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DERMATOSIS FOLLOWING THE USE OF CUTTING OILS AND LUBRICATING COMPOUNDS.

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CONTENTS.

Introduction.

The study covered by this report was undertaken in response to appeals from many industrial plants which requested the United States Public Health Service to instruct them in available methods for preventing the dermatosis resulting from the use of cutting oils and compounds.

Scientific Assistant Forrest Edwards Deeds was first assigned to the study, which was begun in January, 1919, and much of the material contained herein was collected by him. Later the writer was detailed to complete the study and to prepare a report of the work.

The study was confined for the most part to the larger plants in the cities of Chicago, Minneapolis, and St. Paul, and managers and workers heartily cooperated with the investigators. Methods recommended for the prevention of the trouble were tried out by the men in a few plants, with the result that the skin lesions improved very rapidly and no new lesions appeared.

Since the object of the study was to determine if possible the exact cause of the dermatosis and to suggest preventive measures, some

portions of the study are apparently digressive and irrelevant to the dermatosis itself. For this reason the work is divided into two sections, as follows: Part I. Cutting oils and lubricating compounds; Part II. Cutting-oil dermatosis.

Part I. Cutting Oils and Lubricating Compounds.

ADVENT OF CUTTING OILS AND COMPOUNDS.

The introduction of high-speed metal-cutting machines in industry gave rise to the study of methods for minimizing the heat caused by friction between the cutting tool and the metal under operation. If no preventive measures are taken, this heat becomes so excessive that the temper of the metal is drawn and the cutting edge of the tool breaks down very rapidly; and there is a resultant loss of time in removing the old tool and inserting a new one, not to mention the loss involved in the cost of the tool itself. Moreover, when accuracy of measurement of the cut piece is required, excessive heat is detrimental, for the reason that it causes an expansion of the metal, so that, upon cooling, unless very great precaution has been observed, the piece may be undersized.

In 1883, according to Taylor,[1] the fact was first demonstrated that a stream of water poured directly upon the cutting lip of a cutting tool would make possible an increase in cutting speed, with a resulting increase of from 30 to 40 per cent in the amount of work done.

This idea was first utilized industrially in 1884, by the Midvale Steel Works, under the supervision of Taylor. The water which fell from the machines was caught in wrought-iron pans surrounding the machines; but in consequence of this arrangement the machines soon became rusted from the action of the water, and, moreover, the high specific heat of water rendered its use for this purpose still less satisfactory. To obviate this difficulty, soda was added to the water. The solution so formed served the purpose of a "coolant" or "refrigerant," but possessed no lubricating properties, and left a deposit on the machine. Oils were then tried and were found satisfactory. Lard oil became for a time the most popular of lubricating oils; but on account of the high cost of lard oil and the fact that it has a tendency to gum, experimentation was begun with the idea of combining cheaper oils with water, and the mixtures evolved became known as cutting compounds.

CLASSIFICATION OF LUBRICANTS.

Cutting fluids may be grouped into two broad classes, namely, cutting oils and cutting compounds. Cutting oils are pure animal, vegetable, or mineral oils, or mixtures of any of these.

[1] Taylor, F. W.: On the Art of Cutting Metals, p. 9. 1906.

Animal oils, of which lard, sperm, fish, and whale oil are examples, have been used with varying success. Lard oil, when clear and free from rancidity and adulteration, is very satisfactory for all classes of work. The composition of lard oil differs, however, and is graded upon its free fatty acid content, the poorest having a high and the best a low percentage of this constituent. Sperm oil and fish oil, as also whale oil, have been used to some extent. But whale oil, unless combined with other oils, is unsuitable for this use, on account of its drying properties.

Olive oil, the most popular of the vegetable oils, is less viscid in cold weather than lard oil, and flows more freely. Cotton seed, rape, and rosin oils are used occasionally as components of mixed oils and compounds.

The objection to animal and vegetable oils is that the oil film frequently breaks down, because of the decrease of viscosity with increase of temperature.

A mixture of lard oil with a mineral oil, in varying proportions, constitutes the most important of the mixed oils. Mixtures which have from 50 to 70 per cent of mineral oil are termed mineral lard oils. The efficiency of the mixture depends upon the lard oil content, which also affects the cost. Adulterants are frequently used, therefore, to lower the cost. The adulterants commonly used are rosin oil, cottonseed oil, rape oil, aluminum soap, and lead soap. The latter two substances are employed also to increase the viscosity of some of the mineral oils of low viscosity.

The above-mentioned oils, which are used without further treatment, are known as "straight" oils, in contra-distinction to "soluble" oils, or oils which form milky emulsions when mixed with water and soluble materials.

Sulphonated oil is an example of these soluble oils. By heating castor oil, cottonseed oil, olive oil, and some others, with sulphuric acid, a sulpho-compound is formed. When the excess acid content is neutralized by an alkali, after the addition of sodium chloride to the mixture, a sulphonated oil base results. The base is mixed with a mineral oil in such proportion that all the oil is held in emulsion when water is added to the resultant mixture. Oils of this class are likely to contain free sulphuric acid and fatty acids. A small amount of a mineral oil, such as kerosene or gasoline, is frequently added.

Soap oils, which are further examples of soluble oils, are prepared by mixing mineral oils and saponifiable oils, either vegetable or animal. The oils are saponified with an alkali to form soaps, which, when mixed with water, hold the mineral oil in suspension and form creamy emulsions. When cheapness is desired, free fatty acids are used to form the soaps and are mixed with the oil to be carried in suspension.

When carbolic acid and an alkali are added to a suitable oil, the resulting mixture is known as a "phenolated" oil. Phenolated oils are not in general use.

Graphite is held in suspension in oil or water to which small quantities of gallo-tannic acid have been added, and the resultant mixture is marketed as a cutting oil under various trade names.

Many manufacturers prepare their own cutting emulsions, and because of this fact it is not possible to enumerate all the cutting emulsions used. Machine oil, caustic soda, denatured alcohol, and kerosene enter into some compounds. It is a significant fact that no particular oil or emulsion has been accepted as a standard for any one operation. The object is to select a lubricant having the least cohesion consistent with the varying condition of the problem on hand. The choice depends upon the judgment and preference of the individual manufacturer. He is influenced by character of machine, hardness of metal, and use of low speed and shallow cut, high speed and shallow cut, low speed and heavy cut, or high speed and heavy cut.

ANALYSES OF OILS.

While the composition of emulsions used is to a certain extent a trade secret, this secrecy is not general, and so several typical oils and oil mixtures in use were analyzed in connection with the study. The analyses were made by the United States Bureau of Standards. In reading the results of these analyses, which follow, it is well to bear in mind the fact that the soluble oils and refrigerant bases are not used straight, but are diluted. The emulsifying agent is first added to the oil, and the resulting mixture is diluted with water to form an emulsion—usually 1 part of the oil mixture with 5 to 8 parts of water. Therefore the percentage composition of the resultant emulsion is proportionately reduced. The refrigerant bases are mixed with mineral oils, paraffin oil, kerosene, or a mixture of these, in the ratio of 1 part of base with 5 to 8 parts of diluent.

TABLE I.—*Character of oils.*

	Kind of oil and laboratory number.					
	Soluble oil (60268).	Soluble oil (60269).	Refrigerant base (60270).	Mineral oil (60271).	Lard oil (60272).	Lard oil plus mineral oil (60273).
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Total saponifiable matter	25.0	10.1	37.3	21.4	63.5	15.3
Total fatty acids	27.0	17.1	.....	.....	.....	.....
Free fatty acids	14.30	5.12	.....	.....	14.9	1.14
Fatty acids as soap	12.70	12.0	.....	.....	.....	.....
Mineral oil	75.0	89.9	62.7	78.6	.....	84.7
Total volatile matter	14.2	6.1	.....	.....	.....	3.8
Free acid	.....	.....	.....	3.32	.....	.....
Sulphur	.....	.....	3.25	.....	.....	.....
Fatty sulpho acids	.91	(1)	.....	.....	.....	.....

TABLE I.—*Character of oils*—Continued.

	Kind of oil and laboratory number.					
	Cutting oil (60274).	Refriger-ant base (60275).	Mineral oil (60276).	Paraffin oil (60277).	Mineral oil (60278).	Mineral oil (63440).
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Total saponifiable matter	32.4	10.9	5.2	.....	9.8	26.0
Total fatty acids	36.0	.....	.....	.....	.....	.....
Free fatty acids	17.7	.....	.....	.....	.....	.....
Fatty acids as soap	18.3	.....	.....	.....	.....	.....
Mineral oil	67.6	89.1	94.8	.....	83.2	74.0
Total volatile matter	17.7	.....	.....	.....	.....	8.68
Free acid	.....	.....	.....	0.05	1.80	.....
Sulphur	.....	9.20	.....	.....	1.65	.....
Fatty sulpho acids	.62	.....	.....	.....	.....	.....
Saturated hydrocarbons	.....	.....	.....	95.0	.....	.....
Unsaturated hydrocarbons	.....	.....	.....	5.0	.....	33.0

[1] Trace.

The foregoing table gives a fair idea of the chemical composition of some of the more common oils.

O. H. Schunk,[2] of the Hygienic Laboratory, United States Public Health Service, gives the typical analyses of a sulphonated oil and a soap oil as follows:

TABLE II.—*General composition of sulphonated oil.*

	Per cent.
Total saponifiable matter	15.57
Total fatty acids	12.56
Free fatty acids	12.08
Fatty acids as soap	.21
Mineral oil	.62
Total volatile matter	25.35
Volatile mineral oil	18.30
Nonvolatile mineral oil	59.27
Fatty-sulpho acids	15.34
Neutral fatty oil	.62
Water, ammonia, alcohol, etc	7.05

This is described as a clear, urine-red, soluble oil. "A light mineral oil, such as kerosene or gasoline, is present, as shown by the high percentage of total volatile matter. This oil is a sulphonated oil, as shown by the large amount of free fatty acids present, and no soap. The total saponifiable matter in such an oil is present in the form of sulphoacids."

TABLE III.—*General composition of soap oil.*

	Per cent.
Total saponifiable matter	16.37
Total fatty acids	16.05
Free fatty acids	4.68
Fatty acids as fat	3.71
Fatty acids as soap	7.66
Soap	8.26
Neutral fatty oil	4.03
Mineral oil	76.26
Water, alcohol, etc	7.00

[2] Special Report, Office of Industrial Hygiene, United States Public Health Service.

The suggestion was advanced that during use the oils present in the cutting-oil mixtures are possibly changed in their chemical composition by the heat generated in the process of cutting. A series of experiments was run with this object in view. The tests were conducted upon automatic screw machines of the four-spindle type. Six different classes of oil mixtures, selected after careful study of 200 replies to questionnaires concerning the character of oils and compounds used by metal-working factories, were used upon the machines in these tests. The following are those selected:

1. Light mineral oil, used unmixed.
2. Mixture consisting of one part of "H" refrigerant base and eight parts of "H" blending oil (a mineral oil).
3. Mixture consisting of one part of "S–K" refrigerant base and eight parts of paraffin oil.
4. Mixture consisting of one part of "S–K" refrigerant base and eight parts of mineral oil.
5. Mixture consisting of two parts of a special mineral cutting oil and one part of paraffin oil.
6. Mixture consisting of one part of "H" refrigerant base and eight parts of paraffin oil.

The machines in which the oils were used were of the individual oil-supply type. Stock mixtures of the above oils were made and the oil reservoirs were filled with the oils. Although it was impossible to use the same oil throughout the test, because of the fact that oil is lost through being carried away with the finished parts, the original sample was approximated by thoroughly draining the finished parts and then adding only enough fresh stock to replace the loss.

Chemical analyses were made upon samples of the oil at the beginning of the test run and then at intervals of seven days. The machines were in use sixteen hours each work day. The metal worked upon was a nickel steel.

Table IV gives the results of these tests.

TABLE IV.—*Analyses showing changes in chemical composition of oils after use.*

Key number.	Laboratory number.	Total saponifiable matter.	Mineral oil.	Free acid.	Saturated hydrocarbons.	Unsaturated hydrocarbons.	Sulphur.	Mineral acid.	Free fatty acid.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1	60279	29.5	70.5	4.60	.....	.....	.....	.....	.....
2	60283	18.9	81.1	2.13	.....	.....	1.41	.....	.....
3	60284	22.2	77.8	.55	.....	.....	.96	.....	.....
4	60280	19.8	80.2	1.02	.....	.....	.84	.....	.....
5	60281	4.1	95.9	1.43	83.0	17.0	.....	.....	.....
6	60282	16.8	83.2	1.80	.....	.....	1.65	.....	.....

TABLE IV.—*Analyses showing changes in chemical composition of oils after use*—Contd.

SEVEN DAYS LATER.

Key number.	Laboratory number.	Total saponifiable matter.	Mineral oil.	Free acid.	Saturated hydrocarbons.	Unsaturated hydrocarbons.	Sulphur.	Mineral acid.	Free fatty acid.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1	62502	11.9	88.1	.....	.....	27.0	.....	.....	2.49
2	62503	13.5	86.5	0.83	.....	13.0	1.18	.....	.....
3	62504	9.1	.....	.73	.....	10.0	.74	.....	.....
4	62505	16.7	83.3	1.23	.....	20.0	.70	.....	.....
5	62506	13.0	.....	1.58	.....	15.0	.....	.....	.....
6	62507	14.4	.....	2.5	.....	25.0	.98	.....	.....

FOURTEEN DAYS LATER.

1	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	62436	8.2	91.8	0.43	.....	17.0	0.89	.....	.....
3	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	63437	13.5	86.5	.73	.....	30.0	.67	.....	.....
5	63438	5.2	94.8	1.07	.....	12.0	.....	.....	.....
6	63439	16.0	84.0	1.33	.....	27.0	1.39	.....	.....

It will be seen from the table that the unsaturated hydrocarbons do increase upon use of the oil in the machine.

USES OF CUTTING OILS AND COMPOUNDS.

The use of cutting oils and compounds has become so universal that few machine shops, however small, do not employ them to some extent in the cutting of metal and alloys. "Cutting" of metal means working upon metal in the processes of turning, reaming, broaching, threading, boring, forming, drilling, tapping, grinding, sawing, and like processes.

The chief metals which are subjected to these processes are steel, iron, brass, bronze, copper, aluminum, and Monel metal.

The machines on which the above-named processes are carried on are lathes, boring mills, drills, planers, power hack saws, shapers, grinders, gear cutters, hobbers, punch presses, milling machines, stamp presses, automatic screw machines, and others.

As has already been indicated, the important problem which interested investigators was that of devising the best method for eliminating the heat factor; and the use of cutting oils and emulsions is the result of their studies. The terms "coolant" and "refrigerant" are frequently applied to these oils and compounds, because of their cooling properties.

However, the use of these oils and emulsions is advantageous in other respects also. For instance, in deep drilling, milling, and certain other machining operations, the accumulation of chips which result from the cutting processes hampers the operation of the machine. The cutting fluid serves the purpose of washing these

chips away. Again, in machining such materials as low-carbon steel, the lubricating action of the oils is essential, because, without it, the chip curling back over the tool would produce a bearing which would cause a high frictional resistance, with ensuing heat. These oils likewise protect the metals against corrosion and rust, and insure a good finish on the work.

