):		California (August)—Continued.	
Los Angeles County.....	1	Solano County—	
Los Angeles.....	2	Vallejo.....	1
Pomona.....	1	Tulare County.....	1
Monrovia.....	1	Total.....	10
Fresno County—		Massachusetts (August):	
Clovis.....	1	Berkshire County—	
Kings County—		Pittsfield.....	3
Corcoran.....	1	Bristol County—	
Orange County—		Taunton (town).....	2
Santa Ana.....	1		

POLIOMYELITIS (INFANTILE PARALYSIS)—Continued.

State Reports for July and August, 1920—Continued.

Place.	New cases reported.	Place.	New cases reported.
Massachusetts (August)—Continued.		Nebraska (August):	
Essex County—		Madison County.....	1
Amesbury (town).....	1	Pennsylvania (July):	
Haverhill.....	1	Allegheny County.....	1
Lynn.....	1	Bedford County.....	1
Middlesex County—		Chester County.....	1
Arlington (town).....	1	Jefferson County.....	2
Cambridge.....	3	Lawrence County.....	4
Everett.....	4	Northampton County.....	2
Lowell.....	1	Philadelphia County.....	6
Malden.....	2	Schuylkill County.....	1
Medford.....	1	Westmoreland County.....	1
Somerville.....	2	York County.....	1
Waltham.....	2	Total.....	
Wakefield (town).....	2	20	
Norfolk County—		West Virginia (August):	
Brookline (town).....	1	Kanawha County.....	1
Canton (town).....	1	Mercer County.....	1
Milton (town).....	1	Summers County.....	1
Needham (town).....	2	Total.....	
Quincy (town).....	6	3	
Weymouth (town).....	6	Wisconsin (August):	
Plymouth County—		Barron County.....	1
Hull (town).....	1	Dunn County.....	1
Scituate (town).....	1	Fond du Lac County.....	1
Suffolk County—		Green County.....	1
Boston.....	44	Milwaukee County.....	2
Winthrop (town).....	1	Wood County.....	6
Worcester County—		Total.....	
Fitchburg.....	2	12	
Westboro (town).....	1		
Worcester.....	1		
Total.....			
94			

City Reports for Week Ended Sept. 4, 1920.

The column headed "Average cases" gives the average number of cases reported during the corresponding week of the years 1915 to 1919, inclusive. In instances in which the information is not available for the full five years, the average includes from one to four years.

Place.	Average cases.	1920.		Place.	Average cases.	1920.	
		Cases.	Deaths.			Cases.	Deaths.
Connecticut:				Massachusetts—Contd.			
New London.....	0	1	.....	Quincy.....	0	3	.....
Illinois:				Somerville.....	(2)	1	.....
Bloomington.....		2	.....	Taunton.....	(2)		2
Chicago.....	14	7	3	Waltham.....	0	2	.....
Indiana:				Winthrop.....	0	1	.....
Mishawaka.....		1	.....	Minnesota:			
Maryland:				St. Paul.....	2	2	.....
Baltimore.....	4	1	.....	Montana:			
Massachusetts:				Great Falls.....		1	.....
Arlington.....		1	.....	New York:			
Boston.....	(2)	22	9	New York.....	44	3	.....
Brockton.....	0	1	.....	Ohio:			
Chelsea.....	0	1	.....	Cincinnati.....	(2)		1
Everett.....	0		1	Pennsylvania:			
Lynn.....	(2)	4	.....	Philadelphia.....	40	1	1
Malden.....	0	1	.....	Wisconsin:			
Medford.....	(2)	1	.....	La Crosse.....	(2)	1	.....
Newton.....	0	3	.....	Milwaukee.....	(2)	1	.....

¹ Excluding 1916 and 1917, epidemic years.

² Excluding 1916 the average is less than 1.

³ Average less than 1.

⁴ Excluding 1916, an epidemic year.

RABIES IN ANIMALS.**Rochester, N. Y., and Spartanburg, S. C.**

During the week ended September 4, 1920, 1 case of rabies in animals was reported at Rochester, N. Y., and 1 case in Spartanburg, S. C.

ROCKY MOUNTAIN SPOTTED OR TICK FEVER.**Missoula, Mont.—Week Ended Sept. 4, 1920.**

During the week ended September 4, 1920, 1 case of Rocky Mountain spotted or tick fever was reported at Missoula, Mont.

SCARLET FEVER.

See Telegraphic weekly reports from States, p. 2276; Monthly summaries by States p. 2279; and Weekly reports from cities, p. 2292.

SMALLPOX.**Arizona and California Reports for August, 1920—Vaccination Histories.**

Place.	New cases reported.	Deaths.	Vaccination history of cases.			
			Vaccinated within 7 years preceding attack.	Last vaccinated more than 7 years preceding attack.	Never successfully vaccinated.	History not obtained or uncertain.
Arizona:						
Cochise County.....	1					1
Pima County.....	7					7
Total.....	8					8
California:						
Alameda County—						
Berkeley.....	7			2	5	
Oakland.....	23		1	3	15	4
Piedmont.....	1			1		
Butte County—						
Oroville.....	1		1			
Contra Costa County—						
Martinez.....	1				1	
Richmond.....	1				1	
Fresno County.....	1					1
Fresno.....	1				1	
Kern County.....	1					1
Kings County.....	1				1	
Hanford.....	2				2	
Los Angeles County.....	13				10	3
Long Beach.....	7				7	
Los Angeles.....	17			1	11	5
Pasadena.....	3				3	
Pomona.....	2				2	
Santa Monica.....	2			1	1	
Venice.....	1				1	
Modoc County.....	2				2	
Monterey County.....	1				1	
Monterey.....	2				2	
Salinas.....	2				2	
Napa County.....	1				1	
Orange County.....	4				4	
Fullerton.....	2				2	
Newport Beach.....	1				1	
Santa Ana.....	1				1	
Pt. Mas County.....	4				4	
Riverside County—						
Hemet.....	12				12	
Sacramento County.....	1			1		
Sacramento.....	8		1	2	5	
San Diego County—						
San Diego.....	2			1		1
San Francisco.....	5				5	
Santa Clara County.....	2				2	
Mountain View.....	1			1		
San Jose.....	6			1	4	
Sunnyvale.....	1				1	

SMALLPOX—Continued.

Arizona and California Reports for August, 1920—Vaccination Histories—Continued.

Place.	New cases reported.	Deaths.	Vaccination history of cases.			
			Vaccinated within 7 years preceding attack.	Last vaccinated more than 7 years preceding attack.	Never successfully vaccinated.	History not obtained or uncertain.
California—Continued.						
San Joaquin County.....	3			1	2	
Santa Cruz County—						
Santa Cruz.....	1				1	
Siskiyou County—						
Dunsmuir.....	1					1
Solano County.....	1				1	
Petaluma.....	2				2	
Stanislaus County—						
Modesto.....	1					1
Turlock.....	1				1	
Tulare County.....	6				3	3
Total.....	159		3	15	120	21

State Reports for July and August, 1920.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Nebraska (August):			West Virginia—Continued.		
Cheyenne County.....	1		Mercer County.....	7	
Clay County.....	1		Nicholas County.....	5	
Cuming County.....	4		Wyoming County.....	3	
Douglas County.....	12		Total.....	99	
Holt County.....	1		Wisconsin (August):		
Johnson County.....	2		Adams County.....	9	
Knox County.....	2		Brown County.....	8	
Lancaster County.....	1		Calumet County.....	3	
Lincoln County.....	1		Chippewa County.....	2	
Morrill County.....	2		Columbia County.....	1	
Nemaha County.....	2		Dane County.....	10	
Nuckolls County.....	6		Dodge County.....	7	
Pierce County.....	1		Door County.....	23	
Richardson County.....	8		Douglas County.....	20	
Saunders County.....	5		Eau Claire County.....	2	
Scotts Bluff County.....	7		Fond du Lac County.....	1	
Seward County.....	1		Grant County.....	9	
Sheridan County.....	4		Green County.....	8	
Thayer County.....	1		Iowa County.....	5	
Thurston County.....	1		Iron County.....	1	
Webster County.....	1		Jefferson County.....	3	
York County.....	2		Kenosha County.....	18	
Total.....	66		Kewaunee County.....	1	
Pennsylvania (July):			La Crosse County.....	2	
Allegheny County.....	6		Lincoln County.....	1	
Cambria County.....	5		Manitowoc County.....	4	
Delaware County.....	1		Marathon County.....	8	
Fayette County.....	3		Marquette County.....	7	
Greene County.....	4		Milwaukee County.....	49	
Lawrence County.....	1		Oconto County.....	1	
Philadelphia County.....	1		Outagamie County.....	5	
Potter County.....	1		Pierce County.....	3	
Somerset County.....	2		Polk County.....	8	
Susquehanna County.....	1		Portage County.....	1	
Westmoreland County.....	2		Richland County.....	2	
Total.....	27		Rock County.....	2	
West Virginia (August):			St. Croix County.....	2	
Boone County.....	7		Shawano County.....	6	
Cabell County.....	1		Sheboygan County.....	10	
Clay County.....	7		Vernon County.....	1	
Fayette County.....	2		Walworth County.....	5	
Hampshire County.....	9		Washington County.....	2	
Harrison County.....	10		Waupaca County.....	8	
Kanawha County.....	41		Winnebago County.....	7	
McDowell County.....	7		Wood County.....	3	
			Total.....	268	

SMALLPOX—Continued.

City Reports for Week Ended Sept. 4, 1920.

The column headed "Average cases" gives the average number of cases reported during the corresponding week of the years 1915 to 1919, inclusive. In instances in which the information is not available for the full five years, the average includes from one to four years.

