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STUDIES ON TRICHINOSIS

IV. The Role of the Garbage-Fed Hog in the Production of Human Trichinosis

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Previous papers in this series of studies[1] on trichinosis have summarized evidence indicating a high incidence of trichinae, approximately 12.5 percent, in 1,778 cadavers examined for trichinae at various places in the United States, and have noted that this high incidence warrants extensive consideration of the problem of trichinosis in this country. In any consideration of human trichinosis, it is essential that all factors contributing to the production of this disease be considered. The eating of pork is admittedly the customary source of human trichinosis, but this thesis needs elaboration as regards pork and population groups.

On the one hand, pork must be considered with reference to the swine which produce it, and the procedures, such as cooking, freezing, packing-house processes, meat inspection, etc., to which it may or may not be subjected. On the other hand, population groups must be considered to ascertain the groups which are exposed to the eating of pork having a high incidence of trichina, or groups which indulge most generally in the eating of pork not adequately cooked or otherwise processed to kill trichinae which may be present. A systematic consideration of pork and population groups, in relation to trichinosis, is needed in order that some clear, definite, and adequate control program may be developed in lieu of the present program, which is quite evidently not controlling trichinosis or even visibly gaining ground against it.

This control program, at present, is limited mostly to processing, under Federal supervision, those pork products, mostly dry or summer sausage, customarily eaten without cooking by the consumer (fig. 1, *a*), and to issuing to the public warnings to cook pork well (fig. 1, *b*). Unfortunately, almost one-third of our meat supply comes from houses not under Federal inspection or an equivalent inspection; and, as sold or as served in public eating places, uninspected pork products are shuffled, indistinguishably, with inspected products, some places selling or serving inspected, and others uninspected, products,

[1] Public Health Reports for Apr. 16, 1937, p. 468, Apr. 23, p. 512, and Apr. 30, p. 539.

thereby nullifying, to a great extent, the benefits from inspection and processing. It is quite evident that the warnings to cook pork well are being disregarded to a very great extent, and a consideration of groups found to have a high incidence of trichina infestation shows that ordinary newspaper warnings would be of practically no value at all so far as reaching these groups is concerned.

In general, food habits are highly individual and so very variable that one may assume, at this time, and in the light of available evidence, that human trichinosis in geographic and other population groups would usually be more definitely correlated with the incidence of trichinae in the swine from which the pork consumed by them is produced than with the food habits of the groups, except for such cases as those of the mentally deranged under prolonged hospitalization, in which the food habits are determined by the hospital management rather than by the individual. This correlation between porcine trichinosis and human trichinosis in geographic areas has been advanced by Hall and Collins (1937) as an explanation for the variations in the published findings in incidence studies in various parts of the United States.

The role of the garbage-fed hog in the production of human trichinosis is considered in the present paper. The importance of the garbage-fed hog in this connection was pointed out by Mark (1889) almost half a century ago, on the basis of studies conducted at Boston and vicinity. Mark reported that in 1881 he examined 500 hogs from Chicago, representing Middle Western swine of unknown origin, and hence a mixture of some grain-fed hogs and some hogs fed on swill and similar feed, and found trichinae in 2 percent of these. A subsequent study, from 1883 to 1888, of 3,064 hogs, almost all of which were raised near Boston and fed on offal, garbage, and slops containing table scraps, showed that 391, or 12.86 percent, had trichinae. Of 234 garbage-fed hogs from State institutions, 42, or 17.95 percent, had trichinae. These high percentages, approximately 13 to 18 percent, were obtained on microscopic examination of approximately only 1 grain of diaphragm muscle. Hall and Collins (1937) report 19 human cases found on microscopic examination in which there was less than 1 trichina per grain, i. e., less than 15 per gram, a gram being the amount of muscle examined by Hall and Collins; and these 19 cases represent over 70 percent of the 27 cases found by microscopic examination. It is evident that the high incidence found by Mark on examination of 1 grain of muscle was well below the true incidence, and that the examination of 1 gram of muscle would have raised his percentage very definitely. It seems probable that an incidence between 25 and 50 percent would be a conservative estimate.

Mark discussed the relative importance of pork scraps in garbage, as compared with the importance of rats, as a source of trichinae in

swine, and concluded that pork scraps are the important source. He noted that nowhere in the world have swine been found to have so high an incidence of trichinae as he found in the vicinity of Boston, and stated that conditions there for swine acquiring trichinae from rats did not appear to be more favorable than in European cities. He noted, also, the scarcity of observations of swine eating rats. On the other hand, the practice of feeding swine on offal from slaughtered swine, with its content of muscle in attached diaphragm and other parts, and the practice of feeding garbage with its content of uncooked pork scraps, accounted, in his opinion, for the high prevalence of trichinae in swine around Boston, especially in view of the high percentage of infested swine constituting the source of these pork scraps.

Soon after Mark's paper was published, Calvin (1890), in a study made in Iowa, reported that hogs fed on offal at slaughterhouses showed a high incidence of trichinae, about 1 in every 10 to 12 hogs being infested; that hogs kept in town by private families and fed in small pens also showed a high incidence of trichinae; and that hogs fed on corn and fattened in the open fields on farms were almost entirely free from trichinae, an examination of 300 swine from one place showing no trichinae. Calvin noted that rats abound in hog pens but not in fields, and was inclined to regard them as of major importance. However, he ignored the parallel fact that garbage is fed to hogs in hog pens and not to hogs in fields, and failed to bridge the gap in his argument by showing that swine actually eat rats to any notable extent.