For the theory of lubrication, cooling, unit pressure, design of bearings, and relative value of the combination of depth of cut, feed, and cutting speed for different kinds of work, the reader is referred to standard textbooks on these subjects.

APPLICATION OF OILS AND COMPOUNDS.

Various methods are used in applying the oil to the work. Frequently, where the amount required is small, a brush or a "dauber," made of waste wound around a wooden rod, is used for the purpose of applying the oil. The so-called "drip-can" method consists in suspending above the work plane a small can with a hole punched in the bottom, through which the oil passes. A delivery tube of some flexible material is sometimes attached in order to direct the flow upon the cutting tool.

The larger plants usually apply the oil by forcing it, by means of a pump, through pipes which lead from a supply tank or reservoir. A pump may serve one or more machines. The central distributing system, which is used in many plants, is preferable to the individual system, and consists of a central oil reservoir from which the oil may be forced by means of pumps or of gravity through pipes to the individual machines.

RECLAMATION OF OILS AND COMPOUNDS.

As an economic measure, oils are repeatedly reused. The method of saving the waste oil for reuse depends largely upon the nature of the work in question. A can suspended under the machine suffices in some instances to catch the oil. As the can fills with waste oil, it is removed and is emptied into the can above the machine. Some machines are equipped with catch pans and troughs for collecting the used oil; and where the work is of such nature as to necessitate the removal of chips before reusing the oil, the removal is accomplished by means of wire screens, perforated steel plates, or dividing baffle plates in the reservoirs, over which the oil must flow when it is pumped. Drain pipes attached to the collecting pans and troughs are sometimes used to convey the oil to the central supply system. Troughs of wood or of concrete built in the floor often serve the same purpose; and outlet pipes through the floor discharge the oil into a collecting reservoir suspended from the ceiling of the room below.

In the larger plants the oils constitute a considerable item of expense, which is greater than it should be because the chips and turnings from metal-working machines retain considerable oil which might be reused. Various methods of minimizing this waste, such as centrifugalization, sedimentation, filtration, straining, magnetization, and combination of any or all of these methods have been devised. A Detroit automobile plant which uses approximately 1,300 gallons of oil daily is said to reclaim 500 gallons. These various methods are here briefly described.

Centrifugalization.—The chips, turnings, and metal parts which retain the oil are placed in strainers, where as much as possible of the oil is drawn off through grids, and the chips are then placed in rotating containers in the centrifugal separators. The centrifugal action throws the oil away from the chips, and it is thus reclaimed. In many cases the oil-covered chips are subjected in the centrifuges to the heat of steam, which has a tendency to make the oil less viscous and more easily removed. By this means the oils may also be sterilized. A subsequent centrifugalization is necessary to separate the oil and water. The water is frequently evaporated, by passing the mixture through a filtering medium to a set of steam-heated coils, which surround the filtering chamber. In some plants all the oil (as well as the chips) is treated by centrifugalization, in order to remove dirt and other foreign matter.

Sedimentation.—By sedimentation the foreign soluble substances in the oil are caused to settle at the bottom of the tank, and the oil may pass over baffle plates into an outlet reservoir.

Filtration.—By filtration the oil may either be forced through the filtering medium under pressure, or may pass through by gravity. An objection to this method is that the pores of the filter become clogged with chips, and thus the passage of the oil is prevented.

Straining.—By the straining method the larger chips and pieces of metal are strained off by running the oil through grids or perforated plates.

Magnetization.—In magnetization the oil is passed in a shallow stream over a magnetized plate, which draws out all metallic particles. The surface of the magnetized plate is automatically cleaned from metallic particles.

Combined systems.—Frequently two or more of the above systems are used in combination, and such combinations prove to be very efficient in removing the metallic particles.

STERILIZATION OF OILS.

Much emphasis has been given to the sterilization of oils, which is based upon the theory that if the pathogenic organisms which frequently contaminate the oils are killed, the incidence of cutting-oil skin affections will be reduced or entirely eliminated.

The sterilization of oils is accomplished in two ways. First, by means of heat, which is perhaps the most efficient and at the same time the cheapest method available. If the oil is maintained at a temperature of 145° F. for 30 minutes, the more common pathogenic bacteria are killed, and only the more resistant spore-forming, air-borne bacteria remain. Many devices are used to attain heat sterilization of oils and compounds. The most popular device is that of passing live steam through coils of pipe constructed within a large tank, through which the oil flows or is pumped. A second method is that of chemical sterilization. The chemicals generally used for sterilization are phenol, cresol, and other coal-tar derivatives. These, however, are expensive, and when used in concentration sufficient to be efficacious, not infrequently cause a dermatitis themselves. The use of inorganic and metallic germicides, such as mercuric chloride, copper sulphate, silver nitrate, and ferrous sulphate, is restricted because of their corrosive action on the metal with which they come in contact. Oxidizing and reducing agents, such as potassium permanganate, hydrogen peroxide, sulphur dioxide, iodine, bromine, chlorine, and ozone, are not effective germicides because of their lack of stability, and because of the presence of organic matter in the oils and compounds. Chloroform, iodoform, and alcohol are too unstable and too costly. Alkaloids are unsuitable.

The concentration of the chemical to be used depends a great deal upon the character of the oil or compound.

In the report of 1918 of the Commission of the English Ministry of Munitions, phenol or other coal-tar antiseptic, to 1 per cent, is recommended as an effective agent in reducing the bacterial content of oils.

Albaugh, of the Ohio State Department of Health, and Deeds, of the United States Public Health Service, carried on a number of experiments to determine the efficacy of methods of sterilization. The conclusions were that the majority of the available chemical disinfectants are capable of causing a dermatitis when in sufficient concentration or over a period of time; hence, very carefully controlled experimentation with the oil in question is necessary before any recommendation is made as to a chemical disinfectant. The concentration required to set up this dermatitis will vary with the individual workman, and with the oil used, as well as with the character of the operation, since some operations and machines are more prone to splash the oil.

COMBINED STERILIZATION.

It appears that the ideal method for sterilizing the oil would be to combine the heat and the chemical methods. This would afford a constant sterilizing process by the chemical as well as an intermittent one by the heat. The required concentration of the chemical would undoubtedly be much less in this method.

Part II. Cutting Oil Dermatosis.

PREVALENCE.

An examination of the arms and forearms of 2,060 workers whose occupations require contact with one or more of a large variety of cutting oils and lubricating compounds, disclosed the fact that 557, or about 27 per cent, of these workers were suffering from a dermatosis characteristic among metal-cutting operatives. Forty-two of these workers had skin lesions, such as scabies, psoriasis, and other skin affections, which could not be attributed to the use of cutting liquids. This percentage attests the prevalence of the dermatosis in all metal-cutting industries where lubricating compounds are used, according to recent information received from the large plants in the United States. Certain preventive measures which are described in this part of the report were recommended to several plant managers who cooperated with the Public Health Service in this investigation, and in those plants where these measures were consistently carried out, the skin affections ascribed to cutting liquids entirely disappeared. After a period of eight months the writer had the opportunity to visit these plants again and to reexamine the workmen, many of whom had been seen previously, and the effectiveness of the measures was sufficiently demonstrated to assure their adequacy.

DESCRIPTION OF LESIONS.

The skin affection, frequently referred to as "oil acne" or "oil pimples," appears primarily as comedones, situated in the orifices of the hair follicles. Each comedo is followed by a reddish, circumscribed, macular lesion, with a tendency to slight elevation. These lesions are oval in contour, varying in size from one to three millimeters in diameter. They rapidly develop into papular lesions, approximately the size of a pea, with circular bases and conical tops through which the cilia protrude. The lesions are hard in consistency, are discrete, and are distributed for the most part along the dorsum of the hands, the dorsal and ventral surfaces of the forearms, and the anterior surfaces of the thighs. Among workers who have the habit of brushing the hair back with the hand, the forehead and face are additional sites of the lesions. In fact, wherever the cutting liquids come in contact with the skin, the dermatosis is likely to appear.

SYMPTOMS.

There are no accompanying constitutional symptoms, and the only subjective symptoms complained of in uncomplicated cases is itching, which is very intense at times. On expression, these papules discharge a hard, sebaceous substance. After the maculo-papular eruption appears, one of two things usually happens: The lesions

either retrogress or become infected and develop into pustules and abscesses. In rare instances, when the initial lesions do not retrogress, they continue to grow into varying-sized tubercles, which are apparently neoplastic in type, and are of a very firm consistence and pinkish in color. Three of the cases examined showed lesions of this type.

PREVIOUS STUDIES OF CUTTING-OIL DERMATOSIS.

While the study of skin affections attributable to the use of cutting-oils and lubricating compounds is of recent date, because of the comparatively late adoption of such materials into common industrial usage, dermatic affections and other occupational skin diseases caused by the components and the forerunners of the modern cutting oils and compounds were studied as long ago as 1887, in which year White [3] came to the conclusion, as the result of his researches into the effects of petroleum on the skin, that crude petroleum was not able of itself to produce the scarlatinoid eruptions and the furunculosis which were reported among oil-refinery workers, but that the products obtained by the refining of the oil were possibly responsible for the skin diseases. This work was practically the first intensive research conducted upon the subject, although in the previous year (1886) Rémy and Broca [4] reported their studies upon the incidence of dermatic affections among oil-refinery workers.

In 1888 Lewin [5] published the results of his studies of cutaneous poisoning by petroleum. He found among refinery workers many cases of acneform lesions as well as of furuncles, which were localized chiefly upon the upper leg, the knee, and the arm. He ascribes the causation of the affection to the lighter oils or petroleum distillates, rather than to petroleum itself.

Blascho [6] found the affection existing among printers who have to do with the cleaning and oiling of the big machines and among polishers of furniture.

Alfeld and Fischel [7] observed the same condition among factory workers, polishers, belt makers, and turners, and attributed the cause to bad petroleum.

Bettman [8] classifies the lesions into four types, as follows:

1. A sluggish, often itching, folliculitis.
2. Follicular keratosis.

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[3] White, James Clarke: Dermatitis Venenata, p. 151. Boston, 1887.

[4] Remy and Broca: Sur l'ecthyma des raffineurs. Revue de Chirurgie, VI, p. 717-723. Paris, 1886.

[5] Lewin, L.: Ueber Allgemeine und Hautvergiftung durch Petroleum. Virchows Archiv., B. C. VII, H. 1, pp. 35-69. Berlin, 1888.

[6] Berliner dermatologische Gesellschaft, Dermatologische Zeitschrift, vol. XVIII, p. 70. Berlin, 1911.

[7] *Ibid.*

[8] Bettmann: The Injurious Effects of Oils and Vaselines on the Skin. Jour. of Ind. Hyg., vol. I, No. 8, p. 129 of Abstracts. December, 1919.

3. Melanoderma of exposed skin surfaces.
4. Circumscribed warty areas.

Dr. B. F. Davis,[1] in describing the lesions found in the case of men employed in pressrooms where crude paraffin is run into presses for expressing the oils, states: "The paraffin remaining in the press, so-called slack wax, is scraped off by men who use spadelike instruments and usually work barehanded with sleeves rolled up above the elbows. During this process the men become pretty thoroughly smeared with the pressed distillate. During the first few months of employment in this department the majority of workmen suffer from 'wax-boils,' affecting any portion of the skin, but particularly the arms and neck. The susceptibility to this trouble, which appears to be a species of furunculosis, may disappear in time, to a very large extent. A certain proportion of workmen, however, will develop still further lesions. Thus, after a number of years, pigmented spots make their appearance; some of them are scaling and psoriatic, others merely rust-colored areas varying in diameter from a few millimeters to a centimeter and a half (these may be of slow development, amenable to various common remedial measures); finally true epithelioma may appear."

Since the advent of cutting oils and lubricating compounds, as now used, there has been a revival of the study of the subject of occupational dermatoses formerly attributed to the forerunners of these agents. This renewed interest, which has resulted in more energetic reporting of cases of this nature, has been the source of an impression that there is at present a greater proportional incidence of such cases than in the past, although in reality not much evidence has been presented to substantiate this opinion.

SCOPE AND PROCEDURE OF THIS INVESTIGATION.

As has been previously stated, the purpose of this investigation was to determine, if possible, the exact cause of the skin affection and to devise practical methods of prevention. Before the actual field work was commenced, questionnaires were sent to manufacturers who used oils and lubricating compounds in their plant processes for metal-cutting operations, with requests for information as to the approximate number of workers affected with the dermatosis, and as to whether or not the manufacturer would cooperate with the service by granting permission to its investigators to study in their plants the conditions from which the affection arose. Nearly 500 of the questionnaires were answered and returned. A selection of the plants using the greatest variety of oils, of methods for distributing, reclaiming, and sterilizing the

[1] Davis, B. F., in the Journal of the American Medical Association, vol. 75, No. 25, p. 1710. Dec. 18, 1920.

oils, and of other salient features was made, and these plants were visited.

Throughout the course of the investigation careful note was made of information obtained in each plant, relative to working conditions, processes, oils in use, methods of applying, collecting, reclaiming, sterilizing, and straining them, and to physical examination of employees.

A careful analysis of the data collected was made to ascertain, if possible, the factor or factors incident to the dermatosis or contributing to its etiology. Consideration was also given to contending theories adduced to explain the causation of the skin eruption.

THEORY OF PREVENTION.

On the hypothesis, based upon the analysis made (the analysis is discussed in a subsequent part of this report), that the dermatosis is due largely to a mechanical obstruction of the sebaceous ducts induced by extraneous matter in the oil and by other foreign material or dirt which can be found on the forearms and hands of almost any workman, the deduction naturally followed that the principle of prevention depended upon some method of restraining the ingress of the foreign matter.

As a preventive, previous writers on the subject have recommended the frequent cleansing of the hands and forearms with the application of some emollient after the day's work. In the writer's opinion, this routine is equivalent to giving typhoid vaccine after the fever has developed; it is instituting treatment after the injury has been done; it is not preventive. The emollients tend to inhibit further the natural functions of the skin, and at a time when the necessity is not urgent.

PREVENTIVE MEASURES.

In those plants where the study was made the practice was instituted of rubbing well into the orifices and crevices of the skin of the hands and forearms a clean preparation of lanolin or a mixture of equal parts of lanolin and castor oil before the work period began. It was noted, however, that while this measure prevented the ingress of the cutting oils and lubricating compounds, it also had a tendency to force further into the orifices the dirt already present on the surfaces. To obviate this difficulty the workmen were instructed to wash the hands and forearms well before applying the lanolin. Warm water and a mixture (in equal parts) of sawdust and liquid soap were supplied. The mixture of sawdust and soap has not only a cleansing action on the skin but also a psychic effect on the men, and they are apt to be more thorough in applying the soaped sawdust to all parts, not merely "hitting the high spots," so to speak.