Place.	Average cases.	1920.		Place.	Average cases.	1920.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				Montana:			
Mobile.....	0	2	.....	Billings.....	1	3	.....
California:				Great Falls.....	0	1	.....
Los Angeles.....	(¹)	1	.....	Missoula.....	0	3	.....
Sacramento.....	(¹)	3	1	Nebraska:			
San Francisco.....	2	1	.....	Omaha.....	1	4	.....
Colorado:				Nevada:			
Denver.....	3	5	.....	Reno.....	0	2	.....
Pueblo.....	0	2	.....	North Dakota:			
Georgia:				Fargo.....	0	1	.....
Atlanta.....	4	1	.....	Ohio:			
Idaho:				Akron.....	(¹)	2	.....
Boise.....	2	2	.....	Alliance.....	0	1	.....
Illinois:				Canton.....	(¹)	1	.....
Chicago.....	1	1	.....	Cincinnati.....	(¹)	1	.....
Indiana:				Dayton.....	(¹)	1	.....
Huntington.....		1	.....	Lima.....	0	2	.....
Marion.....	0	1	.....	Springfield.....	(¹)	1	.....
South Bend.....	0	2	.....	Oklahoma:			
Iowa:				Oklahoma City.....	1	1	.....
Cedar Rapids.....	0	1	.....	Oregon:			
Dubuque.....	(¹)	3	1	Portland.....	4	3	.....
Kansas:				Texas:			
Parsons.....	0	1	.....	Waco.....	0	2	.....
Topeka.....	0	1	.....	Washington:			
Wichita.....	(¹)	3	.....	Bellingham.....		1	.....
Louisiana:				Everett.....	0	2	.....
New Orleans.....	(¹)	8	.....	Seattle.....	1	7	.....
Michigan:				Spokane.....	1	2	.....
Flint.....	(¹)	2	.....	Tacoma.....	(¹)	1	.....
Highland Park.....	0	2	.....	Vancouver.....		2	.....
Minnesota:				Walla Walla.....	2	1	.....
Minneapolis.....	3	9	.....	Yakima.....		1	.....
St. Paul.....	(¹)	4	.....	Wisconsin:			
Winona.....	0	1	.....	La Crosse.....	(¹)	1	.....
Missouri:				Madison.....	(¹)	2	.....
Joplin.....	0	1	.....	Milwaukee.....	1	6	.....
Kansas City.....	2	2	.....	Sheboygan.....	0	1	.....
St. Joseph.....	1	1	.....	Superior.....	0	1	.....
St. Louis.....	(¹)	2	.....				

¹ Average less than 1.

TETANUS.

City Reports for Week Ended Sept. 4, 1920.

Place.	Cases.	Deaths.	Place.	Cases.	Deaths.
Georgia:			Missouri:		
Savannah.....		3	St. Joseph.....	1	.....
Illinois:			New York:		
Chicago.....	2	.....	New York.....	1	.....
Springfield.....		1	Pennsylvania:		
Minnesota:			Philadelphia.....	1	1
Minneapolis.....		1	Rhode Island:		
			Pawtucket.....		1

TUBERCULOSIS.

See Telegraphic weekly reports from States, page 2276, and Weekly reports from cities, page 2292.

TYPHOID FEVER.

State Reports for July and August, 1920.

Place.	New cases reported.	Place.	New cases reported.
Arizona (August):		Massachusetts (August)—Continued.	
Apache County.....	1	Bristol County—	
Greenlee County.....	1	Attleboro (town).....	2
Maricopa County.....	3	Dartmouth (town).....	3
Pima County.....	2	Fall River.....	19
Yavapai County.....	5	New Bedford.....	14
Yuma County.....	1	Taunton (town).....	1
Total.....	13	Essex County—	
California (August):		Amesbury (town).....	1
Alameda County.....	2	Gloucester.....	1
Alameda.....	7	Haverhill.....	1
Berkeley.....	1	Ipswich (town).....	2
Oakland.....	11	Lynn.....	3
Contra Costa County.....	1	Marblehead (town).....	1
Pittsburg.....	1	Newburyport.....	1
Richmond.....	3	Salem.....	1
El Dorado County.....	1	Swampscott (town).....	2
Fresno County.....	9	Franklin County—	
Clovis.....	2	Colrain (town).....	1
Fresno.....	2	Orange (town).....	1
Reedley.....	1	Hampden County—	
Selma.....	1	Chicopee.....	1
Humboldt County.....	1	Palmer (town).....	1
Kern County.....	1	Springfield.....	4
Kings County.....	3	Hampshire County—	
Los Angeles County.....	27	Easthampton (town).....	1
Los Angeles.....	1	Northampton.....	2
Pasadena.....	1	Worthington (town).....	1
Pomona.....	1	Middlesex County—	
Madera County.....	2	Arlington (town).....	1
Monterey County.....	3	Cambridge.....	1
Napa County.....	1	Everett.....	4
Napa.....	1	Lowell.....	2
Orange County.....	2	Malden.....	1
Anaheim.....	1	Newton.....	1
Fullerton.....	1	Somerville.....	1
Riverside County.....	1	Winchester (town).....	1
Sacramento County—		Norfolk County—	
Sacramento.....	8	Brookline (town).....	1
San Bernardino County—		Foxboro (town).....	1
Ontario.....	1	Norwood (town).....	1
Redlands.....	3	Quincy (town).....	1
San Diego County—		Plymouth County—	
San Diego.....	1	Brockton.....	1
San Francisco.....	11	East Bridgewater (town).....	1
San Joaquin County.....	4	Hull (town).....	1
Manteca.....	1	Kingston (town).....	1
Stockton.....	2	Scituate (town).....	1
San Mateo County—		Suffolk County—	
San Mateo.....	3	Boston.....	12
Santa Barbara County—		Chelsea.....	3
Santa Maria.....	1	Worcester County—	
Santa Clara County.....	1	Clinton.....	1
Santa Cruz County—		Gardner (town).....	1
Santa Cruz.....	2	Leominster.....	1
Shasta County.....	1	Sutton (town).....	1
Redding.....	3	Worcester.....	3
Solano County.....	4	Total.....	117
Vacaville.....	1	Nebraska (August):	
Sonoma County.....	1	Clay County.....	1
Santa Rosa.....	1	Douglas County.....	3
Stanislaus County.....	1	Knox County.....	3
Oakdale.....	4	Madison County.....	1
Turlock.....	1	Nemaha County.....	1
Tulare County.....	3	Sauers County.....	1
Dinuba.....	1	Thurston County.....	1
Ventura County.....	3	Webster County.....	1
Santa Paula.....	2	Total.....	12
Total.....	156	Pennsylvania (July):	
District of Columbia (August).....	19	Adams County.....	1
Massachusetts (August):		Allegheny County.....	33
Berkshire County—		Armstrong County.....	5
Adams (town).....	1	Beaver County.....	7
North Adams.....		Pedford County.....	2
Pittsfield.....	5	Berks County.....	6
		Blair County.....	2
		Bradford County.....	8

TYPHOID FEVER—Continued.

State Reports for July and August, 1920—Continued.

Place.	New cases reported.	Place.	New cases reported.
Pennsylvania—Continued.		West Virginia (August):	
Bucks County.....	2	Boone County.....	5
Butler County.....	2	Braxton County.....	6
Cambria County.....	3	Cabell County.....	6
Carbon County.....	1	Fayette County.....	3
Center County.....	1	Greenbrier County.....	3
Chester County.....	9	Harrison County.....	3
Clarion County.....	2	Jackson County.....	2
Clearfield County.....	3	Jefferson County.....	1
Clinton County.....	8	Kanawha County.....	7
Crawford County.....	4	Lewis County.....	1
Cumberland County.....	7	McDowell County.....	4
Dauphin County.....	6	Marion County.....	20
Delaware County.....	2	Marshall County.....	6
Erie County.....	3	Mason County.....	1
Fayette County.....	20	Mercer County.....	1
Franklin County.....	2	Mingo County.....	3
Fulton County.....	1	Monongalia County.....	1
Huntingdon County.....	5	Monroe County.....	4
Indiana County.....	3	Ohio County.....	1
Jefferson County.....	1	Pendleton County.....	1
Lancaster County.....	3	Preston County.....	1
Lawrence County.....	1	Raleigh County.....	2
Lebanon County.....	5	Roane County.....	4
Lehigh County.....	3	Summers County.....	1
Luzerne County.....	2	Taylor County.....	1
Lycoming County.....	1	Tucker County.....	5
McKean County.....	11	Upshur County.....	1
Mercer County.....	5	Wayne County.....	1
Mifflin County.....	1	Webster County.....	1
Montgomery County.....	7	Wirt County.....	2
Montour County.....	1		
Northampton County.....	4	Total.....	106
Philadelphia County.....	27		
Schuylkill County.....	6	Wisconsin (August):	
Somerset County.....	7	Ashland County.....	1
Venango County.....	3	Barron County.....	1
Warren County.....	2	Clark County.....	1
Washington County.....	12	Eau Claire County.....	1
Westmoreland County.....	5	Fond du Lac County.....	2
York County.....	17	Kenosha County.....	2
Total.....	272	Manitowoc County.....	4
		Milwaukee County.....	4
Vermont (August):		Outagamie County.....	1
Caledonia County.....	1	Rock County.....	1
Chittenden County.....	2	Sheboygan County.....	3
Essex County.....	1	Trempealeau County.....	1
Orleans County.....	2	Washington County.....	1
Rutland County.....	3	Waukesha County.....	2
Washington County.....	1	Winnebago County.....	3
Total.....	10	Total.....	28

City Reports for Week Ended Sept. 4, 1920.

The column headed "Average cases" gives the average number of cases reported during the corresponding week of the years 1915 to 1919, inclusive. In instances in which the information is not available for the full five years, the average includes from one to four years.

Place.	Average cases.	1920		Place.	Average cases.	1920	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				Colorado:			
Birmingham.....	18	.....	1	Denver.....	5	25	2
Mobile.....	2	5	1	Pueblo.....	0	2	.....
Montgomery.....	3	1	.....	Connecticut:			
California:				Bridgeport.....	2	3	.....
Alameda.....	(¹)	1	.....	Hartford.....	4	5	.....
Los Angeles.....	7	2	1	New Britain.....	(¹)	2	.....
Oakland.....	2	.....	1	New Haven.....	6	2	1
Sacramento.....	1	.....	1	New London.....	(¹)	1	.....
San Diego.....	(¹)	1	1	Norwalk.....	0	3	.....
San Francisco.....	3	1	1	Delaware:			
Santa Barbara.....	0	1	.....	Wilmington.....	2	1	.....

¹ Average less than 1.

TYPHOID FEVER—Continued.

City Reports for Week Ended Sept. 4, 1920—Continued.