The improvement of the skin lesions from this procedure was so noticeable that the following routine measures were recommended:

1. On entering the plant each workman should wash the hands and forearms thoroughly with warm water, using a sawdust and liquid-soap preparation to assist the cleansing process.

2. After drying skin with individual towel he should apply either lanolin alone or lanolin and castor oil, and rub well into the skin.

3. Foreman should inspect each worker as he enters the workshop, to insure the efficient carrying out of the foregoing instructions.

4. At noon, before eating luncheon, the workmen should wash hands and forearms with warm water and soap.

5. On returning to work they should repeat the morning schedule of washing and applying the lanolin preparation.

6. At the end of the workday they should wash hands and arms with warm water and soap and dry them. No emollients should be applied unless actual abrasions are present, in which event proper dressings should be applied.

The lesions on the thighs can best be prevented by wearing aprons impenetrable to oils.

Results.—In plants where this routine was enforced the cases of dermatosis disappeared in a short time, and eight months after the institution of the routine physical examinations of many of the same workers examined in the beginning of this study failed to disclose any new cases of the dermatosis.

On the other hand, in plants where the routine measures had been adopted but not enforced, cases still existed, and the men affected admitted, when questioned, that they had discontinued the measures, or had neglected to use them, some because it was too much bother, others because they had to wait in line too long or because enough time was not given or for other reasons equally trivial.

Table V shows the results of these experiments.

TABLE V.—*Cases of cutting-oil dermatosis.*

Preventive measures—	Plant No.	Number of cases on first visit.	Number of men originally examined still on the job 8 months later.	Number of cases 8 months later.	Per cent still with dermatosis.
Enforced	1	85	74	0	.....
	3	16	8	0	.....
	[1]6	94	9	0	.....
Total	.....	195	91	0	0.0
Available, not enforced	2	62	29	7	.....
	5	20	18	3	.....
Total	.....	82	47	10	21.3
Recommended, not supplied	4	70	25	12	48.0

[1]Force diminished to 50, only 9 of original examinees working.

The preventive measures were carried out in various other plants, in which, on account of reduction of force or suspension of work, it is not possible to attribute the reduction in number of cases to the use of preventive measures, and these plants are therefore not included in the table.

The fact that, in plants enforcing the measures, the dermatosis disappeared and no new cases developed, conclusively demonstrates at least the effectiveness of the procedure if not the exciting factors concerned in the development of the eruptions.

THEORIES AND HYPOTHESES.

In an investigation of this nature so many variable factors are encountered that it is difficult to separate them and to obtain data which would place the subject on a scientific basis. Again, the investigator must not lose sight of the personal equation of the worker and of the realization that the protection afforded the skin varies with the individual and his environment. Previous occupations and injuries may have changed or damaged the protective quality of the skin in some individuals or may have created an unfavorable vascular disturbance. The infectious and the chemical or irritant theories both have their advocates.

Infectious theory.—This theory expresses the belief that cutting oils and lubricating compounds support the growth of pyogenic microorganisms, and that these are conveyed by the oils and compounds to the skin of the workmen engaged in processes where cutting mediums are used. The theory assumes that the bacteria secure entrance to the skin through minute punctures made by the metal chips carried by the oil to the body. If this theory were true, the dermatosis would be prevented by the removal of the bacteria and chips from the oil, or by the addition to the oils and lubricating compounds of a disinfectant or germicide. Some plants have incurred the expense of installing a sterilizing system, and have also tried removing the metal chips by magnetism. Two such plants were investigated, and in one of them 30 per cent and in the other 22 per cent of the workers had the dermatosis. The foremen stated that they had noticed no marked difference in the incidence of the cases before and after the installation of the system.

Much time was spent during the present investigation in determining the efficacy of heat sterilization and the effectiveness of germicides and disinfectants. Scientific Assistant Forrest E. Deeds conducted a series of tests which proved that heat sterilization of oils and compounds is possible, and that a 0.5 per cent solution of either phenol or cresol in the cutting oils and compounds is fairly efficient in eliminating the bacteria. However, as stated above, the dermatosis is not

prevented by either sterilization or the use of germicides and disinfectants.

Further proof against the infectious theory seems to lie in the fact that smears taken aseptically from the papular eruptions failed to show the presence of bacteria. Dr. Kendall,[10] professor of bacteriology at Northwestern University, in a similar study, likewise was unable to find bacteria present. Moreover, if the dermatosis were primarily an infection resulting from the use of contaminated oils and compounds, direct evidence of well-defined epidemics of furunculosis, the number of cases approximating reasonably the number of exposures, in all probability would follow.

Secondary infections.—That infections, however, frequently complicate the initial dermatosis can not be disputed; and the occurrences of these infections has led many observers to the erroneous conclusion that the infections are primary. Careful inquiry into the progress of the infections found among the workers examined in this investigation brought forth the information that the primary lesions appear as here described and that the infections follow the opening or scratching of the lesions. The derived lesions vary according to the infecting organism. While it is not the purpose of this article to advance arguments respecting the source of these secondary infections, our bacteriological experiments have failed to incriminate the oils and compounds as the necessary carriers of the infection. Organisms are usually found, it is true, in the cutting oils and compounds which are reused, but in no greater number nor variety than those which are found normally on the body surface and in the air. Besides, irrespective of this source, bacteria can do no harm until they have secured ingress to the skin. The habits of the individual contribute largely as an exciting cause of the infection. The itching which is associated with the dermatosis causes the workers to scratch, and it is not unusual for them to squeeze and pick the papules, because they are annoyed by the unsightly appearance of the black spot at the bases of these. It was noticed that many of the men spent from 10 to 20 minutes in an hour either scratching or picking at the skin lesions. The possibility of producing minute abrasions by the habit thus described is obvious. Moreover, the oils, which are frequently of a high temperature when they reach the skin surface, sometimes produce minute burns, which favor the ingress of bacteria. Again, the ever-increasing distention of the sebaceous ducts, caused by the impacted solid matter and secretions, offers favorable lodgment to the organisms; and the multiplication and growth of these are promoted by the lowered resistance and vitality of the lining cells.

[10] Causes of Skin Sores and Boils Among Metal Workers. Houghton Research Staff, p. 16.

Chemical theory.—Another theory, which has been gaining in popularity of late, would explain the causation of the dermatosis as the result of the chemical or irritant action of the cutting liquids.

The multiplicity of oils and lubricating compounds in use, as emphasized in the first section of this report, evinces the futility of attempting to isolate any one oil or compound or group of compounds as responsible for the dermatosis. It can not be denied, as shown by an analysis of the oils, that certain ingredients found in some of the oils are not capable of producing a dermatosis. The free fatty acids, hydrocarbon sulphonates, alkali, and unsaturated hydrocarbons are often mentioned as agents responsible for the trouble. Another fact which may influence the chemical content of the oils and compounds used as lubricants and coolants in the metal-working industry, is that the various metals used for making rods, bars, and other parts of machinery, are pickled before they leave the rolling mill, and such chemicals as are used for pickling may be carried by the metal. These chemicals may easily be removed from the metal by the oils and compounds as they pass over it, and in this manner the oils and compounds may become carriers of the chemicals.

While it is admitted that some oils may have an irritant action on the skin, examination of the primary skin lesions fails to reveal the presence of an inflammation, such as might be expected from this irritation. Furthermore, chemical irritants would in all probability act upon the intrafollicular spaces as well where, however, no irritation is found, and the lesions would perhaps vary according to the chemical agent used. Irritating oils and compounds unquestionably aggravate the trouble, but proof that they do not necessarily cause the dermatosis lies in the fact that men working in coal dust or in any inert powder frequently develop identically the same sort of skin lesions.

Mechanical obstruction of sebaceous ducts in dry-skinned individuals.—The theory that the affection is caused by mechanical obstruction of the sebaceous ducts in dry-skinned individuals seems best fitted to the facts recorded in this investigation. In order to determine the presence of distinguishing factors, a comparison was made of the physical and dermatological differences between workmen with the dermatosis and workmen not so troubled, while operating the same machines and working under the same conditions. The condition of health apparently exerted no influence. Many very healthy looking individuals were found to have the dermatosis, whereas, on the other hand, many very lean workmen were not affected, and vice versa. Age, length of exposure, diet, complexion, and other characteristics were studied with reference to points of likeness and unlikeness, but the only feature of difference discernible

was the dryness of the skin in a large majority of persons with the dermatosis and the oiliness of the skin in those who did not have it.

While the task of distinguishing the extremes of these conditions is comparatively easy, many individuals are found whose skin would be considered dry by some and oily by others. The investigator, in making a decision in these border-line cases, considered the opinion of the worker himself and that of others in the immediate vicinity, together with his own. In unquestionable cases of naturally dry skin the dermatosis was observed, and in cases of unquestionable oily skin the dermatosis did not exist. Individuals of the latter class may in time develop the dermatosis, because of the desiccating power of many of the oils as suggested by Collis.[11] This is a plausible explanation, also, of the fact that some workers develop the skin lesions early and others later. Those with very dry skin develop the lesions rapidly, while those with a greater degree of oiliness require a greater length of time. In a previous paper on industrial dermatosis among plate printers the writer has called attention to these dermatological differences and to the tendency of individuals with dry skin to develop the dermatosis.[12]

SUMMARY.

In this report attention has been particularly directed toward the practical method of preventing the dermatosis, but it is realized that only a minimum reduction in the number of cases is affected by merely recommending preventives to the workmen without providing adequate sanitary arrangements and employing responsible supervision.

The weight of the evidence collected in this investigation incriminates oils and lubricating compounds of all types carrying extraneous matter in suspension as the primary cause in producing the initial dermatosis by mechanical obstruction of the sebaceous orifices, the underlying or basic cause being a deficiency of the natural oiliness of the skin. Infecting organisms, which usually inhabit the body surface, but which may be carried by cutting liquids, frequently find ingress to the skin through the primary dermatic lesions by reason of the sufferer's scratching the affected surface or by reason of other irritation, and thereby produce a secondary infection of the dermatosis as a complication.

In other cases the abrasions produced by particles of the metal become infected and complicate the dermatosis. The condition so arising is not, however, allied to the primary dermatosis, but is similar to conditions which would be classified under the head of

[11] Collis, E. L.: Dermatitis caused in the manufacture of roll tobacco. Annual Report of Chief Inspector of Factories and Workshops of Great Britain, 1910, p. 194.

[12] Industrial Dermatosis among Printers. Public Health Reports, vol. 36, No. 18, May 6, 1921. Reprint No. 656.

abrasions and infections, such as are commonly found wherever bacteria are present.

Prevention depends, first, upon thorough cleanliness, and, second, upon the application of lanolin or lanolin and castor oil to the skin at the beginning of the work period.

Cure is accomplished by rest of the affected parts and by constant use of the preventive measures.

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RURAL HEALTH SERVICE IN THE UNITED STATES.

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According to data obtained by the Rural Sanitation Office of the Public Health Service from the health departments of the States, the following (Table I) is a list, by States, of counties (or districts) in which the rural sections thereof at the beginning of the calendar years 1920, 1921, and 1922, respectively, were provided with local health service under the administration of whole-time county or district health officers:

TABLE I.—*List of counties, or districts, in which, as of January 1, 1920, 1921, and 1922, respectively, rural sections were provided with local health service under whole-time health officers.*

1920	1921	1922
ALABAMA.		
Calhoun. Colbert. Elmore. Etowah. Jefferson. Madison. Montgomery. Pike. Sumter. Talladega. Tuscaloosa. Walker.	Baldwin. Calhoun. Colbert. Etowah. Hale. Jefferson. Lauderdale. Madison. Mobile. Montgomery. Morgan. Pike. Sumter. Talladega. Tuscaloosa. Walker.	Baldwin. Barbour. Calhoun. Colbert. Dallas. Etowah. Houston. Jefferson. Lauderdale. Madison. Mobile. Montgomery. Morgan. Pike. Sumter. Talladega. Tuscaloosa. Walker.
ARKANSAS.		
Sebastian.		
CALIFORNIA.		
Los Angeles.		Los Angeles. San Francisco.
GEORGIA.		
Baldwin. Bartow. Cobb. Colquitt. Dougherty. Floyd. Glynn. Hart. Laurens. Lowndes. Sumter. Tift. Thomas. Troup. Walker. Worth.	Baldwin. Bartow. Brooks. Clarke. Cobb. Decatur. Dougherty. Floyd. Glynn. Hall. Laurens. Lowndes. Sumter. Thomas. Troup. Walker. Worth.	Baldwin. Bartow. Brooks. Clarke. Cobb. Decatur. Dougherty. Floyd. Glynn. Hall. Laurens. Lowndes. Sumter. Mitchell. Thomas. Troup. Walker. Worth.
IDAHO.		
		Bannock. Twin Falls. Boise.
IOWA.		
		Dubuque.
KANSAS.		
Butler. Cherokee. Ford. Geary. Marion.	Butler. Cherokee. Ford. Geary. Marion.	Butler. Cherokee. Ellis. Ford. Geary. Marion. Ottawa. Wabaunsee.
KENTUCKY.		
Mason.	Boyd. Daviess. Fulton. Harlan. Jefferson. Mason. Muhlenberg. Scott.	Bell. Boyd. Daviess. Fulton. Harlan. Mason. Muhlenberg Scott.
LOUISIANA.[1]		
Rapides.	Rapides.	Beauregard. Caddo. De Soto. Natchitoches. Ouachita. Rapides. Washington.
MARYLAND.		
		Washington.
MASSACHUSETTS.		
		Cape Cod.[2]
MICHIGAN.		
St. Clair.		
MISSISSIPPI.		
Grenada. Harrison. Lee. Monroe. Pike.	Bolivar. Harrison. Jones. Lee.	Bolivar. Coahoma. Forrest. Harrison. Jones. Lee. Marshall. Union. Washington.
MISSOURI.		
	Greene.	Greene. Jasper.

[1] Parishes.

TABLE I.—*List of counties, or districts, in which, as of January 1, 1920, 1921, and 1922, respectively, rural sections were provided with local health service under whole-time health officers*—Continued.

1920	1921	1922
MONTANA.		
Missoula. Yellowstone.	Cascade. Missoula. Yellowstone.	Cascade. Lewis and Clark. Missoula. Yellowstone.
NEW MEXICO.		
	Bernalillo. Chaves. San Miguel. Santa Fe. Union.	Bernalillo. Chaves. San Miguel. Santa Fe. Torrance. Union. Valencia.
NEW YORK.		
Lake George.[1]		
NORTH CAROLINA.		
Cabarrus. Cumberland. Davidson. Durham. Edgecombe. Forsythe. Granville. Guilford. Halifax. New Hanover. Northampton. Pitt. Robeson. Rowan. Surry. Wake. Wilson.	Beaufort. Buncombe. Bertie. Cabarrus. Chatham. Cumberland. Davidson. Durham. Edgecombe. Forsythe. Granville. Halifax. Lenoir. New Hanover. Northampton. Pitt. Robeson. Rowan. Sampson. Surry. Vance. Wake. Wayne. Wilkes. Wilson.	Bertie. Bladen. Buncombe. Cabarrus. Columbus. Craven. Cumberland. Davidson. Durham. Edgecombe. Forsythe. Granville. Guilford. Halifax. Lenoir. Mecklenburg. New Hanover. Northampton. Pamlico. Pitt. Robeson. Rowan. Sampson. Surry. Vance. Wake. Wayne. Wilkes. Wilson.
OHIO.		
Allen. Ashtabula. Butler. Darke. Hamilton. Harrison. Hocking. Mahoning. Medina. Montgomery. Muskingum. Sandusky.	Allen. Ashtabula. Belmont. Butler. Champaign. Clermont. Crawford. Cuyahoga. Delaware. Fairfield. Hamilton. Henry.	Allen. Ashtabula. Belmont. Butler. Champaign. Clermont. Clinton. Columbiana. Coshocton. Crawford. Cuyahoga. Erie.
OHIO—continued.		
Scioto. Shelby. Stark. Summit.	Highland. Hocking. Lake. Lorain. Lucas. Mahoning. Marion. Medina. Meigs. Miami. Monroe. Montgomery. Muskingum. Noble. Paulding. Sandusky. Scioto. Seneca. Shelby. Stark. Summit. Trumbull. Union. Washington.	Greene. Hamilton. Highland. Hocking. Lake. Lorain. Lucas. Madison. Mahoning. Marion. Miami. Monroe. Montgomery. Morrow. Muskingum. Paulding. Ross. Sandusky. Scioto. Seneca. Shelby. Stark. Summit. Trumbull. Union. Washington. Wayne. Wood.
OKLAHOMA.		
Ottawa.	Ottawa.	Ottawa.
SOUTH CAROLINA.		
Calhoun. Darlington. Fairfield. Lee. Newberry. Orangeburg.	Calhoun. Charleston. Cherokee. Darlington. Fairfield. Lee. Newberry. Orangeburg.	Charleston. Cherokee. Darlington. Fairfield. Greenville. Newberry. Orangeburg.
SOUTH DAKOTA.		
		Brown.
TENNESSEE.		
Hamilton.		Davidson. Montgomery. Roane. Williamson.
TEXAS.		
Bell. Jefferson. Tarrant. Wichita. Williamson.	Bell. Dallas. Jefferson. Tarrant. Wichita. Williamson.	Dallam. Dallas. Hidalgo. Jefferson. Tarrant.

[1] District.

TABLE I.—*List of counties or districts in which, as of January 1, 1920, 1921, and 1922, respectively, rural sections were provided with local health service under whole-time health officers*—Continued.

1920	1921	1922
UTAH.		
		Weber.
VERMONT.[1]		
First.	First.	First.
Second.	Second.	Second.
Third.	Third.	Third.
Fourth.	Fourth.	Fourth.
Fifth.	Fifth.	Fifth.
Sixth.	Sixth.	Sixth.
Seventh.	Seventh.	Seventh.
Eighth.	Eighth.	Eighth.
Ninth.	Ninth.	Ninth.
Tenth.	Tenth.	Tenth.
VIRGINIA.		
Arlington.	Albemarle.	Albemarle.
Augusta.	Arlington.	Arlington.
Fairfax.	Augusta.	Augusta.
Fauquier.	Clarke.	Fairfax.
Pittsylvania.	Fairfax.	Fauquier.
Prince William.	Fauquier.	Halifax.
	Halifax.	Norfolk.
	Henry.	Tazewell.
	Norfolk.	Wise.
	Tazewell.	
WASHINGTON.		
Yakima.	King.	King.
	Spokane.	Spokane.
	Walla Walla.	Walla Walla.
	Yakima.	Yakima.
WEST VIRGINIA.		
	Greenbrier.	Greenbrier.
		Logan.
		Mingo.

[1] Districts.

Résumé of Table 1.

State.	Number of counties.			Increase or decrease in 1920.	Increase or decrease in 1921.
	1920	1921	1922		
Alabama	12	16	18	+4	+2
Arkansas	1	0	0	−1	.....
California	1	0	2	−1	+2
Georgia	16	17	18	+1	+1
Idaho	0	0	3	.....	+3
Iowa	0	0	1	.....	+1
Kansas	5	5	8	.....	+3
Kentucky	1	8	8	+7	.....
Louisiana	1	1	7	.....	+6
Maryland	0	0	1	.....	+1
Massachusetts	0	0	1	.....	+1
Michigan	1	0	0	−1	.....
Mississippi	5	4	9	−1	+5
Missouri	0	1	2	+1	+1
Montana	2	3	4	+1	+1
New Mexico	0	5	7	+5	+2
New York	1	0	0	−1	.....
North Carolina	17	25	29	+8	+4
Ohio	16	36	40	+20	+4
Oklahoma	1	1	1	.....	.....
South Carolina	6	8	7	+2	−1
South Dakota	0	0	1	.....	+1
Tennessee	1	0	4	−1	+4
Texas	5	6	5	+1	−1
Utah	0	0	1	.....	+1
Vermont	10	10	10	.....	.....
Virginia	6	10	9	+4	−1
Washington	1	4	4	+3	.....
West Virginia	0	1	3	+1	+2
Total	109	161	203	+52	+42

In view of the general economic situation, the net increases in number of 52 within the calendar year 1920 and of 42 within the

calendar year 1921 are indicative of progress in appreciation by our rural communities of the relative importance of investment for whole-time local health service.

With the now demonstrated value of reasonably adequate local health service, the fact that only about 203 of the 3,065 counties, or equivalent divisions, in our 48 States are provided at this time with rural health service under the direction of whole-time local health officers can be regarded as being in the nature of a national calamity.

If our Federal and State Governments would give to county governments a degree of cooperation in the development and maintenance of local rural health service even approaching that which they have given in a number of other important fields of activity, rapid progress could be made in the prevention of disease and the promotion of health among all our people.

The following (Table II) presents, by States, the percentage of rural population having, at the beginning of 1922, local health service under the direction of whole-time county (or district) health officers:

TABLE II.—*Percentage of rural population having, on Jan. 1, 1922, local health service under whole-time county or district health officers.*

State.	Rural population.	Rural population with local health service under direction of whole-time health officer.	Percentage of rural population with local health service under direction of whole-time health officer.
Alabama	1,838,857	639,845	34.79
Arizona	216,376	0	0
Arkansas	1,461,707	0	0
California	1,095,132	145,826	13.31
Colorado	486,370	0	0
Connecticut	444,292	0	0
Delaware	102,236	0	0
Florida	612,645	0	0
Georgia	2,167,973	359,055	16.56
Idaho	312,829	34,427	11.00
Illinois	2,079,602	0	0
Indiana	1,447,535	0	0
Iowa	1,528,526	19,121	1.25
Kansas	1,151,293	121,927	10.59
Kentucky	1,783,087	148,078	8.30
Louisiana	1,170,346	191,183	16.33
Maine	468,445	0	
Maryland	580,239	31,630	5.45
Massachusetts	202,108	11,558	5.71
Michigan	1,426,852	0	0
Minnesota	1,335,532	0	0
Mississippi	1,550,497	240,952	15.54
Missouri	1,817,152	57,231	3.15
Montana	376,878	47,211	12.52
Nebraska	891,066	0	0
Nevada	62,153	0	0
New Hampshire	163,322	0	0
New Jersey	673,611	0	0
New Mexico	295,390	82,401	27.89
New York	1,794,985	0	0
North Carolina	2,068,753	822,127	39.74
North Dakota	557,446	0	0
Ohio	2,082,258	1,057,137	50.77
Oklahoma	1,488,803	19,435	1.31
Oregon	392,370	0	0
Pennsylvania	3,112,202	0	0
Rhode Island	15,217	0	0
South Carolina	1,389,737	273,636	19.69

TABLE II.—*Percentage of rural population having, on Jan. 1, 1922, local health service under whole-time county or district health officers*—Continued.

State.	Rural population.	Rural population with local health service under direction of whole-time health officer.	Percentage of rural population with local health service under direction of whole time health officer.
South Dakota	534,675	14,972	2.80
Tennessee	1,726,559	109,357	6.33
Texas	3,150,539	128,399	4.07
Utah	233,812	10,650	4.55
Vermont	242,452	242,452	100.00
Virginia	1,535,203	276,118	18.00
Washington	607,886	151,949	25.00
West Virginia	1,094,694	83,795	7.65
Wisconsin	1,357,499	0	0
Wyoming	137,054	0	0
Total	51,304,295	5,314,991	10.34

The figures in this compilation, indicating that only 10.34 per cent of our rural population are protected with health service which even approaches adequacy, should be a matter of serious concern to all persons interested in our national welfare.

DEATH RATES IN A GROUP OF INSURED PERSONS.

DEATH RATES FOR PRINCIPAL CAUSES, APRIL AND MAY, 1922.

The accompanying table is taken from the Statistical Bulletin of the Metropolitan Life Insurance Co. for June, 1922, and presents the mortality experience of the industrial department of the company for April and May, 1922, and May and year, 1921. The figures are based on a strength of approximately 14,000,000 insured persons.

The death rate in this group for May, 1922, was 1 per cent lower than that for April, but 6 per cent higher than the rate for May, 1921. In comparison with the corresponding month of 1921, higher death rates were recorded for May of this year for measles, influenza, cancer, organic diseases of the heart, and pneumonia. The mortality from diphtheria, however, was 36 per cent lower for May, 1922, than for the corresponding month of last year.

Death rates (annual basis) for principal causes per 100,000 lives exposed, April and May, 1922, and May and year, 1921.

[Industrial Department, Metropolitan Life Insurance Co.]

Cause of death.	Death rate per 100,000 lives exposed.			
	May, 1922.	April, 1922.	May, 1921.	Year 1921[1].
Total, all causes	910.2	918.2	855.1	853.8
Typhoid fever	3.5	3.4	3.8	6.6
Measles	8.3	7.2	4.8	3.1
Scarlet fever	4.4	5.6	7.5	6.9
Whooping cough	2.1	2.0	3.8	3.9
Diphtheria	11.9	12.1	18.5	22.3
Influenza	19.7	38.9	9.8	8.6
Tuberculosis (all forms)	123.5	118.2	125.0	115.1
Tuberculosis of respiratory system	112.2	107.9	111.6	102.6
Cancer	71.5	63.2	69.9	70.4
Cerebral hemorrhage	58.9	63.2	58.0	60.9
Organic diseases of heart	133.0	134.7	116.6	115.0
Pneumonia (all forms)	77.6	97.0	71.0	66.5
Other respiratory diseases	16.6	14.2	13.3	14.1
Diarrhea and enteritis	7.3	5.2	9.5	12.9
Bright's disease (chronic nephritis)	68.4	70.9	69.7	66.7
Puerperal state	17.4	17.3	17.8	19.5
Suicides	7.8	8.5	7.8	7.5
Homicides	5.7	4.0	4.6	6.6
Other external causes (excluding suicides and homicides)	51.9	42.6	48.9	56.2
Traumatism by automobile	11.6	8.3	9.8	11.9
All other causes	220.8	210.0	195.2	189.0

[1] Based on provisional estimate of lives exposed to risk in 1921.

DEATHS DURING WEEK ENDED JULY 8, 1922.

Summary of information received by telegraph from industrial insurance companies for week ended July 8, 1922, and corresponding week, 1921. (From the Weekly Health Index, July 11, 1922, issued by the Bureau of the Census, Department of Commerce.)

	Week ended July 8, 1922.	Corresponding week, 1921.
Policies in force	49,632,235	46,741,826
Number of death claims	6,245	6,531
Death claims per 1,000 policies in force, annual rate	6.6	7.3

Deaths from all causes in certain large cities of the United States during the week ended July 8, 1922, infant mortality, annual death rate, and comparison with corresponding week of 1921. (From the Weekly Health Index, July 8, 1922, issued by the Bureau of the Census, Department of Commerce.)

City.	Estimated population July 1, 1922.	Week ended July 8, 1922.		Annual death rate per 1,000 corresponding week, 1921.	Deaths under 1 year.		Infant mortality rate, week ended July 8, 1922.[2]
		Total deaths.	Death rate.[1]		Week ended July 8, 1922.	Corresponding week, 1921.	
Total		5,733	10.7	11.3	826	936	
Akron, Ohio	[3] 208,435	34	8.5	9.6	9	4	95
Albany, N. Y.	116,223	33	14.8	16.8	2	4	45
Atlanta, Ga.	220,047	72	17.1	15.1	11	18	
Baltimore, Md.	762,222	219	15.0	12.6	42	35	118
Birmingham, Ala.	191,017	64	17.5	19.0	10	13	
Boston, Mass.	764,017	180	12.3	10.3	25	25	67
Bridgeport, Conn.	[3] 143,555	18	6.5	9.7	1	4	12
Buffalo, N. Y.	528,163	108	10.7	11.4	20	16	79
Cambridge, Mass.	110,944	24	11.3	10.4	1	4	18
Camden, N. J.	121,915	31	13.3	15.7	1	13	15
Chicago, Ill.	2,833,288	458	8.4	11.2	72	107	
Cincinnati, Ohio	404,865	121	15.6	15.3	16	8	107
Cleveland, Ohio	854,003	148	9.0	10.7	20	24	52
Columbus, Ohio	253,455	46	9.5	14.0	4	5	42
Dallas, Tex.	171,974	43	13.0	12.6	4	7	
Dayton, Ohio	161,824	34	11.0	17.1	9	5	153
Denver, Colo.	267,591	69	13.4	12.7	8	7	
Detroit, Mich.	[3] 993,678	187	9.8	10.7	27	57	52
Fall River, Mass.	120,790	31	13.4	10.4	7	4	98
Fort Worth, Tex.	114,717	19	8.6		2		
Grand Rapids, Mich.	143,572	21	7.6	14.0	2	7	33
Houston, Tex.	150,087	30	10.4	8.7	4	3	
Indianapolis, Ind.	333,257	69	10.8	10.2	6	11	46
Jersey City, N. J.	305,911	49	8.4	12.1	5	17	82
Kansas City, Kans.	105,688	22	10.9	10.0	1	4	23
Kansas City, Mo.	343,988	85	12.9	12.9	7	13	
Los Angeles, Calif.	634,866	192	15.8	11.2	32	20	133
Louisville, Ky.	236,877	70	15.4	19.9	12	19	130
Lowell, Mass.	114,423	23	10.5	9.2	5	3	84
Memphis Tenn.	167,862	53	16.5	18.6	7	11	
Milwaukee, Wis.	476,603	76	8.3	10.5	15	20	73
Minneapolis, Minn.	400,970	77	10.0	9.6	13	6	71
Nashville, Tenn.	122,832	38	16.1	18.8	4	4	
New Bedford, Mass.	127,542	15	6.1	7.1	2	4	30
New Haven, Conn.	169,987	35	10.7	8.4	7	5	86
New Orleans, La.	399,616	114	14.9	16.1	16	14	
New York, N. Y.	5,839,746	1,091	9.7	9.7	166	158	64
Newark, N. J.	431,792	83	10.0	8.5	18	12	80
Norfolk, Va.	124,915	36	15.0	15.1	6	8	106
Oakland, Calif.	223,279	42	9.4	8.7	3	2	38
Omaha, Nebr.	200,739	47	12.2	10.3	2	3	23
Paterson, N. J.	138,521	27	10.2	8.0	4	4	62
Philadelphia, Pa.	1,894,506	380	10.5	11.5	50	56	59
Pittsburgh, Pa.	607,902	130	11.2	15.5	26	32	83
Portland, Oreg.	289,240	58	11.2	11.0	7	4	69
Providence, R. I.	241,011	42	9.1	7.6	2	7	16
Richmond, Va.	178,365	59	17.2	15.7	14	10	170
Rochester, N. Y.	311,548	59	9.9	9.7	6	6	46
St. Louis, Mo.	795,008	158	10.4	11.2	8	19	
St. Paul, Minn.	239,836	39	8.5	10.3	7	6	66
Salt Lake City, Utah	123,918	24	10.1	14.2	3	8	45
San Antonio, Tex.	178,056	49	14.3		16		
San Francisco, Calif.	529,792	123	12.1	10.3	5	4	29
Seattle, Wash.	[3] 315,312	42	6.9	10.5	3	8	25
Spokane, Wash.	104,445	18	9.0	8.0	3	1	64
Springfield, Mass.	140,052	21	7.8	10.0	1	4	15
Syracuse, N. Y.	181,012	40	11.5	9.1	5	7	80
Toledo, Ohio	260,717	38	7.6	9.5	5	5	49
Trenton, N. J.	125,075	30	12.5	10.2	6	5	92
Washington, D. C.	[3] 437,571	87	10.4	14.5	13	14	74
Wilmington, Del.	115,568	21	9.5	11.5	6	4	117
Worcester, Mass.	188,449	40	11.1	15.2	4	12	43
Yonkers, N. Y.	105,422	18	8.9	8.1	6	3	125
Youngstown, Ohio	144,970	23	8.3	15.7	2	13	26

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births—an annual rate based on deaths under 1 year for the week and estimated births for 1921. Cities left blank are not in the registration area for births.
[3] Enumerated population Jan. 1, 1920.