Place.	Average cases.	1920		Place.	Average cases.	1920	
		Cases.	Deaths.			Cases.	Deaths.
District of Columbia:				New Jersey—Continued.			
Washington.....	14	4	.....	Irvington.....	0	1	.....
Georgia:				Jersey City.....	1	2	.....
Atlanta.....	4	8	2	Trenton.....	3	1	.....
Rome.....	2	3	.....	New York:			
Savannah.....	2	2	1	Albany.....	3	1	.....
Illinois:				Buffalo.....	8	6	1
Aurora.....		1	.....	Ithaca.....	0	1	.....
Chicago.....	15	6	1	Jamestown.....	(1)	1	.....
Kankakee.....	1	1	.....	Mount Vernon.....	0	1	.....
Springfield.....	(1)	1	.....	Newburgh.....	0	2	1
Indiana:				New York.....	80	45	7
Brazil.....	0	1	.....	Niagara Falls.....	2	1	1
Fort Wayne.....	1	.....	1	Rochester.....	1	2	.....
Hammond.....	0	1	.....	Syracuse.....	3	6	1
La Fayette.....	0	1	.....	White Plains.....	1	1	1
Logansport.....	0	1	.....	North Carolina:			
South Bend.....	(1)	1	.....	Durham.....	4	5	2
Iowa:				Greensboro.....	1	.....	1
Burlington.....	0	1	.....	Wilmington.....	(1)	2	.....
Council Bluffs.....	0	2	1	Winston-Salem.....	6	6	.....
Kansas:				Ohio:			
Coffeyville.....	3	1	.....	Akron.....	3	2	.....
Hutchinson.....	0	1	.....	Barberton.....	0	1	.....
Kansas City.....	2	1	.....	Cincinnati.....	4	.....	1
Tepeka.....	4	6	.....	Cleveland.....	10	7	1
Wichita.....	3	1	.....	Dayton.....	1	1	.....
Kentucky:				Fr. mont.....	0	1	.....
Covington.....	1	2	.....	Lancaster.....	1	1	.....
Lexington.....	2	1	.....	Piqua.....	0	1	.....
Louisville.....	14	6	.....	Toledo.....	11	1	.....
Paducah.....		2	.....	Oklahoma:			
Louisiana:				Oklahoma City.....	2	1	.....
New Orleans.....	8	3	4	Oregon:			
Maine:				Portland.....	2	1	.....
Portland.....	4	3	.....	Pennsylvania:			
Maryland:				Allentown.....	2	4	.....
Baltimore.....	37	10	2	Bethlehem.....	(1)	1	.....
Massachusetts:				Carnegie.....	0	11	.....
Adams.....	(1)	1	.....	Chester.....	1	1	.....
Attleboro.....	0	1	.....	Philadelphia.....	26	15	2
Boston.....	10	4	.....	Pittsburgh.....	6	.....	1
Cambridge.....	1	1	.....	Washington.....	1	1	.....
Fall River.....	7	6	1	York.....	(1)	2	.....
Haverhill.....	0	1	.....	Rhode Island:			
Lynn.....	12	1	.....	Providence.....	2	9	.....
Malden.....	(1)	2	.....	South Carolina:			
Melrose.....	(1)	1	.....	Columbia.....	1	2	.....
Pittsfield.....	(1)	3	.....	Spartanburg.....	4	1	.....
Westfield.....	0	1	.....	Tennessee:			
Michigan:				Knoxville.....	6	1	.....
Ann Arbor.....	4	1	.....	Nashville.....	14	2	.....
Detroit.....	11	8	2	Texas:			
Flint.....	6	5	.....	Corpus Christi.....	(1)	.....	1
Grand Rapids.....	2	1	.....	Dallas.....	1	2	.....
Highland Park.....	1	1	.....	El Paso.....	1	.....	1
Kalamazoo.....	1	2	.....	Waco.....	0	.....	1
Port Huron.....		1	.....	Vermont:			
Saginaw.....	2	3	.....	Burlington.....	(1)	5	.....
Minnesota:				Rutland.....	(1)	1	.....
Minneapolis.....	4	2	.....	Virginia:			
St. Paul.....	1	1	.....	Alexandria.....		1	.....
Missouri:				Norfolk.....	4	1	.....
Independence.....	(1)	2	1	Petersburg.....	0	2	.....
Joplin.....	0	1	.....	Richmond.....	6	2	.....
Kansas City.....	7	5	.....	Roanoke.....	5	4	.....
St. Louis.....	14	5	1	Washington:			
Nebraska:				Seattle.....	2	3	.....
Lincoln.....	(1)	1	.....	Spokane.....	0	6	.....
Omaha.....	(1)	2	2	Tacoma.....	(1)	.....	2
Nevada:				Yakima.....		1	.....
Reno.....	1	1	.....	Wisconsin:			
New Hampshire:				Milwaukee.....	1	2	.....
Concord.....	(1)	2	.....	Sheboygan.....	0	1	.....
New Jersey:				Wausau.....	0	1	.....
Atlantic City.....	2	1	.....				
East Orange.....	(1)	1	.....				

1 Average less than 1.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.

City Reports for Week Ended Sept. 4, 1920.

City.	Population as of July 1, 1917 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Adams, Mass.	14,406	1	2		7					
Akron, Ohio	93,604	35	6				7			
Alameda, Calif.	28,433	2							1	
Albany, N. Y.	103,632								5	
Alexandria, La.	16,232	6								
Alexandria, Va.	17,959	4								1
Allentown, Pa.	65,109								5	
Alliance, Ohio	19,581	4								
Alton, Ill.	23,783	6	4							1
Altoona, Pa.	59,712	1								
Amesbury, Mass.	10,200	2							1	1
Ann Arbor, Mich.	15,041	13	1				1			
Anniston, Ala.	14,326	4								
Arlington, Mass.	13,073	6								
Ashland, Wis.	11,594	1								
Atlanta, Ga.	196,144	45	3	1	1		1			3
Atlantic City, N. J.	59,515	11	3				1		1	
Attleboro, Mass.	19,776	5								
Ansburn, Me.	16,607	1								
Auburn, N. Y.	37,823	6	2		1					
Aurora, Ill.	34,795	11			1					2
Baltimore, Md.	594,637	188	12		9		5	1	20	11
Bangor, Me.	26,958				2				2	
Barberton, Ohio	14,187	2					1			
Baton Rouge, La.	17,544	4							2	2
Battle Creek, Mich.	30,159		1							
Bayonne, N. J.	72,204		1						2	
Beatrice, Nebr.	10,437	7								
Beaumont, Tex.	28,851	5								1
Bedford, Ind.	10,613	2					3			
Bellefonte, N. J.	12,797								1	
Bellingham, Wash.	34,362						1			
Beloit, Wis.	18,547						1			
Benton Harbor, Mich.	11,099	5					1			
Berlin, N. H.	13,892	3					3			
Bethlehem, Pa.	14,353		4							
Beverly, Mass.	22,128	5								
Billings, Mont.	13,123	2								
Binghampton, N. Y.	54,864	9	1		3					
Birmingham, Ala.	189,716	51	3				2		7	1
Bloomfield, N. J.	19,013	5							1	
Bloomington, Ill.	27,462	5								
Bloomington, Ind.	11,661	1					1			
Bluefield, W. Va.	16,123				1					
Boise, Idaho	35,951	4								
Boston, Mass.	767,813	195	21	1	8		11		44	17
Brazil, Ind.	10,472	3					1			
Bridgeport, Conn.	124,724	25	1				1		3	2
Bristol, Conn.	16,318	2					1			
Brookton, Mass.	69,152	9			1				1	2
Brookline, Mass.	33,526	6	1							
Brunswick, Ga.	10,984	3							2	1
Buffalo, N. Y.	475,781	127	32	1	6		3			9
Burlington, Iowa	25,144	4								
Burlington, Vt.	21,892	6							1	
Butte, Mont.	44,057	10							2	
Cadillac, Mich.	10,158	3								
Cambridge, Mass.	114,293	24	2				4		3	2
Canton, Ill.	13,674	1								
Canton, Ohio	62,566	15							3	2
Carnegie, Pa.	11,963		3							
Cedar Rapids, Iowa	38,033	1								
Centralia, Ill.	11,838	6								
Charlotte, N. C.	40,759	20	5	1						1
Chelsea, Mass.	46,405	5	3		1					
Chester, Pa.	41,857								3	
Chicago Heights, Ill.	22,863	7	4							
Chicago, Ill.	2,547,201	495	66	8	9		24		100	42
Chicopee, Mass.	29,950	5	1						1	1
Chillicothe, Ohio	15,625	4								
Cincinnati, Ohio	414,248	99	9	1			6		19	7
Cleveland, Ohio	692,259	180	18		6		18	2	20	14
Clinton, Mass.	13,075	1			5				22	1
Coffeyville, Kans.	18,331	1					1			
Cohoes, N. Y.	25,292	8	1		1					2

Population Apr. 15, 1910.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Contd.

City Reports for Week Ended Sept. 4, 1920—Continued.