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 July 15, 1922.

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

ARKANSAS.	Cases.
Chicken pox	7
Diphtheria	2
Hookworm disease	1
Influenza	1
Malaria	150
Measles	7
Pellagra	3
Scarlet fever	3
Smallpox	2
Tuberculosis	20
Typhoid fever	23
Whooping cough	6

CALIFORNIA.	
Diphtheria	84
Influenza	9
Leprosy—San Francisco	1
Lethargic encephalitis—San Francisco	1
Measles	14
Plague—Santa Cruz County	1
Poliomyelitis—Stockton	1
Scarlet fever	31
Smallpox	17
Typhoid fever	26

COLORADO. (Exclusive of Denver.)	
Chicken pox	2
Diphtheria	5
Mumps	4
Scarlet fever	6
Tuberculosis	34
Typhoid fever	7
Whooping cough	1

CONNECTICUT.	
Cerebrospinal meningitis	1
Chicken pox	65

CONNECTICUT—Continued.	Cases.
Diphtheria	15
Favus	1
Influenza	5
Lethargic encephalitis	1
Malaria	2
Measles:	
Bridgeport	18
New Haven	41
Norwalk	18
West Haven	11
Westbrook	10
Scattering	62
Mumps	6
Pneumonia (lobar)	10
Scarlet fever	18
Smallpox	8
Tetanus	1
Tuberculosis (all forms)	37
Typhoid fever	11
Whooping cough	60

DELAWARE.	
Chicken pox	5
Diphtheria	1
Measles	1
Mumps	1
Scarlet fever	2
Tetanus	1
Tuberculosis	2
Typhoid fever	3

FLORIDA.	
Diphtheria	12
Influenza	38
Malaria	22
Ophthalmia neonatorum	1
Pneumonia	1
Poliomyelitis	2

FLORIDA—continued.	Cases.
Scarlet fever	7
Smallpox	2
Typhoid fever	6
GEORGIA.	
Conjunctivitis (infectious)	2
Diphtheria	10
Dysentery (amebic)	1
Dysentery (bacillary)	2
Hookworm disease	8
Influenza	4
Malaria	63
Measles	1
Mumps	2
Paratyphoid fever	2
Pellagra	6
Pneumonia	2
Scarlet fever	2
Septic sore throat	3
Smallpox	1
Tuberculosis (all forms)	20
Typhoid fever	70
Whooping cough	23
INDIANA.	
Diphtheria	22
Rabies in animals:	
Floyd County	1
Sullivan County	1
Scarlet fever	12
Smallpox	5
Typhoid fever	11
IOWA.	
Diphtheria	15
Scarlet fever	22
Smallpox	5
KANSAS.	
Cerebrospinal meningitis	1
Chicken pox	3
Diphtheria	25
Favus	1
Malaria	1
Measles	10
Mumps	5
Pellagra	3
Scarlet fever	31
Smallpox	21
Tetanus	1
Tuberculosis	48
Typhoid fever	20
Whooping cough	53
LOUISIANA.	
Anthrax	2
Diphtheria	12
Malaria	49
Pellagra	6
Scarlet fever	4
Smallpox	3
Typhoid fever	26
MARYLAND.[1]	
Chicken pox	9
Diphtheria	22
Dysentery	9

[1] Week ended Friday.

MARYLAND—continued.	Cases.
Influenza	2
Malaria	6
Measles	103
Mumps	29
Paratyphoid fever	3
Pneumonia (all forms)	15
Poliomyelitis	3
Scarlet fever	14
Tuberculosis	63
Typhoid fever	15
Vincent's angina	1
Whooping cough	44
MASSACHUSETTS.	
Chicken pox	24
Conjunctivitis (suppurative)	7
Diphtheria	108
German measles	2
Malaria	2
Measles	349
Mumps	54
Ophthalmia neonatorum	9
Pneumonia (lobar)	24
Poliomyelitis	5
Scarlet fever	45
Septic sore throat	1
Trachoma	1
Tuberculosis (all forms)	149
Typhoid fever	13
Whooping cough	112
MISSISSIPPI.	
Diphtheria	14
Poliomyelitis	6
Scarlet fever	13
Typhoid fever	42
MISSOURI.	
Chicken pox	2
Diphtheria	17
Epidemic sore throat	4
Influenza	3
Measles	11
Mumps	2
Ophthalmia neonatorum	1
Pneumonia	4
Scarlet fever	17
Tetanus	9
Tuberculosis	48
Typhoid fever	14
Whooping cough	15
MONTANA.	
Diphtheria	3
Rocky Mountain spotted or tick fever:	
Billings, R. D. 1	1
Bonita	1
Bridger	1
Three Forks	1
Scarlet fever	3
Smallpox	2
Typhoid fever	3
NEBRASKA.	
Chicken pox	4
Diphtheria	8
Influenza	2
Measles	10

NEBRASKA—continued.	Cases.
Mumps	2
Scarlet fever	3
Smallpox	8
Typhoid fever	1
Whooping cough	7

NEW JERSEY.	
Cerebrospinal meningitis	4
Chicken pox	22
Diphtheria	80
Influenza	2
Malaria	3
Measles	248
Pneumonia	26
Poliomyelitis	6
Scarlet fever	60
Smallpox	1
Typhoid fever	17
Whooping cough	176

NEW MEXICO.	
Diphtheria	10
German measles	1
Pneumonia	1
Poliomyelitis	1
Scarlet fever	1
Smallpox	1
Tuberculosis	8
Typhoid fever	5

NEW YORK.

(Exclusive of New York City.)

Cerebrospinal meningitis	2
Diphtheria	92
Influenza	1
Measles	582
Pneumonia	48
Poliomyelitis	1
Scarlet fever	84
Smallpox	1
Tetanus	4
Typhoid fever	21
Whooping cough	215

NORTH CAROLINA.	
Chicken pox	16
Diphtheria	61
German measles	1
Measles	25
Scarlet fever	25
Septic sore throat	3
Smallpox	12
Typhoid fever	102
Whooping cough	240

OREGON.	
Chicken pox	10
Diphtheria	3
Measles	1
Mumps	1
Pneumonia	[1] 3
Scarlet fever	1
Smallpox	8
Typhoid fever	3
Whooping cough	3

[1] Deaths.

SOUTH DAKOTA.	Cases.
Cerebrospinal meningitis	2
Chicken pox	4
Diphtheria	3
Measles	4
Scarlet fever	8
Smallpox	3
Tuberculosis	2
Typhoid fever	2

TEXAS.	
Diphtheria	20
Pneumonia	2
Scarlet fever	8
Smallpox	1
Typhoid fever	26

VERMONT.	
Chicken pox	5
Diphtheria	3
Measles	6
Mumps	2
Poliomyelitis	1
Scarlet fever	3
Smallpox	1
Typhoid fever	1
Whooping cough	10

VIRGINIA.	
Smallpox—Dickenson County	5

WASHINGTON.	
Chicken pox	38
Diphtheria	7
Measles	3
Mumps	18
Scarlet fever	9
Smallpox	9
Tuberculosis	34
Typhoid fever	15
Whooping cough	36

WEST VIRGINIA.	
Diphtheria	6
Scarlet fever	2
Tuberculosis	5
Typhoid fever	12
Whooping cough	5

WISCONSIN.	
Milwaukee:	
Cerebrospinal meningitis	1
Chicken pox	17
Diphtheria	11
German measles	2
Measles	56
Scarlet fever	4
Smallpox	8
Tuberculosis	11
Typhoid fever	4
Whooping cough	195
Scattering:	
Chicken pox	25
Diphtheria	26
German measles	1
Influenza	2

WISCONSIN—continued.

Scattering—Continued.	Cases.
Lethargic encephalitis	1
Measles	58
Pneumonia	4
Scarlet fever	39
Smallpox	15
Tuberculosis	45

WISCONSIN—continued.

Scattering—Continued.	Cases.
Typhoid fever	4
Whooping cough	143

WYOMING.

Diphtheria	1
Influenza	1
Scarlet fever	1

Delayed Reports for Week Ended July 8, 1922.

DISTRICT OF COLUMBIA.	Cases.
Chicken pox	7
Diphtheria	1
Influenza	1
Measles	2
Poliomyelitis	1
Scarlet fever	2
Tuberculosis	18
Typhoid fever	4
Whooping cough	9

KENTUCKY.	
Chicken pox	2
Diphtheria	1
Dysentery	5
Influenza	

KENTUCKY—continued.	Cases.
Malaria	3
Measles:	
Jefferson County	9
Scattering	8
Mumps	1
Pellagra	
Pneumonia	4
Scarlet fever	2
Septic sore throat	2
Trachoma	2
Tuberculosis:	
Jefferson County	19
Scattering	12
Typhoid fever	19
Whooping cough	26

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week.

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles.	Pellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
1922.										
Alabama (May)	1	37	30	78	27	33	.....	26	93	74
Connecticut (June)	3	154	22	4	1,430	.....	.....	159	25	41
District of Columbia (June)	.....	20	.....	.....	130	.....	.....	14	1	28
Florida (June)	1	35	161	113	10	12	1	14	31	81
Louisiana (June)	2	34	2	178	16	25	4	11	30	102
Massachusetts (June)	13	459	11	5	3,199	.....	4	470	1	41
Nebraska (June)	1	44	.....	.....	187	.....	1	56	18	4

PLAGUE (HUMAN).

Soquel, Santa Cruz County, Calif.

One case of human plague was reported at Soquel, Santa Cruz County, Calif., July 15, 1922

CITY REPORTS FOR WEEK ENDED JULY 1, 1922.

BOTULISM.

City.	Cases.	Deaths.
Illinois:		
Quincy	1	1

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

CEREBROSPINAL MENINGITIS.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 1, 1922.	
		Cases.	Deaths.
California:			
Los Angeles	0	2	1
Connecticut:			
Derby	0	.....	1
Illinois:			
Chicago	2	2	1
Mattoon	.....	1	.....
Massachusetts:			
Boston	1	2	1
Michigan:			
Detroit	0	1	1
Missouri:			
Kansas City	.....	1	1
New Jersey:			
Jersey City	0	1	.....
New York:			
New York	7	3	3
Ohio:			
Cleveland	1	1	.....
Pennsylvania:			
Braddock	0	1	.....
Philadelphia	.....	1	.....
Wisconsin:			
Manitowoc	0	1	.....

DIPHTHERIA.

See p. 1811; also Telegraphic weekly reports from States, p. 1802, and Monthly summaries by States, p. 1805.

INFLUENZA.

City.	Cases.		Deaths, week ended July 1, 1922.
	Week ended July 2, 1921.	Week ended July 1, 1922.	
California:			
Long Beach	2	.....	.....
Los Angeles	.....	.....	1
Oakland	4	2	.....
San Francisco	1	.....	.....
Connecticut:			
New Haven	.....	.....	1
Florida:			
Tampa	.....	3	.....
Georgia:			
Atlanta	1	.....	.....
Illinois:			
Chicago	2	1	2
Danville	.....	1	.....
Springfield	.....	1	.....
Kentucky:			
Louisville	.....	1	.....
Maryland:			
Baltimore	1	.....	.....
Massachusetts:			
Boston	2	.....	.....
Fall River	.....	.....	1
Woburn	.....	.....	1
Michigan:			
Detroit	4	.....	.....
New Jersey:			
Newark	.....	4	.....
New York:			
New York	5	6	.....
Ohio:			
Columbus	1	.....	.....
East Cleveland	.....	1	.....
Toledo	.....	.....	1
Pennsylvania:			
Philadelphia	3	.....	.....
Wisconsin:			
Green Bay	2	.....	.....

LEPROSY.

City.	Cases.	Deaths.
California:		
San Francisco	1	.....
New York:		
New York	2	.....

LETHARGIC ENCEPHALITIS.

California:		
San Francisco	1	1

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

MALARIA.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			Illinois:		
Tuscaloosa	3		Chicago	1	1
Arkansas:			Louisiana:		
Little Rock	8		New Orleans	1	1
North Little Rock	1		Massachusetts:		
Florida:			Everett	1	
Tampa	10		New Jersey:		
Georgia:			Montclair	1	
Albany	1		Trenton	1	
Atlanta		1	Tennessee:		
Macon	5		Memphis	6	
Savannah	2				

MEASLES.

See p. 1811; also Telegraphic weekly reports from States, p. 1802, and Monthly summaries by States, p. 1805.

PELLAGRA.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			Ohio:		
Birmingham	1	1	Cincinnati		1
Mobile		1	Texas:		
Georgia:			Beaumont		1
Savannah		1	Fort Worth	1	1
Kentucky:			Waco		1
Lexington		1	Virginia:		
North Carolina:			Petersburg	1	1
Winston-Salem	2	1			

PNEUMONIA (ALL FORMS).

City.	Cases.	Deaths.	City.	Cases.	Deaths.
California:			Indiana:		
Alameda		1	Anderson		1
Long Beach		2	East Chicago		1
Los Angeles	22	11	Fort Wayne		1
Oakland	4	1	Indianapolis		5
Pasadena	1		South Bend		1
Riverside		1	Kansas:		
Sacramento		1	Topeka	4	
San Francisco	8	3	Wichita		1
Santa Ana		1	Kentucky:		
Santa Barbara		1	Covington		2
Colorado:			Louisville	5	2
Denver		7	Louisiana:		
Connecticut:			New Orleans	8	6
Milford	1		Maine:		
New Haven		2	Lewiston	2	1
Waterbury		3	Portland		1
Delaware:			Sanford		2
Wilmington		3	Maryland:		
District of Columbia:			Baltimore	14	9
Washington		5	Massachusetts:		
Georgia:			Boston		4
Atlanta		3	Braintree		2
Savannah		2	Cambridge		3
Illinois:			Clinton	1	
Alton	1		Fall River		2
Aurora	2		Gardner		1
Blue Island		1	Leominster	1	
Chicago	65	39	Lowell		5
Danville	1		Lynn	2	
Decatur	3		Methuen		2
Kewanee	1		New Bedford		1
Oak Park	2		Northampton	1	
Peoria		1	Springfield		1
Springfield		3	Worcester		1

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

PNEUMONIA (ALL FORMS)—Continued.

City.	Cases.	Deaths.
Michigan:		
Ann Arbor	1	
Detroit	26	11
Flint		1
Pontiac		1
Port Huron	1	
Minnesota:		
Minneapolis		2
St. Paul		3
Missouri:		
Kansas City		7
St. Joseph		1
Nebraska:		
Lincoln		2
Omaha		2
New Hampshire:		
Berlin		1
New Jersey:		
Bayonne	1	
Belleville	1	
Garfield	3	1
Harrison	1	
Jersey City	3	
Kearny	1	
Montclair	1	
Newark	11	1
Orange	3	
Passaic		1
Plainfield	3	1
Trenton	9	
New York:		
Albany	3	
Auburn	1	
Buffalo	10	2
Elmira	2	
New York	151	66
Rochester	5	4
Rome	1	
Syracuse	5	3
Troy		2
Watertown	2	1
White Plains		1
Yonkers		3
North Carolina:		
Charlotte		2
Wilmington		1
Ohio:		
Canton		1
Cincinnati		5
Cleveland	16	14
Columbus		5
East Cleveland		2
Findlay		1
Sandusky		1
Toledo		2
Youngstown		2
Oklahoma:		
Oklahoma		1
Oregon:		
Portland		3
Pennsylvania:		
Philadelphia	27	21
Rhode Island:		
Cranston		1
Providence		3
South Carolina:		
Charleston		1
Tennessee:		
Memphis		5
Nashville		3
Texas:		
Beaumont		1
Dallas		1
El Paso		1
Fort Worth		2
Houston		1
Utah:		
Provo	1	
Salt Lake City		4
Vermont:		
Burlington		1
Virginia:		
Norfolk		1
Richmond		2
Roanoke		1
Wisconsin:		
Beloit		1
Milwaukee	1	
Racine	1	

POLIOMYELITIS (INFANTILE PARALYSIS).

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 1, 1922.	
		Cases.	Deaths.
California:			
Los Angeles	0	3	
Illinois:			
Chicago	1	1	
Louisiana:			
New Orleans	0	1	
Maryland:			
Baltimore	0	1	
Massachusetts:			
Lowell	0	1	1
Michigan:			
Ann Arbor	0		1
Ohio:			
Lorain	0	1	
South Carolina:			
Charleston	0	1	
Texas:			
Fort Worth	0	1	
Virginia:			
Petersburg		1	

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

RABIES IN ANIMALS.

City.	Cases.
California:	
Los Angeles	5
Georgia:	
Valdosta	1
Missouri:	
Kansas City	2

RABIES IN MAN.

City.	Cases.
Kansas:	
Kansas City	1

SCARLET FEVER.

See p. 1811; also Telegraphic weekly reports from States, p. 1802, and Monthly summaries by States, p. 1805.

SMALLPOX.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 1, 1922.	
		Cases.	Deaths.
Alabama:			
Mobile	3	2	.....
California:			
Los Angeles	1	2	.....
Oakland	0	2	.....
Colorado:			
Denver	10	1	.....
Connecticut:			
Bridgeport	0	2	.....
Georgia:			
Atlanta	6	1	.....
Illinois:			
Blue Island	0	1	1
Pekin	0	1	.....
Iowa:			
Burlington	0	1	.....
Cedar Rapids	2	1	.....
Council Bluffs	0	2	.....
Mason City	0	3	.....
Sioux City	2	1	.....
Kansas:			
Kansas City	3	2	.....
Minnesota:			
Duluth	2	2	.....
Minneapolis	12	3	.....
Montana:			
Great Falls	4	2	.....
Nebraska:			
Omaha	7	1	1
North Carolina:			
Durham	0	1	.....
Ohio:			
Alliance	1	1	.....
Dayton	0	1	.....
Fremont	0	1	.....
Springfield	0	5	.....
Oklahoma:			
Oklahoma	4	3	.....
Oregon:			
Portland	7	4	.....
Texas:			
Fort Worth	2	1	.....
Utah:			
Salt Lake City	6	1	.....
Virginia:			
Norfolk	0	3	.....
Washington:			
Bellingham	0	2	.....
Everett	1	2	.....
Seattle	8	1	.....
West Virginia:			
Bluefield	6	2	.....
Wisconsin:			
Appleton	0	1	.....
Milwaukee	4	2	.....
Oshkosh	1	1	.....
Superior	2	8	.....
Waukesha	.....	1	.....

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

TETANUS.

City.	Cases.	Deaths.
California:		
Los Angeles	1	2
San Francisco	1	
Georgia:		
Savannah		1
Illinois:		
Chicago	1	2
New Jersey:		
Newark	2	
New York:		
Albany	2	
Cohoes		1
Tennessee:		
Knoxville	1	1
Texas:		
Houston		1
Virginia:		
Portsmouth		1

TUBERCULOSIS.

See p. 1811; also Telegraphic weekly reports from States, p. 1802.

TYPHOID FEVER.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1921, inclusive. In instances in which data for the full seven years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 1, 1922.	
		Cases.	Deaths.
Alabama:			
Birmingham	4	1	
Montgomery	0	2	1
Arkansas:			
Little Rock	1	1	
California:			
Los Angeles	1	4	1
Stockton	0	3	
Colorado:			
Denver	0	1	
Trinidad	0	2	
Connecticut:			
Meriden	0	1	
New Haven	0	5	
Delaware:			
Wilmington	0	1	
District of Columbia:			
Washington	1	2	1
Georgia:			
Atlanta	3	7	
Macon	1	8	1
Rome	1	2	
Savannah	2	2	
Illinois:			
Chicago	5	5	
Kewanee	0	1	
Rock Island	0	1	
Indiana:			
Indianapolis	2		1
La Fayette	0		1
Iowa:			
Mason City	0	1	
Waterloo	0	1	
Kansas:			
Atchison	0		1
Coffeyville	0	1	
Fort Scott	0	4	
Topeka	1	2	
Wichita	0		1
Kentucky:			
Lexington	1		1
Louisville	2	3	
Owensboro		3	
Louisiana:			
New Orleans	8	10	2
Maine:			
Portland	1	1	
Maryland:			
Baltimore	5	3	
Cumberland	1		1
Massachusetts:			
Boston	3	1	
Everett	0	1	
Fall River	4	1	
Lowell	0	1	1
Malden	0	1	
Taunton	0	1	
Michigan:			
Detroit	5	1	1
Kalamazoo	0	2	
Minnesota:			
Minneapolis	2	2	
Missouri:			
Kansas City	1	1	
St. Louis	3	3	1
Montana:			
Missoula	0	1	
New Jersey:			
Atlantic City	0	1	
Garfield	0	1	
Morristown	0	1	
Plainfield	0	1	
New York:			
Cohoes	0	2	
Elmira	0	1	
New York	20	18	3
Saratoga Springs	0	1	
Syracuse	0	1	1
North Carolina:			
Charlotte	2	8	
Durham	2	4	
Salisbury	0		1
Wilmington	1		1
Winston-Salem	2	4	
Ohio:			
Alliance	0	2	
Bucyrus	0	3	
Cincinnati	2	5	1
Cleveland	3	2	
Dayton	0	2	
Piqua	0	1	
Toledo	1	3	1
Oklahoma:			
Tulsa	5	1	

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

TYPHOID FEVER—Continued.

City.	Median for previous years.	Week ended July 1, 1922.	
		Cases.	Deaths.
Oregon:			
Portland	1	2	
Pennsylvania:			
Philadelphia	7	14	2
Pittsburgh	2	5	
Scranton	0	1	
Swissvale	0	2	
South Carolina:			
Charleston	9	4	
Columbia	1	1	
Greenville	4	1	1
South Dakota:			
Sioux Falls	0	2	
Tennessee:			
Chattanooga	0	1	
Knoxville	3	5	
Memphis	2	4	1
Nashville	6	5	
Texas:			
Dallas	4	6	
Fort Worth	2	3	1
Houston	3	1	
Waco	0	2	
Virginia:			
Portsmouth	1	2	
Richmond	1	1	1
Roanoke	0	1	
Washington:			
Seattle	1	1	
Spokane	0	2	
Tacoma	0	2	
Yakima	0	1	
West Virginia:			
Bluefield	0	1	
Morgantown	0	1	
Wisconsin:			
Superior	0	1	

TYPHUS FEVER.

City.	Cases.	Deaths.
Alabama:		
Montgomery	1	

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.

City.	Population Jan. 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Alabama:										
Anniston	17,734		2							
Birmingham	178,270	46	3		4		1		4	11
Mobile	60,151	20								1
Montgomery	43,464	13	2				1		2	1
Tuscaloosa	11,996		1							
Arkansas:										
Hot Springs	11,695	4								
Little Rock	64,997								4	
North Little Rock	14,048		1						1	
California:										
Alameda	28,806	6					1			
Long Beach	55,593	18	2						1	
Los Angeles	576,673	187	42	2	1		23	1	56	29
Oakland	216,361	47	14	2			9		8	4
Pasadena	45,354	11							3	
Richmond	16,843	3	2	1						
Riverside	19,341	11	1							4
Sacramento	65,857	13	7				6			3
San Bernardino	18,721	7								2
San Diego	74,683	23	2		1		1		4	2
San Francisco	508,410	110	24	1	14		3		18	10
Santa Ana	15,485	3								1
Santa Barbara	19,441	4								
Santa Cruz	10,917	2								
Stockton	40,296	7	1				1			
Vallejo	21,107	0	1							
Colorado:										
Denver	256,369	64	11		5		7	1		7
Pueblo	42,908	12	1				1			2

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

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

City.	Population Jan. 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths	Cases.	Deaths.	Cases.	Deaths.
Connecticut:										
Bridgeport	143,538	19	8	1	19		5			3
Bristol	20,620	0	1		4					
Derby	11,238	5								
Fairfield (town)	11,475	0			1					
Greenwich (town)	22,123		2		2		2		1	
Hartford	138,036	24	2		8				8	11
Manchester (town)	18,370	4	1				1			
Meriden (city)	29,842				1				1	
Milford (town)	10,193	0	1		5				1	
New Haven	162,519	28	2		75	1			13	1
New London	25,688	4	2	1	4		1			
Waterbury	91,410	18	4		3		3		6	2
Delaware:										
Wilmington	110,168	24	1	1			2			
District of Columbia:										
Washington	437,571	110	4		17		3		24	14
Florida:										
Tampa	51,252	9			1				1	2
Georgia:										
Albany	11,555		2							
Atlanta	200,616	89	2	1			1			3
Brunswick	14,413	4							1	1
Macon	52,995				2					
Savannah	83,252	35	2				1		3	5
Valdosta	10,783	1								
Idaho:										
Boise	21,393	10								
Illinois:										
Alton	24,682	3	1						3	
Aurora	36,397	12	3	1	1				3	1
Bloomington	28,725	10							1	
Blue Island	11,424	2	2							
Centralia	12,491	3								
Chicago	2,701,705	530	106	6	374	6	34	1	213	48
Cicero	44,995	8	2		4					1
Danville	33,750	9	1				1		4	2
Decatur	43,818	5	1							
East St. Louis	66,740	13						1		
Elgin	27,454	7			1				2	1
Evanston	37,215	5			6				1	
Freeport	19,669	5			1		5		2	1
Galesburg	23,834	4	1							
Kewanee	16,026	1					2			
Mattoon	13,552								1	
Oak Park	39,830	10	4		17					1
Peoria	76,121	20	2		1		1		7	2
Quincy	35,978	12								1
Rockford	65,651	12	3		10					
Rock Island	35,177	6	1						1	1
Springfield	59,183	22					1		2	1
Indiana:										
Anderson	29,767	5	1							1
Bloomington	11,595	3								
Clinton	10,962	3								
Crawfordsville	10,139	2								
East Chicago	35,967	6	2		1		2			
Fort Wayne	86,549	16	2	1						1
Frankfort	11,585	2							1	
Hammond	36,004	4			5		1			
Huntingdon	14,000	3								
Indianapolis	314,194	97	4		53		1		3	6
Kokomo	30,067	8								
LaFayette	22,486	10								3
Logansport	21,626	8								
Mishawaka	15,195	4	1		3		1			1
Muncie	36,624	13								
South Bend	70,983	11			20				2	
Terre Haute	66,083	16					2			2
Iowa:										
Burlington	24,057	8								
Clinton	24,151		2				2			
Council Bluffs	36,162	8					1			
Davenport	56,727		1							

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

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

City.	Population Jan. 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Iowa—Continued.										
Marshalltown	15,731						2			
Mason City	20,065	4	1							
Muscatine	16,068	6								
Sioux City	71,227		10				3			
Waterloo	36,230				1		1			
Kansas:										
Atchison	12,630									1
Coffeyville	13,452	2								
Fort Scott	10,693	2	1							
Kansas City	101,177		3		5		1		18	
Lawrence	12,456	2	1							
Parsons	16,028	4							1	
Salina	15,085	2	1							
Topeka	50,022	10	1						5	2
Wichita	72,128	21	2		1		2			1
Kentucky:										
Covington	57,121	16	1							1
Lexington	41,534	18			15				1	1
Louisville	234,891	58	1		2		2		16	3
Owensboro	17,424								3	
Paducah	24,735		1				1			
Louisiana:										
New Orleans	387,219	137	1				1		27	13
Maine:										
Auburn	16,985	3								
Bangor	25,978								2	
Bath	14,731	3			2					
Biddeford	18,008	2							2	
Lewiston	31,791	5					1		1	
Portland	69,272	17	4		1		1			2
Sanford	10,691	6					1			
Maryland:										
Baltimore	733,826	181	13	1	85		8		29	24
Cumberland	29,837	9					1		1	
Frederick	11,066	8			1		2			1
Massachusetts:										
Adams	12,967	4					1		2	
Amesbury	10,036	1	1		1					
Arlington	18,665	6	3		14					2
Attleboro	19,731	3								
Belmont	10,749	3					1		1	1
Beverly	22,561	5	1		17		2			
Boston	748,060	178	54	4	144	1	21	1	26	18
Braintree	10,580	4								
Brookline	37,748	5			14				1	1
Cambridge	109,694	28			22		7		5	1
Chelsea	42,184	14	2		7				4	2
Chicopee	36,214	6	1						1	1
Clinton	12,979	5								
Dedham	10,792	2	1		1		3			
Everett	40,120	3					2			
Fall River	120,485	26	5	1	2				3	3
Gardner	16,971	5			1		1		2	1
Greenfield	15,462	2					1			
Haverhill	53,884	12	1		2				1	2
Lawrence	94,270	20	1		15	1			4	4
Leominster	19,744	2							2	
Lowell	112,479	26	5		4		4		20	3
Lynn	99,148	17	2		15		4		3	
Malden	49,103	11			12	1	2		1	1
Medford	39,038	10			1		1			
Methuen	15,189	4			6				1	
New Bedford	121,217	25	1				5		6	1
Newburyport	15,618	5			2					
Newton	46,054	7			21		1		1	
North Adams	22,282	1								
Northampton	21,951	4	1		10		3			
Pittsfield	41,751	10			1					
Plymouth	13,045	3								
Quincy	47,876	7	1		6					
Salem	42,529	8	1		3		1		1	
Saugus	10,874	1					3		1	
Somerville	93,091	22	1		10		3		1	2