City.	Popula- tion as of July 1, 1917 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Columbia, S. C.	35,165	.....	2	.....	.....	.....	.....	.....	1	.....
Concord, N. H.	22,858	7	.....	.....	.....	.....	.....	.....	.....	1
Corpus Christi, Tex.	10,789	5	.....	.....	.....	.....	.....	.....	1	.....
Council Bluffs, Iowa	31,838	6	.....	.....	.....	.....	.....	.....	.....	.....
Covington, Ky.	59,623	15	.....	.....	.....	.....	.....	.....	.....	3
Cranston, R. I.	26,773	2	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland, Md.	26,686	11	3	.....	1	.....	.....	.....	.....	1
Dallas, Tex.	129,738	33	11	.....	1	.....	2	.....	1	.....
Davenport, Iowa	49,618	.....	.....	.....	.....	.....	1	.....	.....	.....
Dayton, Ohio	128,939	35	4	.....	.....	.....	3	.....	1	.....
Decatur, Ill.	41,483	6	.....	.....	.....	.....	.....	.....	.....	.....
Denver, Colo.	268,439	83	17	.....	5	.....	2	.....	.....	16
Des Moines, Iowa	104,052	2	.....	.....	.....	.....	1	.....	2	.....
Detroit, Mich.	619,648	187	39	3	3	.....	28	.....	48	13
Dover, N. H.	13,276	2	.....	.....	.....	.....	.....	.....	.....	.....
Dubuque, Iowa	40,096	.....	.....	.....	.....	.....	3	.....	.....	.....
Duluth, Minn.	97,077	17	.....	.....	1	.....	5	.....	.....	1
Durham, N. C.	26,160	9	1	.....	.....	.....	.....	.....	.....	.....
East Chicago, Ind.	30,286	16	.....	.....	.....	.....	.....	.....	.....	2
Easthampton, Mass.	10,656	.....	.....	.....	.....	.....	.....	.....	1	.....
East Orange, N. J.	43,761	2	.....	.....	.....	.....	.....	.....	.....	.....
East Providence, R. I.	18,485	.....	1	.....	.....	.....	.....	.....	.....	.....
East St. Louis, Ill.	77,312	20	1	.....	.....	.....	.....	.....	2	.....
Eau Claire, Wis.	18,887	.....	1	.....	.....	.....	2	.....	.....	.....
Elgin, Ill.	28,562	5	.....	.....	2	.....	.....	.....	1	.....
Elizabeth, N. J.	88,830	.....	2	.....	.....	.....	5	.....	5	1
Elkhart, Ind.	22,273	4	.....	.....	.....	.....	1	.....	.....	.....
El Paso, Tex.	69,149	23	1	1	.....	.....	1	.....	1	.....
Englewood, N. J.	12,603	2	.....	.....	.....	.....	1	.....	.....	3
Erie, Pa.	76,582	.....	9	.....	1	.....	10	.....	7	1
Eugene, Oreg.	14,357	2	.....	.....	3	.....	.....	.....	.....	.....
Eureka, Calif.	15,142	9	.....	1	3	.....	.....	.....	.....	.....
Everett, Mass.	40,160	5	4	.....	.....	.....	.....	.....	3	.....
Everett, Wash.	37,205	.....	.....	.....	1	.....	.....	.....	.....	.....
Fall River, Mass.	123,828	30	2	2	1	.....	.....	.....	7	2
Fargo, N. Dak.	17,872	4	1	.....	.....	.....	.....	.....	.....	.....
Farrell, Pa.	10,190	.....	1	.....	.....	.....	.....	.....	.....	.....
Findlay, Ohio	14,858	3	.....	.....	.....	.....	.....	.....	.....	1
Flint, Mich.	57,386	15	8	.....	.....	.....	4	.....	.....	.....
Fond du Lac, Wis.	21,486	.....	6	.....	.....	.....	1	.....	.....	.....
Fort Scott, Kans.	10,564	1	5	.....	.....	.....	.....	.....	.....	.....
Fort Smith, Ark.	23,360	.....	2	.....	1	.....	2	.....	.....	.....
Fort Wayne, Ind.	78,614	17	.....	.....	.....	.....	.....	1	2	2
Fostoria, Ohio	10,959	7	.....	.....	.....	.....	3	.....	.....	.....
Freeport, Ill.	19,844	4	.....	.....	.....	.....	.....	.....	.....	.....
Fremont, Nebr.	10,080	1	.....	.....	.....	.....	.....	.....	.....	.....
Fremont, Ohio	11,034	5	.....	.....	.....	.....	3	.....	.....	.....
Galesburg, Ill.	24,629	6	1	.....	1	.....	.....	.....	.....	.....
Galveston, Tex.	42,650	12	.....	.....	.....	.....	.....	.....	.....	.....
Gardner, Mass.	17,554	7	.....	.....	.....	.....	.....	.....	.....	2
Gary, Ind.	56,060	16	1	.....	1	.....	.....	.....	.....	.....
Geneva, N. Y.	13,915	6	.....	.....	.....	.....	.....	.....	.....	.....
Grand Rapids, Mich.	132,861	32	7	3	1	.....	3	.....	3	.....
Granite City, Ill.	15,890	2	.....	.....	.....	.....	.....	.....	.....	.....
Great Falls, Mont.	13,948	6	.....	.....	.....	.....	1	.....	.....	.....
Greely, Colo.	11,942	4	.....	.....	.....	.....	.....	.....	.....	.....
Green Bay, Wis.	30,017	.....	.....	.....	.....	.....	2	.....	.....	.....
Greenfield, Mass.	12,251	3	3	.....	.....	.....	.....	.....	.....	.....
Greenboro, N. C.	20,171	12	.....	.....	.....	.....	.....	.....	.....	2
Greenwich, Conn.	19,594	3	2	.....	.....	.....	.....	.....	.....	.....
Hackensack, N. J.	17,412	6	.....	.....	.....	.....	.....	.....	.....	.....
Hammond, Ind.	27,016	6	1	.....	.....	.....	3	.....	.....	.....
Harris, N. J.	17,345	.....	.....	.....	.....	.....	.....	.....	2	.....
Hartford, Conn.	112,851	24	6	1	2	.....	7	.....	3	.....
Haverhill, Mass.	49,180	12	3	.....	.....	.....	.....	.....	4	1
Highland Park, Mich.	33,859	4	10	.....	3	.....	3	.....	.....	.....
Hoboken, N. J.	78,324	15	.....	.....	.....	.....	.....	.....	1	1
Holland, Mich.	13,459	1	.....	.....	.....	.....	.....	.....	.....	.....
Holyoke, Mass.	66,503	18	1	.....	.....	.....	.....	.....	2	.....
Hot Springs, Ark.	17,690	2	.....	.....	.....	.....	.....	.....	.....	1
Huntington, Ind.	10,982	4	1	.....	.....	.....	.....	.....	.....	.....
Huntington, W. Va.	47,686	28	1	.....	.....	.....	.....	.....	.....	1
Independence, Mo.	11,964	6	1	.....	.....	.....	.....	.....	1	1
Indianapolis, Ind.	283,622	86	.....	.....	.....	.....	.....	.....	.....	6
Iowa City, Iowa	11,628	.....	1	.....	.....	.....	.....	.....	.....	.....

* Population Apr. 15, 1910.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Contd.

City Reports for Week Ended Sept. 4, 1920—Continued.

City.	Population as of July 1, 1917 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Ironton, Ohio.....	14,079	3	1		1					
Irrington, N. J.....	16,710								1	
Ishpeming, Mich.....	12,448	2	1							
Ithaca, N. Y.....	16,017	7					1			
Jamestown, N. Y.....	37,431	6								
Jefferson City, Mo.....	13,712	3								
Jersey City, N. J.....	312,557		17		2		1		10	
Johnstown, Pa.....	70,437		2							
Joplin, Mo.....	33,400						1			
Kalamazoo, Mich.....	50,408	17	4						6	
Kankakee, Ill.....	14,270	0			4				1	
Kansas City, Kans.....	102,096		3		1		4		4	
Kansas City, Mo.....	305,816	74	6	1			1		5	5
Kearny, N. J.....	24,325	1							4	
Keene, N. H.....	10,725	2							2	
Kenosha, Wis.....	32,833		1		1		4			
Kewanee, Ill.....	13,607	5							1	1
Knoxville, Tenn.....	58,112		5		1		4		4	4
Kokomo, Ind.....	21,929	6					2			
La Fayette, Ind.....	21,481	5								
Lancaster, Ohio.....	16,086								2	
Lancaster, Pa.....	51,437		5							
La Salle, Ill.....	12,332	1								
Lawrence, Kans.....	13,477	3								
Lawrence, Mass.....	102,923	22	2		1		1		2	1
Leavenworth, Kans.....	19,363	6			1					
Leominster, Mass.....	21,365	8								
Lexington, Ky.....	41,997				2				2	1
Lima, Ohio.....	37,145	7	1						1	1
Lincoln, Nebr.....	46,957	7							1	1
Lincoln, R. I.....	10,473		1							
Little Rock, Ark.....	58,716	2			1				1	
Lockport, N. Y.....	20,028	5								
Logansport, Ind.....	21,338	4					1			
Long Beach, Calif.....	29,163	14	2				1		1	
Long Branch, N. J.....	15,733	2								
Lorsain, Ohio.....	38,266				5		1			
Los Angeles, Calif.....	535,485	130	29	1	12		1		54	21
Louisville, Ky.....	240,808	39	2				2		12	4
Lowell, Mass.....	114,366	21	3	1	7	2	1		3	
Ludington, Mich.....	10,566	2								
Lynn, Mass.....	104,534	19	1						1	1
Madison, Wis.....	31,315		1		1					
Malden, Mass.....	52,243	7	2				1		3	
Manchester, Conn.....	15,859	2								
Manchester, N. H.....	79,607	17			1		1		2	2
Manitowoc, Wis.....	13,931						5		1	
Mankato, Minn.....	110,385	2								
Marinette, Wis.....	14,610						1		1	
Marion, Ind.....	19,923	5	1				1			
Marquette, Mich.....	12,555	0							1	
Martins Ferry, Ohio.....	10,135	7								
Mason City, Iowa.....	14,938	2					2			
Mattoon, Ill.....	12,764		1						1	
Medford, Mass.....	26,681	4	1						1	
Melrose, Mass.....	17,724	2	1							
Meriden, Conn.....	29,431		1							
Methuen, Mass.....	14,320	1					1			
Middletown, Conn.....	13,502						2			
Middletown, Ohio.....	16,384	2								3
Milwaukee, Wis.....	445,008	73	19	2	3	1	11		12	1
Minneapolis, Minn.....	373,448	74	3		5		7		21	6
Mishawaka, Ind.....	17,083	3								
Missoula, Mont.....	19,075	4								
Mobile, Ala.....	59,201	21					1			
Montclair, N. J.....	27,087	2								1
Montgomery, Ala.....	44,039	18					1			1
Morgantown, W. Va.....	14,444	0								
Morristown, N. J.....	13,410	2								
Moundsville, W. Va.....	11,513	3								
Mount Vernon, N. Y.....	37,991	10					1		1	1
Muscatine, Iowa.....	17,713	1								
Nanticoke, Pa.....	23,811		1							
Nashua, N. H.....	27,541	11					1			2

1 Population Apr. 15, 1910.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Contd.

City Reports for Week Ended Sept. 4, 1920—Continued.

City.	Popula- tion as of July 1, 1917 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuber- culosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Nashville, Tenn.	118,136	39			1		2		1	7
New Bedford, Mass.	121,622	22	2				2		5	3
New Britain, Conn.	55,385	10	1		3		1		1	
Newburgh, N. Y.	29,883	10					4		4	1
Newburyport, Mass.	15,291	3								
New Castle, Pa.	41,915				1					
New Haven, Conn.	152,275	38	5				6		12	
New London, Conn.	21,199									1
New Orleans, La.	377,010	103	9		12		3		23	10
Newport, R. I.	30,585	5								
Newton, Mass.	44,343	9					1			
New York, N. Y.	5,757,492	1,054	94	7	18	1	28	1	* 192	9*
Niagara Falls, N. Y.	38,466	14	3				3		2	94
Norfolk, Va.	91,148									3
North Adams, Mass.	122,019	3	3		2				2	2
Northampton, Mass.	20,006	6							4	1
North Attleboro, Mass.	11,248	0								
Norwalk, Conn.	27,332	5								
Norwich, Conn.	21,923	5								
Norwood, Ohio	23,269	3								1
Oakland, Calif.	206,403	37	4	1			1		1	1
Oak Park, Ill.	27,816	14	1				4			1
Ogdensburg, N. Y.	16,845	5								
Oil City, Pa.	20,162				3					
Oklahoma City, Okla.	97,588	18	2				1		1	2
Omaha, Nebr.	177,777	42	6	7	1		6		2	5
Orange, N. J.	33,636	9								
Oshkosh, Wis.	36,549		2							
Paducah, Ky.	25,178		3		1		2			
Parkersburg, W. Va.	21,059	6	1							1
Pasadena, Calif.	49,620	8			1				4	
Passaic, N. J.	74,478	17	4				1			2
Paterson, N. J.	140,512	3	3		1		1		2	
Pawtucket, R. I.	60,666	20							4	
Peekskill, N. Y.	19,034	5								
Peoria, Ill.	72,184	18					5			1
Perth Amboy, N. J.	42,646	9	2				2		3	
Petersburg, Va.	25,817	8	1						2	
Philadelphia, Pa.	1,735,514	362	21	3	6		18		57	33
Phillipsburg, N. J.	15,879	1								
Piqua, Ohio	14,275	3								1
Pittsburgh, Pa.	586,196	152	17	1	15	1	8			10
Pittsfield, Mass.	39,678	7			2				3	
Plainfield, N. J.	24,330	3	1		1		2		1	
Plattsburg, N. Y.	13,111	5								
Plymouth, Mass.	14,001	6								
Pontiac, Mich.	18,006	10	1				1			
Port Chester, N. Y.	16,727	2	3							
Port Huron, Mich.	18,863	10	1				3		2	1
Portland, Me.	64,720	10			4		2			
Portland, Oreg.	308,399	59	6		6		4		13	4
Portsmouth, N. H.	11,730								1	
Pottsville, Pa.	22,717		1							
Poughkeepsie, N. Y.	30,786	0								
Providence, R. I.	259,895	46	12	2						5
Provo, Utah	10,923	3								
Pueblo, Colo.	56,084	8	8		3		1			1
Quincy, Mass.	39,022	1	1						2	1
Rahway, N. J.	10,361	5								
Reading, Pa.	111,607	48	4	1	1					2
Redlands, Calif.	14,573	4								1
Reno, Nev.	15,514	2							1	
Richmond, Ind.	25,080	3	1				1			
Richmond, Va.	158,702	39	15				6		7	2
Riverside, Calif.	20,496	5			4				1	
Roanoke, Va.	46,282	23	1		1		1			2
Rochester, N. Y.	264,714	73	16	1	1		3		14	6
Rockford, Ill.	56,739	13	4							
Rock Island, Ill.	29,452	9								
Rocky Mount, N. C.	12,673	4								
Rome, Ga.	15,607		1		1				2	
Rome, N. Y.	24,259				6				1	
Rutland, Vt.	15,038	3								
Sacramento, Calif.	68,984	13					1		1	

* Population Apr. 15, 1910.

* Pulmonary tuberculosis only.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Contd.

City Reports for Week Ended Sept. 4, 1920—Continued.

City.	Population as of July 1, 1917 (estimated by U. S. Census Bureau).	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Saginaw, Mich.	56,469	20	5	2			3			2
St. Cloud, Minn.	12,013		1		1				1	
St. Joseph, Mo.	86,498	19								
St. Louis, Mo.	768,630	146	38	2	1		6		47	13
St. Paul, Minn.	252,465	47	13				2		5	7
Salem, Mass.	49,346	15	1						4	1
San Angelo, Tex.	10,321	10								5
San Diego, Calif.	56,412	28							9	5
Sandusky, Ohio.	20,226	2							1	
Sanford, Me.	11,217	3								
San Francisco, Calif.	471,023	114	7		2		4		24	11
Santa Barbara, Calif.	15,360	5							3	
Santa Cruz, Calif.	15,150	8								
Saratoga Springs, N. Y.	13,839	5							1	2
Sault Ste. Marie, Mich.	14,130	3	1				1			
Savannah, Ga.	69,250	29	1	1			1		1	
Schneectady, N. Y.	103,774	14	1						3	
Seattle, Wash.	366,445		9				2			
Sheboygan, Wis.	28,907						3			
Sioux Falls, S. Dak.	16,887	1					1			
Somerville, Mass.	88,618	25	1						1	1
South Bend, Ind.	70,967	8					2		1	1
Southbridge, Mass.	14,465	3								
Spartanburg, S. C.	21,985	5	1							
Spokane, Wash.	157,656		2		1					
Springfield, Ill.	62,623	21	1		1		2			1
Springfield, Mass.	108,668	26			2		2			
Springfield, Ohio.	52,296	18	2		1		7		4	
Stamford, Conn.	31,810								1	
Steubenville, Ohio.	28,259	6								
Stillwater, Minn.	10,198	2								
Superior, Wis.	47,167	4	2							1
Syracuse, N. Y.	158,559	43	3		4		2	1		
Tacoma, Wash.	117,446		1		3					
Taunton, Mass.	36,610	24							1	3
Terre Haute, Ind.	67,351	23		1						1
Tiffin, Ohio.	12,962	1								
Toledo, Ohio.	202,010	49	5	1			9		4	4
Topeka, Kans.	49,538	18					3		6	
Traverse City, Mich.	14,090	4			1		1			
Trenton, N. J.	113,974	36	3	1					2	3
Trinidad, Colo.	14,413		2							
Troy, N. Y.	78,094	15					1			
Tucson, Ariz.	17,324	5								1
Turcaloosa, Ala.	10,824		4							
Vallejo, Calif.	13,803	4								
Vancouver, Wash.	13,805				2					
Waco, Tex.	34,015	6								
Waltham, Mass.	31,011	5					1		1	1
Washington, D. C.	369,282	81	1		1		7		19	9
Washington, Pa.	22,076		1		3					
Waterbury, Conn.	89,201		2						1	
Wausau, Wis.	19,666	2	1	1					1	
West Chester, Pa.	13,403				11					
Westfield, Mass.	18,769	2	1							
West Hoboken, N. J.	44,386	4	1						1	
West New York, N. J.	19,613	12							2	1
West Orange, N. J.	13,964	3			2					
Wheeling, W. Va.	43,657	15	2				3		1	
White Plains, N. Y.	23,331	7					1			1
Wichita, Kans.	73,597	22	4	1	2		4			2
Wilkes-Barre, Pa.	78,334	13		1			1		2	
Wilkinsburg, Pa.	23,899	3			1					
Wilmington, Del.	95,369	21	1				1			1
Wilmington, N. C.	30,400	9							1	
Winston-Salem, N. C.	33,136	7	4		1					
Winthrop, Mass.	13,105	0								
Woburn, Mass.	16,076	2								
Yakima, Wash.	22,058		1						1	
Yonkers, N. Y.	103,066	18	1		1		4			5
York, Pa.	52,770		3							
Zanesville, Ohio.	31,320	9							1	

1 Population Apr. 15, 1910.

FOREIGN AND INSULAR.

CHOLERA ON VESSEL.

United States Steamship "Keketicut"—Shanghai, China.

The occurrence of a case of cholera on the U. S. S. *Keketicut*, at Shanghai, China, August 2, 1920, has been reported. The vessel left Shanghai for Boston, August 24, 1920.

BRAZIL.

Death Rates—1917, 1918, 1919—Bahia.

The reported death rate of Bahia, Brazil, for the year 1919, was 27.95 per 1,000 inhabitants, as compared with 15.45 in 1917 and 18.73 in 1918.

Mortality from Contagious Diseases—1917, 1918, 1919.

	1917	1918	1919		1917	1918	1919
Beriberi.....	22	17	27	Plague.....	29	7	2
Diphtheria.....	4	3	8	Smallpox.....			2,804
Dysentery.....	23	18	51	Tuberculosis.....	965	1,153	1,065
Influenza.....	17	386	49	Typhoid fever.....	10	12	21
Leprosy.....	7	10	3	Whooping cough.....	7	28	13
Malaria.....	277	479	532	Yellow fever.....	1	18	48
Measles.....	2	1	4				

BRITISH EAST AFRICA.

Plague—Mombasa.

Plague was reported present at Mombasa, British East Africa, in February and April, 1920, with 20 reported cases, and in May and June with approximately 50 and 150 cases, respectively. The disease was stated to be confined to the native quarter. On July 20 plague was reported still present.

CUBA.

Communicable Diseases—Habana.

Communicable diseases have been notified at Habana as follows:

Disease.	Aug. 22-31, 1920.		Remaining under treatment Aug. 31, 1920.	Disease.	Aug. 22-31, 1920.		Remaining under treatment Aug. 31, 1920.
	New cases.	Deaths.			New cases.	Deaths.	
Cerebrospinal meningitis.....			2	Malaria.....	34	1	172
Chicken pox.....	1			Measles.....	9	2	31
Diphtheria.....	2	1	2	Scarlet fever.....	4	1	10
Leprosy.....			11	Smallpox.....			22
				Typhoid fever.....	30	8	295

¹ From the interior, 48.

² From abroad, 2.

³ From the interior, 33.

JAMAICA.**Infectious Disease Reported Present.¹**

During the week ended August 21, 1920, 500 cases, with 3 fatalities, of a disease resembling varioloid and variously designated as alastrim, cowpox, and Kaffir milkpox, were reported in the island of Jamaica. During the week ended August 28, 1920, 318 cases of alastrim, 24 cases of cowpox, and 72 cases of chicken pox were reported in the island.

JAVA.**Plague—Batavia—Port Declared Infected.**

According to information dated September 9, 1920, the port of Batavia, Java, has been declared infected, five fatal cases of plague having been notified at Batavia during the week ended September 8, 1920.