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

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

City.	Population Jan. 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Massachusetts—Continued.										
Southbridge	14,245	3						1		
Springfield	129,563	26			23				2	
Taunton	37,137	18	1						2	
Wakefield	13,025	9	3		2					
Waltham	30,915	4			1					
Watertown	21,457	0			3		2			
Webster	13,258	2			3					
West Springfield	13,443	2								
Westfield	18,604	1			3					
Winthrop	15,455	0			2				1	
Woburn	16,574	4								
Worcester	179,754	37	2		2		1			1
Michigan:										
Alpena	11,101						3			
Ann Arbor	19,516	16			5					
Battle Creek	36,164				2		1			
Benton Harbor	12,233	1								
Detroit	993,739	191	25	2	23	3	33		48	21
Flint	91,599	16			16		2			
Hamtramck	48,615	0	2							
Highland Park	46,499	10	1		7		2			
Ironwood	15,739	3					1		1	
Kalamazoo	48,858	11	7						1	
Pontiac	34,273	9	5		16		3			
Port Huron	25,944	3			30					
Sault Ste. Marie	12,096	2					2			
Minnesota:										
Duluth	98,917	17			4				2	
Faribault	11,089	5			2					2
Hibbing	15,089	2	1				4			
Minneapolis	380,582	56	8		19		14		25	5
Rochester	13,722	17								
St. Cloud	15,873						2			
St. Paul	234,595	43	11		38		4		10	5
Winona	19,143	1			5					
Missouri:										
Cape Girardeau	10,252				2					
Independence	11,686	1								1
Kansas City	324,410	94	3	3	10		3		7	9
St. Joseph	77,939	33	1		1		1			2
St. Louis	772,897	162	17		7		3		34	13
Springfield	39,631	14								
Montana:										
Billings	15,100	2								
Great Falls	24,121	4								1
Missoula	12,668	7								
Nebraska:										
Lincoln	54,934	11			1					
Omaha	191,601	45	3		5		1			4
Nevada:										
Reno	12,016	4								
New Hampshire:										
Berlin	16,104	7								
Concord	22,167	10			7					
Dover	13,029	2								
Keene	11,210	4			4		1		3	
New Jersey:										
Asbury Park	12,400	4					1			
Atlantic City	50,682	10			4		1			
Bayonne	76,754		3		4				1	
Belleville	15,660				2					
Bloomfield	22,019	1			2		1			
Clifton	26,470		3		3		1			
East Orange	50,710		1		5		1		2	
Englewood	11,627	2			2					
Garfield	19,381	1			1					
Hackensack	17,667	7			6					
Harrison	15,721				3					
Jersey City	297,864		21		5		10		19	
Kearny	26,724	5			2		3			
Montclair	28,810	2			6					
Morristown	12,548	3	1		6				1	

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

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

City.	Population Jan. 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
New Jersey—Continued.										
Newark	414,216	77	6	.....	91	2	16	.....	20	10
Orange	33,268	6	1	.....	.....	.....	2	.....	2	1
Passaic	63,824	6	1	.....	28	.....	.....	.....	2	2
Paterson	135,866	.....	5	.....	19	.....	5	.....	19	.....
Perth Amboy	41,707	2	2	.....	6	.....	3	.....	2	.....
Phillipsburg	16,923	4	.....	.....	.....	.....	.....	.....	1	1
Plainfield	27,700	10	.....	.....	23	.....	.....	.....	.....	.....
Rahway	11,042	1	.....	.....	.....	.....	.....	.....	.....	.....
Summit	10,174	3	.....	.....	3	.....	.....	.....	1	1
Trenton	119,289	33	6	2	31	.....	.....	.....	10	2
Union	20,551	.....	.....	.....	.....	.....	1	.....	2	.....
West Hoboken	40,068	4	2	.....	.....	.....	.....	.....	2	3
West New York	29,926	3	3	.....	3	.....	.....	.....	.....	.....
West Orange	15,573	1	.....	.....	.....	.....	1	.....	.....	1
New Mexico:										
Albuquerque	15,157	4	4	.....	.....	.....	2	.....	4	2
New York:										
Albany	113,344	.....	3	.....	.....	.....	1	.....	8	.....
Auburn	36,192	3	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo	506,775	116	11	1	5	.....	17	.....	21	11
Cohoes	22,987	6	2	.....	.....	.....	.....	.....	.....	.....
Elmira	45,305	8	.....	.....	4	.....	.....	.....	2	.....
Geneva	14,648	4	.....	.....	.....	.....	.....	.....	.....	.....
Hornell	15,025	.....	.....	.....	12	.....	.....	.....	.....	.....
Hudson	11,745	6	1	.....	1	.....	.....	.....	.....	.....
Ithaca	17,004	5	.....	.....	.....	.....	.....	.....	1	.....
Lackawanna	17,918	1	1	.....	.....	.....	.....	.....	.....	1
Little Falls	13,029	1	.....	.....	.....	.....	.....	.....	.....	.....
Lockport	21,308	4	.....	.....	1	.....	2	.....	.....	.....
Newburgh	30,366	5	.....	.....	44	.....	1	.....	.....	.....
New York	5,621,151	1,079	212	11	412	12	88	3	[1] 263	[1] 97
Ogdensburg	14,609	4	.....	.....	.....	.....	.....	.....	.....	.....
Olean	20,506	4	.....	.....	.....	.....	.....	.....	.....	.....
Peekskill	15,868	3	.....	.....	3	.....	.....	.....	.....	.....
Plattsburg	10,909	5	.....	.....	.....	.....	.....	.....	.....	2
Poughkeepsie	35,000	14	1	.....	3	.....	.....	.....	1	.....
Rochester	295,750	60	4	.....	70	6	2	.....	13	3
Rome	26,341	6	.....	.....	.....	.....	2	.....	.....	.....
Saratoga Springs	13,181	4	.....	.....	.....	.....	.....	.....	1	.....
Schenectady	88,723	8	.....	.....	.....	.....	2	.....	6	.....
Syracuse	171,717	37	6	.....	3	.....	8	.....	6	1
Troy	72,013	27	3	.....	4	.....	.....	.....	4	2
Watertown	31,285	7	.....	.....	3	.....	1	.....	.....	.....
White Plains	21,031	6	.....	.....	.....	.....	.....	.....	.....	.....
Yonkers	100,226	19	.....	1	15	.....	6	.....	.....	2
North Carolina:										
Charlotte	46,338	18	2	.....	.....	.....	.....	.....	3	1
Durham	21,719	8	.....	.....	.....	.....	.....	.....	.....	1
Rocky Mount	12,742	5	.....	.....	.....	.....	.....	.....	.....	.....
Salisbury	13,884	6	.....	.....	.....	.....	.....	.....	.....	.....
Wilmington	33,372	11	.....	.....	.....	.....	.....	.....	1	1
Winston-Salem	48,395	16	.....	.....	.....	.....	.....	.....	3	.....
North Dakota:										
Fargo	21,961	0	1	.....	.....	.....	.....	.....	.....	.....
Ohio:										
Akron	208,435	20	3	.....	10	.....	1	.....	.....	.....
Alliance	21,603	2	.....	.....	2	.....	.....	.....	.....	1
Ashtabula	22,082	1	.....	.....	.....	.....	.....	.....	.....	.....
Barberton	18,811	2	.....	.....	.....	.....	.....	.....	.....	1
Bucyrus	10,425	5	.....	.....	.....	.....	.....	.....	.....	.....
Cambridge	13,104	6	1	.....	.....	.....	.....	.....	1	.....
Canton	87,091	12	4	.....	3	1	1	.....	1	.....
Chillicothe	15,831	3	.....	.....	.....	.....	.....	.....	.....	.....
Cincinnati	401,247	97	9	1	11	.....	4	.....	23	9
Cleveland	796,836	145	21	2	168	3	31	.....	51	22
Cleveland Heights	15,236	.....	.....	.....	8	.....	1	.....	.....	.....
Columbus	237,031	59	.....	.....	34	.....	2	.....	6	7
Dayton	152,559	33	.....	.....	4	.....	1	.....	1	.....
East Cleveland	27,292	2	.....	.....	4	.....	1	.....	.....	.....
East Youngstown	11,237	1	.....	.....	.....	.....	.....	.....	.....	.....
Findlay	17,021	4	.....	.....	.....	.....	.....	.....	.....	.....

[1] Pulmonary tuberculosis only.

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

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

City.	Population Jan. 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Ohio—Continued.										
Fremont	12,468								1	
Ironton	14,007	3								2
Kenmore	12,683				1				1	
Lancaster	14,706	3	1						1	
Lorain	37,295				1		3			
Mansfield	27,824	4	1		1					1
Martins Ferry	11,634	2					1			
Middletown	23,594	2							28	
Newark	26,718	6			3		1			
Niles	13,080	1	2							
Norwood	24,966	1								
Piqua	15,044	1								
Salem	10,305	2			40					
Sandusky	22,897	8			1		1		1	
Springfield	60,840	20			4	1				2
Steubenville	28,508	6							1	
Tiffin	14,375	3								
Toledo	243,109	41	20	1	108		6		15	8
Youngstown	132,358		1		22	1	2	1		1
Zanesville	29,569	8	1							1
Oklahoma:										
Oklahoma	91,258	22	1				2		2	2
Tulsa	72,075				2		1			
Oregon:										
Portland	258,288	45	4	1	2		3		5	2
Pennsylvania:										
Altoona	60,331		1		6					
Beaver Falls	12,802		1		2					
Bethlehem	50,358				2					
Bristol	10,273				1					
Canonsburg	10,632				2				2	
Carlisle	10,916				6					
Carnegie	11,516				1					
Chambersburg	13,171				1					
Chester	58,030				15		1		2	
Duquesne	19,011				1					
Easton	33,813				2				1	
Harrisburg	75,917				12					
Hazleton	32,277				1					
Homestead	20,452				1					
Jeannette	10,627				1					
Johnstown	67,327				1					
McKees Rocks	16,713		4							
North Braddock	14,928				3					
Old Forge	12,237								2	
Olyphant	10,236								1	
Philadelphia	1,823,158	383	42	8	246	2	39	3	78	41
Pittsburgh	588,193		21		213		16		14	
Plymouth	16,500		1							
Pottsville	21,876		1							
Punxsutawney	10,311								1	
Reading	107,784				2					
Scranton	137,783		2		8					
Shamokin	21,204				1					
Sharon	21,747				3					
Steelton	13,428						1		1	
Sunbury	15,721				1					
Swissvale	10,908		1		6		1			
Uniontown	15,692				2					
Washington	21,480		1							
Wilkes-Barre	73,833		2		4		1		2	
Wilkinsburg	24,403		1		20					
York	47,512		1							
Rhode Island:										
Cranston	29,407	7								
Newport	30,255	5								
Pawtucket	64,248	18								
Providence	237,595	51	3		2		1		1	3
South Carolina:										
Charleston	67,957	14								2
Columbia	37,524								3	
Greenville	23,127	5							2	

CITY REPORTS FOR WEEK ENDED JULY 1, 1922—Continued.

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

City.	Population Jan. 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
South Dakota:										
Sioux Falls	25,176	7					1			
Tennessee:										
Chattanooga	57,895		1				1			
Knoxville	77,818				6				3	3
Memphis	162,351	52	8				1		8	4
Nashville	118,342	47					1		3	1
Texas:										
Beaumont	40,422	17								2
Corpus Christi	10,522	4	1							1
Dallas	158,976	41	6	1	20		3			6
El Paso	77,543	22					1			5
Fort Worth	106,482	22	1		2		3		3	1
Galveston	44,255	8					1			
Houston	138,076	34	3				2			
Waco	38,500	6								3
Utah:										
Provo	10,303	2								
Salt Lake City	118,110	37	1				1		2	2
Vermont:										
Barre	10,008		2							
Burlington	22,779	11								1
Rutland	14,954	5								
Virginia:										
Alexandria	18,060	2	1		1					
Norfolk	115,777								5	1
Petersburg	31,002	15							4	
Portsmouth	54,387	15								1
Richmond	171,667	58	3		9		1		5	2
Roanoke	50,842	12	3							2
Washington:										
Everett	27,644				2					
Seattle	315,652		7		2		4		5	
Spokane	104,437		4				5			
Tacoma	96,965		3				1			
West Virginia:										
Bluefield	15,282	9								
Charleston	39,608	22	3							1
Clarksburg	27,869	12	1							
Huntington	50,177	25	1				1			3
Moundsville	10,669	4					1			
Wheeling	54,322	16			1		4		12	2
Wisconsin:										
Appleton	19,561		1						1	
Beloit	21,284	4			1				2	
Eau Claire	20,880		1							
Fond du Lac	23,427	7								
Green Bay	31,017		2							
Janesville	18,293	8								
Kenosha	40,472	10			1		1			
La Crosse	30,363						1			
Manitowoc	17,563								1	
Marinette	13,610								1	
Milwaukee	457,147		9		48		9		10	
Oshkosh	33,162	4	1							1
Racine	58,593	6	1				1		2	
Sheboygan	30,955								1	
Stevens Point	11,371						2			
Superior	39,624	9					1			1
Waukesha	12,558						2			
Wyoming:										
Cheyenne	13,829	2			1					

FOREIGN AND INSULAR.

SMALLPOX ON VESSEL.

Steamship "Shelley"—From Hongkong—At Thursday Island Quarantine.

On April 19, 1922, a case of confluent hemorrhagic smallpox developed at sea on board the steamship *Shelley*, which left Hongkong April 17, 1922, direct for Thursday Island Quarantine, Australia. The case occurred in a member of the crew of the vessel. The *Shelley* arrived at Thursday Island April 28, and on April 30 proceeded in quarantine to Sydney.

TYPHUS FEVER FROM VESSEL.