JUGO-SLAVIA.**Influenza—Smallpox—Typhus Fever—Feb. 1-June 12, 1920.**

During the period February 1 to June 12, 1920, influenza, smallpox, and typhus fever were reported in the Kingdom of the Serbs, Croats, and Slovenes, as follows: Influenza, cases, 31,934, fatalities, 2,322; smallpox, cases, 2,404, fatalities, 535; typhus fever, cases, 678, fatalities, 85.

The cases were distributed in the States of Serbia, Croatia-Slavonia, Bosnia-Herzegovina, Dalmatia, Montenegro, and Voivoidina. (Aggregate estimated population 14,000,000.)

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER.**Reports Received During Week Ended Sept. 24, 1920.²****CHOLERA.**

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy.....	July 18-24.....		3	
Chungking.....	July 25-Aug. 7.....		731	
Shanghai.....	Aug. 2-8.....	1		
Chosen (Korea):				
Chinampo.....	Aug. 1-20.....	34	23	
Fusan.....	do.....	627	246	
Seoul.....	do.....	643	293	
Greece:				
Patras.....	July 26-Aug. 1.....			Present in surrounding country.
Zante.....	Aug. 2-8.....			Present.
India:				June 13-26, 1920: Deaths, 2,224.
Bombay.....	July 18-24.....	6	10	
Calcutta.....	do.....	63	60	
Madras.....	Aug. 1-7.....	3	1	
Rangoon.....	July 11-24.....	5	3	
Indo-China:				
Saigon.....	July 26-Aug. 1.....	4	1	
Japan:				
Kobe.....	Aug. 17-23.....	70	38	

¹ Public Health Reports, Sept. 3, 1920, p. 2132.² From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended Sept. 24, 1920—Continued.

CHOLERA—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Java:				
West Java—				
Batavia.....	July 9-15.....	1	.....	
Siam:				
Bangkok.....	June 26-July 10...	18	4	
Straits Settlements:				
Singapore.....	July 18-24.....	2	2	
On vessel:				
S. S. Keketticut.....	Aug. 2.....	1	.....	

PLAGUE.

Brazil:				
Bahia.....	July 4-17.....	2	.....	
Pernambuco.....	June 28-July 25...	11	10	
British East Africa:				
Kisumu.....	July 17-Aug. 7.....	4	4	
Mombasa.....	July 17-31.....	16	16	
China:				
Amoy.....	July 18-24.....	.....	1	
Hongkong.....	July 11-31.....	9	8	
Egypt:				Jan. 1-Aug. 5, 1920: Cases, 402; deaths, 233.
Alexandria.....	July 30-Aug. 5.....	1	.....	
Port Said.....	Aug. 2.....	.....	1	
Suez.....	Aug. 4.....	1	.....	
Greece:				
Athens.....	Aug. 19-25.....	2	2	
Nauplia.....	Sept. 9.....	.....	.....	Approximately 20 cases.
Piræus.....	Sept. 13-16.....	3	.....	
Zante.....	Sept. 9.....	.....	.....	Do.
India:				July 18-24, 1920: Cases, 773; deaths, 515.
Bombay.....	July 18-24.....	7	6	
Madras Presidency.....	Aug. 1-7.....	740	629	
Rangoon.....	July 11-24.....	56	52	
Indo-China:				
Saigon.....	July 26-Aug. 1.....	1	1	
Java:				
Batavia.....	Sept. 2-8.....	5	5	
Mexico:				
Vera Cruz.....	.....	.....	.....	From outbreak in May, 1920, to July, 1920: Cases, 58; deaths, 36.
Siam:				
Bangkok.....	June 28-July 3.....	1	.....	
Straits Settlements:				
Singapore.....	July 11-17.....	1	1	

SMALLPOX.

Algeria:				
Department—				
Oran.....	Aug. 1-10.....	13	.....	
Brazil:				
Pernambuco.....	May 30-June 27...	35	1	
Do.....	June 30-July 25...	64	2	
Sao Paulo.....	June 21-27.....	.....	1	
Do.....	June 28-July 4.....	.....	1	
British East Africa:				
Nairobi.....	Aug. 1-7.....	4	.....	
Canada:				
Ontario—				
Ottawa.....	Aug. 29-Sept. 4...	1	.....	
China:				
Hongkong.....	July 11-17.....	1	1	
Nanking.....	July 25-Aug. 7.....	.....	.....	Present.
Colombia:				
Santa Marta.....	Aug. 22-28.....	.....	.....	Do.
Cuba:				
Antilla.....	Aug. 24-30.....	1	.....	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended Sept. 24, 1920—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Egypt:				
Cairo.....	May 27-June 17...	14	9	
Port Said.....	do.....	4	1	
Great Britain:				
Glasgow.....	Aug. 22-28.....	17	6	
Greece:				
Saloniki.....	Aug. 9-15.....		1	
India:				June 13-26, 1920: Deaths, 2,267.
Bombay.....	July 18-24.....	3		
Calcutta.....	do.....	6	7	
Madras.....	Aug. 1-7.....	2		
Rangoon.....	July 11-24.....	8	2	
Italy:				
Catania.....	Aug. 16-22.....	1		
Java:				
West Java—Batavia.....	July 9-15.....	3	1	
Jugo-Slavia.....				Feb. 1-June 12, 1920: Cases, 2,404; deaths, 535.
Russia:				
Riga.....				May, 1920: Cases, 5; June, 1920: cases, 7.
Spain:				
Barcelona.....	Aug. 12-18.....		4	
Tunis:				
Tunis.....	Aug. 18-24.....	4	1	

TYPHUS FEVER.

Brazil:				
Ceara.....	July 11-24.....		2	
China:				
Antung.....	July 18-Aug. 8....	6		Report week ended July 31 not received.
Egypt:				
Alexandria.....	July 30-Aug. 5....	13	6	
Cairo.....	May 28-June 17...	157	87	
Greece:				
Saloniki.....	Aug. 2-8.....	14	7	
Japan:				
Kobe.....	Aug. 17-23.....	7		
Jugo-Slavia.....				Feb. 1-June 12, 1920: Cases, 678; deaths, 85.

YELLOW FEVER.

Guatemala:				
Los Amates.....	Sept. 1.....	1		Aug. 5-23, 1920: Cases, 8; deaths, 6.
Mexico:				
Tuxpam.....	Aug. 26-Sept. 1....	5	5	
Salvador:				
San Salvador.....	Aug. 1-21.....	6	2	Fatal cases were in Europeans.

Reports Received from June 26 to Sept. 17, 1920.

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
Brazil:				
Rio de Janeiro.....	June 27-July 3....		1.	
China:				
Amoy.....	June 20-July 3....		3	
Chungking.....	May 16-24.....		1,319	
Do.....	June 6-July 24....		2,890	
Foochow.....	July 11-24.....			Present.
Hankow.....	July 4-17.....	12	5	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from June 26 to Sept. 17, 1920—Continued.

CHOLERA—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Chosen (Korea)				Sept. 8, 1920: Cases, 13,000; deaths, 5,000 (estimated).
Chemulpo.	Sept. 8.	2		Apr. 11-May 22, 1920: Deaths, 7,549.
India:				
Bombay.	May 2-June 26.	85	36	
Do.	June 27-July 17.	65	35	
Calcutta.	May 2-June 12.	376	363	May 30-June 12, 1920: Deaths, 1,486.
Madras.	May 2-June 26.	20	13	
Do.	July 11-31.	4		
Rangoon.	July 4-10.	6	5	
Indo-China:				
Saigon.	Apr. 26-May 16.	56	41	Report for May 9 not received.
Do.	June 7-13.	74	53	
Japan:				
Kobe.	June 14-27.	36	24	Kobe, June 6-13, 34 cases. Moji, June 6-12, 10 cases. Kochi, June 6-12, 1 case. Hiroshima, June 6-12, 6 cases.
Do.	June 28-Aug. 7.	205	127	
Nagasaki.	June 21-27.	7		
Do.	June 28-July 18.	34	13	
Osaka.	do.			
Taiwan Island.	May 22-June 20.	60	33	
Do.	July 11-20.	10	6	
Java:				
West Java—				
Batavia.	Apr. 30-June 3.	6	2	June 4-17: Present.
Do.	June 25-July 1.	1		
Philippine Islands:				
Manila.	May 9-June 26.	5	1	May 9-June 26, 1920: Cases, 16; deaths, 12. June 27-July 17, 1920: Cases, 63; deaths, 31.
Do.	June 27-July 10.	3		
Provinces—				
Albay.	May 9-15.	2	1	
Batangas.	June 27-July 3.	1		
Bohol.	do.	1	1	
Cagayan.	May 9-June 26.	11	19	
Do.	June 27-July 10.	35	9	
Iloilo.	June 27-July 17.	3		
Isabela.	July 11-17.	5	5	
Laguna.	July 4-10.	8		
Misamis.	July 11-17.	4	2	
Pangasinan.	July 4-17.	6	4	
Russia.				Reported prevalent in southern Russia, June 4, 1920.
Sebastopol (district).	June 20.			Reported increasing.
Siam:				
Bangkok.	Apr. 25-June 26.	542	343	
Turkey:				
Amassia.	Dec. 24.	1		Asiatic Turkey.
Kaiser.	Dec. 22.	1		Do.
Karasi.	Jan. 3.	1		Do.
Mamuret-ul-Aziz.	Dec. 31.	1	1	Do.
Panderma.	Dec.-Jan.	16	6	
Rodosto.	Dec. 29.	1		European Turkey.
Smyrna.	Dec. 22.	3	2	Asiatic Turkey.

PLAGUE.

Brazil:				
Bahia.	Apr. 25-May 22.	8	2	
Do.	June 27-July 3.	2	3	
Pernambuco.	May 3-9.	1	1	
Porto Alegre.	June 27-July 10.		1	
British East Africa.				Apr. 1-30, 1920: Cases, 22; deaths, 9.
Kisumu.	Apr. 25-June 26.	14	12	
Do.	July 11-17.	1	1	
Mombasa.	Apr. 25-June 26.	104	39	
Do.	June 27-July 7.	34	31	
Nairobi.	Apr. 25-June 10.	14	8	
Ceylon:				
Colombo.	May 25-June 12.	7	2	
Do.	June 27-July 24.	9	9	
Chile.				Mar. 1-May 31, 1920: Cases, 15; deaths, 2. Plague reported in Departments of Tacna and Tarata.
Antofagasta.	May 17-June 20.	5		Mar. 1-May 31, 1920: Cases, 7; deaths, 1.
Do.	July 5-11.	1		
Iquique.	Mar. 1-May 31.	8	1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from June 26 to Sept. 17, 1920—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy.....	June 20-July 3.....	.....	1	
Hongkong.....	Apr. 4-June 26.....	90	70	
Do.....	June 27-July 10.....	12	10	
Egypt.....				Jan. 1-July 15, 1920: Cases, 387; deaths, 227.
Cities—				
Alexandria.....	June 18-July 29.....	7	6	
Suez.....	May 13-June 8.....	12	6	
Do.....	July 3-13.....	3	3	3 cases pneumonic.
Provinces—				
Assiout.....	May 15-June 5.....	7	4	
Do.....	July 2-14.....	6	.....	
Beni-Souef.....	July 7-10.....	2	1	
Fayoum.....	June 5.....	1	.....	
Garbieh.....	do.....	1	.....	
Do.....	July 1-12.....	14	10	
Keneh.....	May 18.....	1	.....	
Mariut.....	May 18-June 8.....	19	22	
Do.....	July 3-9.....	1	2	
Minieh.....	May 15.....	2	1	Septicemic.
Do.....	July 13.....	1	.....	
Great Britain:				
Liverpool.....	June 20-26.....	1	1	
Greece:				
Dante.....	July 22.....	2	.....	
Kavalla.....	July 5-Aug. 21.....	3	.....	
Nauplia.....	Aug. 21.....	2	.....	
Piræus.....	June 29-Aug. 26.....	8	1	
India:				Apr. 18-June 26, 1920: Cases, 12,476; deaths, 9,961. June 27-July 17, 1920: Cases, 1,915; deaths, 1,515.
Bombay.....	Apr. 18-June 26.....	152	124	
Do.....	June 27-July 3.....	12	9	
Calcutta.....	May 2-June 12.....	26	19	
Karachi.....	May 9-July 24.....	64	57	
Madras Presidency.....	May 9-July 31.....	1,152	665	
Rangoon.....	Apr. 25-June 26.....	120	112	
Do.....	July 4-10.....	36	34	
Indo-China:				
Salgon.....	May 10-16.....	1	1	
Do.....	June 7-13.....	8	1	
Italy:				
Catania.....	June 22-July 3.....	3	2	
Java:				
East Java.....	Apr. 23-May 5.....	7	7	
Mesopotamia:				
Bagdad.....	June 1-30.....	6	3	
Mexico.....				Apr. 15-June 16, 1920: Cases, 8; deaths, 8, Surabaya Residency.
Tampico.....	July 26-Aug. 16.....	3	3	
Vera Cruz.....	June 14-20.....	11	1	May 29-July 24, 1920: Cases, 49; deaths, 29.
Do.....	July 18-24.....	2	2	
Peru.....				Mar. 1-31, 1920: Cases, 46; deaths, 29. Apr. 1-30, 1920: Cases, 36; deaths, 13. In coastal departments.
Callao.....	Mar. 1-31.....	6	3	
Do.....	Apr. 1-30.....	9	4	
Lima (city).....	Mar. 1-31.....	5	3	
Do.....	Apr. 1-30.....	4	4	
Lima (country).....	Mar. 1-31.....	1	1	
Do.....	Apr. 1-30.....	1	.....	
Mollendo.....	Mar. 1-31.....	13	9	
Falta.....	do.....	5	2	
Do.....	Apr. 1-30.....	2	.....	
Salaverry.....	Mar. 1-31.....	4	3	
Do.....	Apr. 1-30.....	6	1	
San Pedro.....	do.....	6	1	
Trujillo.....	May 31-June 29.....	3	2	
Siam:				
Bangkok.....	Apr. 25-May 1.....	3	3	
Do.....	May 9-June 5.....	5	2	
Straits Settlements:				
Singapore.....	Apr. 25-June 19.....	14	13	
Syria:				
Beirut.....	June 30.....	.....	.....	Present.
Turkey:				
Constantinople.....	July 25-31.....	3	2	
Uruguay:				
Montevideo.....	June 1-30.....	1	1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from June 26 to Sept. 17, 1920—Continued.

SMALLPOX.

Place.	Date.	Cases.	Deaths.	Remarks.
Algeria:				
Departments—				
Algiers.....	May 11-July 31.....	45		City of Algiers, Apr. 1-30, 1920:
Constantine.....	June 1-July 31.....	16		One case. July 1-31, 1920:
Oran.....	May 11-July 31.....	145		Cases, 3; deaths, 2.
Austria.....				May 30-June 26, 1920: Cases, 27.
Vienna.....	May 30-June 26.....	1		
Azores:				
Ponta Delgada.....	July 17-Aug. 20.....	7		
Bolivia:				
La Paz.....	May 2-31.....	6	8	
Brazil:				
Bahia.....	Apr. 25-June 26.....	5	5	
Do.....	June 27-July 3.....	1		
Pernambuco.....	Mar. 29-May 2.....	79	2	
Rio de Janeiro.....	Apr. 11-June 26.....	31	6	
Do.....	June 27-July 24.....	30	4	
Santos.....	Mar. 24-28.....	1		
British East Africa.....				Mar. 1-31, 1920: Cases, 107; Apr.
Mombasa.....	May 2-22.....	2	1	1-30, 1920: Cases, 69. Re-
Do.....	July 11-17.....	3		ported by native inspectors.
Nairobi.....	May 23-June 26.....	11	1	
Bulgaria:				
Sofia.....	July 11-17.....	1		
Canada:				
Alberta—				
Calgary.....	June 3-9.....	1		
Do.....	July 4-Aug. 7.....	5		
British Columbia—				
Vancouver.....	May 16-July 10.....	3		
Manitoba—				
Winnipeg.....	May 29-June 5.....	3		
Do.....	Aug. 8-21.....	2		
New Brunswick—				
Bonaventure and	Aug. 1-31.....	1		
Gaspé Counties.....				
Gloucester County.....	May 31-June 26.....	5		
Campbelltown.....	July 1-31.....	7		
Queens County.....	July 4-Aug. 21.....	7		
Nova Scotia—				
Halifax.....	do.....	2		
Sydney.....	May 31-June 26.....	2		
Ontario—				
Cornwall.....	June 25-30.....	2		
Fort William.....	July 25-Aug. 14.....	2		
Hamilton.....	June 13-Aug. 7.....	3		
Kingston.....	May 31-June 19.....	4		
North Bay.....	June 23-29.....	1		
Do.....	July 11-Aug. 28.....	5		
Ottawa.....	June 6-26.....	32		
Do.....	June 27-Aug. 28.....	42		
Peterborough.....	Apr. 18-July 31.....	33	1	
Port Arthur.....	July 11-17.....	2		
Prescott.....	do.....	1		
Do.....	Aug. 1-14.....			Present at Cardinal and Brock-
Toronto.....	June 6-19.....	13		ville.
Do.....	June 26-Aug. 21.....	24		
Windsor.....	Aug. 22-28.....	3		
Prince Edward Island—				
Charlotte Town.....	Aug. 12-18.....	1		
Quebec—				
Montreal.....	June 13-19.....	1		
Do.....	July 4-Aug. 7.....	4		
Quebec.....	June 27-Aug. 28.....	6		
Saskatchewan—				
Moosejaw.....	June 26-30.....	6		
Do.....	July 25-Aug. 7.....	1		
Regina.....	June 26-30.....	1		
Ceylon:				
Colombo.....	May 9-June 5.....	2		
Chile:				
Antofagasta.....	May 17-23.....			1 case in interior.
China:				
Amoy.....	May 2-July 3.....		12	
Antung.....	May 9-June 13.....	3	3	
Do.....	June 21-27.....	1		
Chungking.....	May 2-June 5.....			Present.
Do.....	July 11-24.....			Do.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from June 26 to Sept. 17, 1920—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China—Continued.				
Foochow.....	May 9-29.....	2	.....	Present.
Hankow.....	June 20-26.....	19	15	
Hongkong.....	Apr. 4-June 26.....	1	1	
Do.....	June 27-July 10.....	.....	.....	Do.
Mukden.....	July 19-25.....	.....	.....	Do.
Nanking.....	May 9-June 5.....	.....	.....	Prevalent.
Do.....	July 4-24.....	2	.....	
Tientsin.....	May 25-31.....	2	.....	
Do.....	June 13-19.....	1	.....	
Tsinanfu.....	May 9-15.....	.....	.....	
Chosen (Korea):				
Chemulpo.....	Mar. 1-June 30.....	69	40	
Fusan.....	do.....	24	6	
Seoul.....	do.....	353	86	
Colombia:				
Barranquilla.....	May 16-July 3.....	.....	.....	Epidemic.
Santa Marta.....	May 31-Aug. 21.....	.....	.....	Present.
Cuba:				
Habana.....	July 4.....	1	.....	From steamship Frank Henniss from Jamaica. Arrived Santiago June 30, 1920.
Matanzas.....	Aug. 15-21.....	1	1	In vicinity, at Aguacate, Aug. 1-7, 1920: Cases, 12.
Cyprus.....				
Czechoslovakia:				
Moravia.....	Feb. 1-28.....	68	.....	August, 1919: Cases, 242; deaths, 54.
Danzig.....	June 20-July 17.....	9	2	
Egypt:				
Alexandria.....	May 14-June 29.....	53	19	
Do.....	June 25-July 15.....	9	3	
Cairo.....	Apr. 2-May 20.....	45	13	
Port Said.....	do.....	18	7	
France:				
Brest.....	May 15-21.....	1	.....	
Cette.....	June 24-30.....	.....	1	
Nice.....	June 1-30.....	.....	1	
Paris.....	May 1-10.....	3	.....	
Germany.....				
Great Britain:				
Glasgow.....	May 25-June 26.....	136	22	
Do.....	July 4-Aug. 21.....	144	34	
Liverpool.....	July 18-24.....	1	.....	
London.....	June 13-July 10.....	14	.....	
Greece:				
Saloniki.....	May 31-June 27.....	4	1	
Do.....	July 25-Aug. 1.....	1	.....	
India.....				
Bombay.....	Apr. 26-June 26.....	103	45	Apr. 11-May 22, 1920: Deaths, 7,743. May 30-June 12, 1920: Deaths, 1,197.
Do.....	June 27-July 17.....	32	5	May 9-15, 1920: Cases, 26; deaths, 11.
Calcutta.....	May 2-June 12.....	101	93	
Karachi.....	May 9-June 26.....	15	12	
Do.....	June 27-July 10.....	7	4	
Madras.....	May 9-June 26.....	27	15	
Do.....	June 27-July 31.....	20	5	
Rangoon.....	Apr. 25-June 26.....	35	14	
Do.....	July 4-10.....	8	1	
Indo-China:				
Saigon.....	May 10-16.....	7	2	
Do.....	June 7-13.....	5	1	
Italy:				
Catania.....	July 12-Aug. 15.....	24	.....	Aug. 9-15, 1920: 30 cases in vicinity.
Genoa.....	May 17-23.....	12	.....	In Province.
Do.....	June 14-27.....	20	.....	
Do.....	June 28-July 4.....	3	.....	
Messina.....	May 10-June 27.....	7	1	
Do.....	June 28-July 11.....	1	1	Province, May 10-June 27: Cases, 168; deaths, 27.
Milan.....	Mar. 1-May 31.....	30	5	Province: Cases, 9; deaths, 3.
Naples.....	May 23-June 20.....	7	3	
Palermo.....	May 11-Aug. 5.....	47	3	
Turin.....	June 28-July 4.....	1	.....	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from June 26 to Sept. 17, 1920—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Jamaica:				
Kingston.....	July 22.....	.....	.....	Present.
Japan:				
Kobe.....	May 9-June 27....	10	5	
Do.....	June 28-July 18....	7	2	
Taiwan Island.....	May 1-June 20....	40	11	
Do.....	June 21-July 20....	14	8	
Tokyo.....	Apr. 21-May 10....	5	4	
Java:				
West Java.....	.....	.....	.....	Apr. 16-June 24, 1920: Cases, 56;
Batavia.....	Apr. 16-June 17....	94	26	deaths, 10. June 25-July 1,
				1920: Cases, 6.
Madeira:				
Funchal.....	June 20-28.....	.....	2	
Do.....	July 18-24.....	.....	.....	Present.
Malta.....	May 1-June 30....	.....	3	
Manchuria:				
Mukden.....	May 2-8.....	.....	.....	Do.
Mexico:				
Ciudad Juarez.....	Aug. 2-8.....	1	.....	
Guadalajara.....	May 1-31.....	1	.....	
Do.....	July 1-31.....	3	.....	
Laredo.....	July 30.....	2	.....	
Mazatlan.....	May 19-25.....	.....	1	
Salina Cruz.....	June 1-30.....	5	3	
San Luis Potosi.....	May 31-June 6.....	.....	1	
Do.....	June 28-Aug. 22....	.....	6	
Tampico.....	July 1-31.....	.....	5	
Newfoundland:				
St. Johns.....	June 5-11.....	3	.....	Reported at 2 other localities.
Shoal Harbor.....	July 10-16.....	7	.....	July 3-16: Present at 4 localities.
Poland.....	.....	.....	.....	Jan. 1-31, 1920: Cases, 1,895;
Minsk District.....	Jan. 1-31.....	1,052	228	deaths, 301.
Porto Rico:				
Caguas.....	Aug. 9-15.....	1	.....	
Portugal:				
Lisbon.....	May 16-June 28....	.....	8	
Do.....	June 27-July 31....	.....	10	
Russia:				
Vladivostok.....	Jan. 1-June 30....	252	78	
Spain:				
Barcelona.....	May 19-June 12....	.....	4	
Do.....	June 18-Aug. 4.....	8	8	
Corunna.....	July 16-29.....	.....	1	
Valencia.....	May 23-June 26....	15	3	
Do.....	July 4-Aug. 14.....	9	3	
Vigo.....	May 31-June 26....	.....	4	
Do.....	July 18-24.....	.....	1	
Switzerland:				
Geneva.....	May 9-15.....	7	.....	
Tunis:				
Tunis.....	May 25-Aug. 16....	.....	19	
Turkey:				
Constantinople.....	May 16-June 19....	7	.....	
Do.....	June 20-July 31....	5	.....	