Steamship "Smolensk"—From Danzig—At Southampton, England.

A fatal case of typhus fever occurred June 14, 1922, in a Polish transmigrant at the embarkation detention camp at Southampton, England, arriving on the steamship *Smolensk* from Danzig. The patient was a seven-year-old child belonging to a family originating in a small Polish town, and having left Warsaw, Poland, May 26, 1922. The *Smolensk* left Danzig May 30, 1922.[1]

GREECE.

Plague—Patras.

The occurrence of three fatal cases of plague has been reported at Patras, Greece, for the three weeks ended May 14, 1922.

JAVA.

Epidemic Plague—Soerakarta.

Epidemic plague was reported present May 20, 1922, in the residency of Soerakarta, Java. The occurrence was in the subdistrict of Keporen, district of Klaten.

MADAGASCAR.

Plague—Province of Tananarive.

A death from plague occurred May 4, 1922, at Ankestrina, a native village in the Province of Tananarive, Island of Madagascar. Several cases of illness among natives were observed beginning about

[1] Case previously reported at Southampton, Public Health Reports, June 30, 1922, p. 1607.

April 27. The locality was declared plague-infected May 6, 1922, but data as to the number of cases and fatalities have not been received.

MEXICO.

Plague-Infected Rodent—Vera Cruz.

A plague-infected rodent (rat) was reported found at Vera Cruz, Mexico, June 30, 1922.

PERU.

Plague—May 1-15, 1922.

During the period May 1 to 15, 1922, 36 cases of plague with 19 deaths were reported in Peru.

POLAND.

Cholera—Rowno.

Under date of June 18, 1922, cholera was reported present at Rowno, Poland, occurring among persons repatriated from Russia.

UNION OF SOUTH AFRICA.

Plague-Infected Wild Rodent—Orange Free State.

During the week ended May 20, 1922, a plague-infected wild rodent was reported found near Rendezvous railway station, Orange Free State.[1]

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER.

Reports Received During Week Ended July 21, 1922.[a]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy	May 26-June 3		2	
India:				
Madras	May 28-June 3	1		
Rangoon	May 7-20	10	9	
Poland:				
Rowno	June 18			Among persons repatriated from Russia.

PLAGUE.

Asia Minor:				
Smyrna	June 4-10	1	1	
Brazil:				
Pernambuco	May 7-13	1		
Ceylon:				
Colombo	May 21-27	2	2	
China:				
Amoy	May 26-June 3		10	
Canton	May 1-31	21	17	
Ecuador:				
Guayaquil	June 1-15			Rats found infected, 16; examined, 3,400.

[a] From medical officers of the Public Health Service, American consuls, and other sources.

The reports contained in the following tables must not be considered as complete or final, either as regards the list of countries included or the figures for the particular countries for which reports are given.

[1] Public Health Reports, May 5, 1922, p. 1107, and June 30, 1922, p. 1608.

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

Reports Received During Week Ended July 21, 1922—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Greece:				
Patras	Apr. 24–May 14		3	
India				May 7–13, 1922: Cases, 848; deaths, 632.
Bombay	Apr. 30–May 13	68	48	
Madras Presidency	May 28–June 3	9	3	
Rangoon	May 6–20	56	53	
Java:				
Soerakarta—				
Keporen	May 20			Epidemic.
Madagascar:				
Tananarive Province—				
Ankestrina	May 4		1	Native village; disease stated to have been present since about Apr. 27, 1922.
Mexico:				
Vera Cruz	June 30			One plague-infected rat.
Peru				May 1–15, 1922: Cases, 36; deaths, 19.
Union of South Africa:				
Orange Free State	May 14–20			Plague-infected wild rodent found near Rendezvous railway station.

SMALLPOX.

Arabia:				
Aden	June 4–10	14	4	
Bolivia:				
La Paz	Mar. 1–Apr. 30	97	16	
Brazil:				
Rio de Janeiro	May 21–June 3	20	5	
Canada:				
Alberta—				
Calgary	June 18–24	1		
Ontario—				
Ottawa	June 24–30	6		
Toronto	June 25–July 1	5		
Chile				May 30–June 5, 1922: Prevalent throughout the southern Provinces.
Concepcion	May 30–June 5		3	
Quillon	do			Epidemic.
China:				
Antung	May 29–June 4	2		
Chungking	May 28–June 3			Present.
Hongkong	May 21–June 3	16	11	
Manchuria—				
Harbin	May 22–28	1		
Chosen (Korea):				
Chemulpo	May 1–31	1		
Fusan	do	118	53	
Seoul	do	15	2	
Cuba:				
Cienfuegos	June 24–July 1	1		
Dominican Republic:				
San Pedro de Macoris	June 11–17	39	1	
Santo Domingo	June 18–24	2	3	And vicinity.
France:				
Paris	June 1–10	1	1	
Great Britain:				
Sheffield	June 11–17	1		
Southampton	June 18–24	2		
India:				
Karachi	May 28–June 3	11		
Madras	do	48	16	
Rangoon	May 7–13	21	4	
Mexico:				
Chihuahua	June 22–July 2		1	
Guadalajara	May 1–31	7		
Peru				May 1–15, 1922: Cases, 5; deaths 4.
Portugal:				
Lisbon	June 4–10	17		
Syria:				
Aleppo	June 11–17			Present.
Switzerland:				
Zurich	June 11–17	5		
Turkey:				
Constantinople	June 4–17	11	4	

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

Reports Received During Week Ended July 21, 1922—Continued.

SMALLPOX—Continued.

Place	Date.	Cases.	Deaths.	Remarks.
Union of South Africa:				
Cape Province	May 21-27			Outbreaks.
Orange Free State	do			Do.
Southern Rhodesia	May 25-31	8		
Transvaal	May 14-20			Do.
Yugoslavia				Sept. 4-24, 1921: Cases, 11; deaths, 4.
Serbia—				
Belgrade	June 11-17	1		
On vessel:				
S. S. Shelley	Apr. 19	1		At sea en route from Hongkong. Vessel left Hongkong Apr. 17. Arrived Thursday Island Quarantine, Australia, Apr. 28, 1922. Case, member of crew; type, confluent hemorrhagic.

TYPHUS FEVER.

Algeria:				
Oran	June 11-20	2		
Asia Minor:				
Smyrna	June 4-10	3		District.
Austria:				
Vienna	May 21-27	1		
Bolivia:				
La Paz	Mar. 1-Apr. 30	15	8	
Bulgaria:				
Sofia	June 11-17	2		
Egypt:				
Alexandria	June 11-17	3	1	
Germany:				
Königsberg	May 28-June 3	1		
Turkey:				
Constantinople	June 11-17	3		
Union of South Africa:				
Cape Province	May 14-20			Outbreaks.
Transvaal	May 14-27			Do.
Yugoslavia:				
Croatia-Slavonia	Sept. 4-10	1		Year 1921.
From vessel:				
S. S. Smolensk	June 14	1	1	From Danzig, May 30, 1922. At embarkation detention camp, Southampton, England. Public Health Reports, June 30, 1922, p. 1610.

Reports Received from July 1 to 14, 1922.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy	May 14-20	1		
Greece:				
Athens	June 29	1	1	
Saloniki	June 7-17	30	11	At quarantine station, among passengers from vessel carrying Russian refugees.
India:				
Bombay	Apr. 23-29	1	1	
Calcutta	Apr. 23-May 20	380	259	
Madras	May 21-27	1		
Philippine Islands:				
Province—				
Camarines Sur	Mar. 25-Apr. 1	1	1	
Siam:				
Bangkok	Apr. 30-May 13	4	3	
Syria:				
Aleppo	May 27-June 3			A few cases in interior.

[1] From medical officers of the Public Health Service, American consuls, and other sources. For reports received from Dec. 31, 1921, to June 30, 1922, see Public Health Reports for June 30, 1922. The tables of epidemic diseases are terminated semiannually and new tables begun.

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

Reports Received from July 1 to 14, 1922—Continued.

PLAGUE.

Place.	Date.	Cases.	Deaths.	Remarks.
Asia Minor:				
Smyrna	May 28-June 3	1		
Ceylon:				
Colombo	May 6-20	2	1	
China:				
Amoy	May 7-20		22	May 20: From 10 to 20 deaths reported daily.
Foochow	May 7-13	4	4	
Egypt				Jan. 1-June 3, 1922: Cases, 185; deaths, 84.
City—				
Alexandria	June 1-6	12	3	
Suez	May 24-June 5	3	2	
Province—				
Assiout	May 30	1	1	Septicemic.
Benisouef	May 26-June 7	3	1	
Fayoum	June 3-6	4	2	
Gharbieh	May 26-June 7	18	7	
Minieh	June 2-7	2	2	
India				Apr. 23-May 6, 1922: Cases, 2,892; deaths, 2,140.
Bombay	Apr. 23-29	42	28	
Calcutta	Apr. 23-May 20	41	39	
Karachi	May 23-29	39	36	
Madras Presidency	May 21-27	1		
Java				Month of April, 1922: Report of the seven provinces of Java: Cases, 413; deaths, 495.
East Java—				
Soerabaya	May 7-13	2	2	
Mesopotamia:				
Bagdad	Apr. 1-30	68	40	
Siam:				
Bangkok	Apr. 30-May 13	1	1	
Straits Settlements:				
Singapore	Apr. 30-May 29	6	7	
Union of South Africa:				
Orange Free State—				
Grootkom Farm	May 7-13			One dead plague-infected rodent found. Locality adjoins Trucart's Berg Farm, on which plague-infected mouse was found preceding week.

SMALLPOX.

Asia Minor:				
Smyrna	May 14-20	2		
Arabia:				
Aden	May 7-June 3	20	8	
Brazil:				
Para	May 29-June 18	6		
Rio de Janeiro	May 14-20	11	2	
Sao Paulo	Apr. 10-23	2		
British East Africa:				
Kenya Colony—				
Dar es Salaam	Apr. 16-May 22	12		
Zanzibar	May 1-31	26	6	
Canada:				
Manitoba—				
Winnipeg	May 6-June 17	3		
New Brunswick—				
Madawaska County	June 4-17	6		
Ontario—				
North Bay	June 3-17	2		
Ottawa	June 10-17	11		
Toronto	June 18-24	2		
Ceylon:				
Colombo	May 14-20	1		
Chile:				
Concepcion	Mar. 14-May 29		59	
Quillon				In Concepcion Province; epidemic in May, 1922, with 60 reported cases.
San Patricio	May 16-22	13		
Talcahuano	do			Present.
Temuco				Province of Cautin; epidemic, May, 1922.

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

Reports Received from July 1 to 14, 1922—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy	May 7–20			Present.
Foochow	May 14–20	1		
Hongkong	do	10	9	
Manchuria—				
Dairen	May 15–21	1	1	
Nanking	May 7–June 3			Do.
Shanghai	May 22–28	1		Native.
Tientsin	May 14–20			Present.
Tsingtau	May 9–15	1	1	
Cuba:				
Antilla	June 18–24	1		Reported for Preston.
Dominican Republic:				
San Pedro de Macoris	June 4–10	43		City and country.
Santo Domingo	do	1	6	Present with a few cases in city and country; no mortality, June 11–17, 1922.
Egypt:				
Port Said	June 11–17	1		
Fiume	June 13–19	1		
Great Britain:				
Sheffield	May 28–June 10	4		
Greece:				
Saloniki	May 1–21	3		
Syra Island	May 26	12	5	
India:				
Bombay	Apr. 23–29	4	2	
Calcutta	Apr. 23–May 20	45	37	
Karachi	May 23–29	14	4	
Madras	May 14–20	43	18	
Java:				
West Java—				
Batavia	Apr. 28–May 18	8		City and Province.
Malta	May 16–31	1		
Mesopotamia:				
Bagdad	Apr. 1–30	3	1	
Mexico:				
Manzanillo	June 6–25		4	Estimated cases, 4 to 10.
Mexico City	May 21–June 3	62		Including municipalities in Federal District.
Spain:				
Corunna	June 11–17	1		
Seville	do	36		Week ended June 11; many new cases.
Valencia	May 21–27	2	1	
Straits Settlements:				
Singapore	Apr. 30–May 29	10	2	
Switzerland:				
Basel	May 28–June 3	1		
Berne	May 14–20	1		
Zurich	June 4–10	1		Apr. 23–29: One case.
Syria:				
Aleppo	June 4–10			Present.
Turkey:				
Constantinople	May 21–June 3	9	1	
Union of South Africa:				
Cape Province	May 7–13			Outbreaks.
Orange Free State	do			Do.
Southern Rhodesia	May 11–24	46	1	
Transvaal	May 7–13			Do.
Virgin Islands:				
St. Thomas	June 5–18	1	1	At quarantine. From vessel from Dominican Republic.
On vessel:				
Schr. Fancy Me	May 28			At St. Thomas, Virgin Islands. From San Pedro de Macoris, Dominican Republic. One case removed to quarantine June 5; died, June 18.

TYPHUS FEVER.

Algeria:				
Algiers	May 1–31	16	4	
Oran	June 1–10		1	
Asia Minor:				
Smyrna	May 14–June 3	3		

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

Reports Received from July 1 to 14, 1922—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Austria:				
Vienna	May 7–13	1		
Bulgaria:				
Sofia	May 28–June 10	2		
Chile:				
Concepcion	Apr. 11–May 29		10	
China:				
Antung	May 15–21	1		
Foochow	May 14–20	1		
Manchuria—				
Harbin	May 8–21	3		
Egypt:				
Alexandria	June 4–10	1		
Cairo	Mar. 19–Apr. 8	14	10	Relapsing fever, Mar. 26–Apr. 8, 1 case.
Port Said	May 28–June 3	1		
Germany				May 1–6, 1922: five cases typhus fever at quarantine station of Osternothafen, in persons returning from Russia.
Berlin	Apr. 30–May 6		1	
Greece:				
Saloniki	May 1–28	23	1	
Mesopotamia:				
Bagdad	Apr. 1–30	1		
Mexico:				
Mexico City	Apr. 23–June 3	85		Including municipalities in Federal District.
Poland				Mar. 16–Apr. 29, 1922: Cases 7,155. Recurrent typhus, cases, 5,432.
Warsaw	Apr. 23–May 20	80		Among permanent and transient residents.
Portugal:				
Oporto	May 4–10	2	1	
Rumania:				
Province—				
Bucovina	Jan. 1–31	35	13	
Chisinau	Apr. 1–30	14		Recurrent typhus: Cases, 7.
Transylvania	Jan. 1–31	16	3	
Russia:				
Esthonia	Apr. 1–30	15		
Lettonia	do	275		Recurrent typhus: Cases, 12.
Spain:				
Seville	May 21–June 3		1	
Tunis:				
Tunis	June 4–10	2		
Turkey:				
Constantinople	May 21–June 3	9		
Union of South Africa:				
Cape Province	May 7–13			Outbreaks.
Natal	do			Do.
Transvaal	do			Do.
Yugoslavia				Aug. 7–13, 1921: 2 new cases.
Bosnia-Herzegovina	Aug. 7–13	1		
Voivodina	do	1		