TYPHUS FEVER.

Algeria:				
Departments—				
Algiers.....	May 11-July 31....	38	.....	
Constantine.....	May 21-July 31....	19	.....	
Oran.....	May 11-July 31....	344	.....	
Austria.....	.....	.....	.....	Feb. 15-June 26, 1920: Cases, 67.
Vienna.....	Feb. 15-June 26....	65	.....	
Bolivia:				
La Paz.....	May 2-31.....	.....	5	
Brazil:				
Ceara.....	Apr. 25-June 12....	.....	4	
Bulgaria:				
Sofia.....	June 20-25.....	2	.....	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from June 26 to Sept. 17, 1920—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Chile.....				March, 1920: Cases, 400; deaths, 72. April, 1920: Cases, 208; deaths, 49. May, 1920: Cases, 312; deaths, 50. Present.
Antofagasta.....	July 5-11.....			
Caleta Coloso.....	May 10-16.....		2	
Concepcion.....	Mar. 8-June 28.....	31	39	
Do.....	June 29-July 12.....	37	5	
Santiago.....	Mar. 1-May 31.....	315	59	
Valparaiso.....	May 2-July 17.....		50	
China:				
Antung.....	July 12-18.....	1		
Chosen:				
Chemulpo.....	June 1-30.....	3		
Seoul.....	Mar. 1-Apr. 30.....	4	1	
Czechoslovakia.....				Feb. 1-28, 1920: Cases, 88; deaths, 7. Quarantine station.
Leipnik.....	Feb. 22-28.....	1		
Danzig.....	June 20-26.....	1		Feb. 27-Mar. 27, 1920: Cases, 16.
Do.....	July 25-31.....	1	1	
Egypt:				
Alexandria.....	May 7-June 24.....	333	86	
Do.....	June 25-July 29.....	112	44	
Cairo.....	Apr. 2-May 20.....	565	202	
Port Said.....	Apr. 9-May 13.....	112	52	
Germany.....				Feb. 22-Mar. 27, 1920: Cases, 23. Among troops, 4; among persons from Poland, 8. Mar. 28-June 26, 1920: Cases, 96.
Great Britain:				
Dublin.....	May 23-June 19.....	3	1	
Dundee.....	July 4-10.....	1		
Glasgow.....	May 30-June 5.....		1	
Queenstown.....	Aug. 1-7.....	1		
Greece:				
Athens.....	June 27-July 3.....		2	
Drama.....	July 12-18.....	1		
Patras.....	June 29-July 4.....		1	
Piræus.....	June 29-July 5.....		1	
Saloniki.....	Apr. 12-27.....	384	42	
Do.....	June 28-Aug. 1.....	83	28	
Hungary:				
Budapest.....	Jan. 10-May 23.....	27		Jan. 19-May 29, 1920: Cases, 50.
Italy:				
Catania.....	July 10-17.....	3		
Trieste.....	May 16-22.....	5		
Do.....	June 13-Aug. 14.....	65	9	
Japan:				
Nagasaki.....	May 25-30.....	1		
Do.....	June 21-27.....	1		
Java:				
East Java—				
Surabaya.....	June 10-16.....	1		
West Java—				
Batavia.....	May 28-June 30.....	5	1	
Mexico:				
Chihuahua.....	May 31-June 6.....		1	
Nogales.....	Aug. 9-14.....	2		
San Luis Potosi.....	June 8-July 8.....			Present.
Do.....	July 2-Aug. 15.....		2	
Poland.....				Jan. 1-Mar. 31, 1920: Cases, 87,910; deaths, 19,733.
Warsaw.....				Jan. 1-Feb. 29, 1920: Cases, 911; deaths, 117.
Serbia.....				Mar. 14-April 10, 1920: Cases, 181; deaths, 23.
Portugal:				
Oporto.....	Apr. 4-June 24.....	15	6	
Siberia:				
Vladivostok.....	May 1-31.....	22	2	Jan. 1-Apr. 30, 1920: Cases, 1,284; deaths, 144.
Spain:				
Barcelona.....	July 9-15.....		1	
Madrid.....	June 1-30.....		1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from June 26 to Sept. 17, 1920—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Switzerland:				
Geneva.....	June 28-July 4....	1	.....	
Tunis:				
Tunis.....	May 24-June 27....	36	18	
Do.....	July 6-12.....	.....	1	
Turkey:				
Constantinople.....	May 16-June 12....	27	.....	
Do.....	June 19-July 19....	15	.....	
Venezuela:				
Maracaibo.....	July 21-27.....	.....	1	

YELLOW FEVER.

Brazil:				
Bahia.....	May 23-June 19....	1	.....	
Colombia:				
Buenaventura.....	June 3.....	1	1	
Guatemala:				
Los Amates.....	Aug. 5-14.....	9	3	Aug. 17: Present at several localities.
Mexico:				
Progreso.....	July 30.....	1	.....	
Do.....	Aug. 4-18.....	4	2	July 30-Aug. 18, 1920: Cases, 5; deaths, 3.
Puerto Mexico.....	Aug. 24-27.....	1	1	Case arrived Aug. 23, on s. s. Melchor Ocampo from Progreso. Previously reported, P. H. R., Sept. 10, 1920.
Tampico.....	Aug. 10-16.....	.....	1	
Tuxpam.....	Sept. 1.....	.....	2	
Vera Cruz.....	June 22.....	.....	2	
Do.....	July 19-Sept. 4....	41	19	
Peru.....				Mar. 1-31, 1920: Cases, 128. Apr. 1-30, 1920: Cases, 64.
Callao.....	Apr. 1-30.....	1	.....	At quarantine station. From s. s. Huallaga.
Catacaos.....	Mar. 1-31.....	14	.....	
Do.....	Apr. 1-30.....	2	.....	
La Huaca.....	Mar. 1-31.....	9	.....	
Do.....	Apr. 1-30.....	5	.....	
Morropon.....	do.....	37	.....	
Munuela.....	Mar. 1-31.....	12	.....	
Paita.....	do.....	81	.....	
Do.....	Apr. 1-30.....	14	.....	
Piura.....	Mar. 1-31.....	1	.....	
Do.....	Apr. 1-30.....	4	.....	
Salitral.....	Mar. 1-31.....	2	.....	
Sullana.....	do.....	9	.....	
Do.....	Apr. 1-30.....	1	.....	
Salvador:				
Armenia.....	June 20-26.....	1	1	
Sonsonate.....	May 22-June 24....	49	17	
On vessel:				
S. S. Soestdijk.....	Sept. 11.....	1	1	At Quarantine, La.