In the United States, microscopic inspection of export pork for trichinae was begun in 1891. The figures for the 8 years from 1898 to 1906, during which American pork for export to certain countries, especially Germany, was thus inspected, show that in over 8,000,000 hogs the incidence of live trichinae, which trichinae are the ones of importance as capable of transmitting trichinosis to man, was 1.41 percent. This pork was prepared for export at only a relatively few large plants, and in March 1900 there were only 39 packing houses with microscopic inspection out of a total of 156 houses under Federal inspection. These houses were all in 14 cities, and these cities were located as follows: 3 in Iowa, 2 in Illinois, 2 in Ohio, and 1 each in Nebraska, Kansas, Missouri, Indiana, Wisconsin, New York, and Massachusetts. Obviously the reported incidence of trichinae is, in general, that in swine from the Middle West, largely grain-fed animals. The incidence of live trichinae for these swine is approximately that recently reported by Hall (1935) and Schwartz (1936) for grain-fed hogs at the present time. The reports of Hall and Schwartz cover studies in the Federal Bureau of Animal Industry in recent years, Hall (1935) reporting an incidence of 1.5 percent of live trichinae in grain-fed hogs, and 4.8 percent in garbage-fed hogs, and Schwartz

(1936) reporting approximately 1 percent incidence in grain-fed hogs, and approximately 5 percent in garbage-fed hogs, the incidence being based on an examination of thousands of hogs. Since garbage-fed hogs have live trichinae apparently between three and five times as commonly as do grain-fed hogs, and since, therefore, the pork from these garbage-fed hogs is apparently three to five times as dangerous as that from grain-fed hogs as an agency for transmitting human trichinosis, the garbage-fed hog evidently presents a special problem in the general problem of trichinosis.

Garbage-fed swine could become infected with trichinae by eating trichinous rats, as Calvin (1890) and others, previously and since, have suggested, or by eating uncooked trichinous pork scraps in garbage, ignoring at this time the rare cases of swine eating the carcasses of dead swine in fields or pens. There has been much debate as to the relative importance of rats and pork scraps in the production of porcine trichinosis; but the evidence seems very definitely to favor the idea that pork scraps in garbage, table scraps, swill, and slops are the important source. So far as rats are concerned, they are quite common around garbage-feeding plants, as well as around dirty hog pens, and often show a high incidence of trichinae; but, in the experience of the writer and many others, the rats and swine appear to live together, as a rule, on friendly terms. The writer has yet to see a hog eat a rat, and those persons with whom he has discussed the matter, some of them with long experience, up to 24 years, around garbage-feeding plants, have either never seen hogs eat rats or have seen them do so very rarely. Mark (1889), who investigated trichinosis in garbage-fed hogs over a period of 5 years, has stated, likewise, that swine raisers rarely or never know of swine eating rats. Presumably, swine on a feed containing very little protein might occasionally kill and eat rats, manifesting what might be regarded as a form of pica following dietary deficiencies, or rats may be killed and fed to swine, a thing which does happen and which might condition swine to the eating of rats; but one may summarize the present evidence as indicating that although the eating of rats by swine does occur, it is a relatively rare occurrence. Rats perpetuate rodent trichinosis to some extent by cannibalism, a common thing, and to some extent by eating pork scraps in table scraps and garbage; but this form of trichinosis probably operates, for the most part, as a closed circle of rat trichinosis (fig. 1, (1)) lying outside the circle of a porcine trichinosis (fig. 1, (2)) perpetuated primarily by swine eating pork scraps from trichinous swine, and outside the field of human trichinosis (fig. 1, (3)) in which the circle of events is never completed and trichinae coming to rest in human beings can no longer get back to a cycle in new hosts (fig. 1). The idea that rats are important in producing porcine trichinosis is not substantiated by data, observational or experimental,

showing that swine eat rats to any extent that would account for the known incidence of trichinae in swine, and this gap must be bridged before a preponderant connection between rodent trichinosis and swine trichinosis derived from rodents can be established. Billings (1880) reported that, at the Knacker's yard on Spectacle Island, Mass., he found trichinae in 39, or 76.5 percent, of 51 rats, whereas he found no trichinae in 28 swine kept at the same place and fed on grain and cooked meat.

On the other hand, the common occurrence of pork scraps, including those not so cooked or processed as to kill trichinae, in garbage and swill, and the eating of such scraps by large numbers of swine, are well-established facts. Americans throw into the garbage much more food than is thrown away by other nations, and as they rank about fifth in amount of meat per capita purchased, the discarded food includes a great deal of meat. This is especially true of so-called hotel garbage, which is definitely high in discarded meat, although the less valuable alley garbage, the household garbage, contains more meat in the United States than it does in other countries.

It is the testimony of the field veterinarians of the Federal Bureau of Animal Industry that pork scraps are usually present in garbage and swill. The veterinary field force engaged in hog-cholera control has paid special attention to this subject for many years in tracing outbreaks of hog cholera; and in the State of Maryland, where this subject was given particular investigation by Dr. I. K. Atherton and his field force, approximately 80 percent of outbreaks of hog cholera were traced to garbage containing uncooked pork scraps. The extent of garbage feeding varies locally in accordance with the amount and kind of feed available, and over the Middle West, with plenty of grain available, there is relatively less garbage feeding than along our seaboards. It varies also with the price of pigs, and currently it appears that, with prices of pigs above 6 cents a pound, garbage feeding is profitable in Maryland, and with prices below 6 cents it is not profitable. The precise critical price would vary with different swine growers and other factors.

There are, usually, approximately thirty to forty million hogs slaughtered annually in the United States, and the scraps of pork from these millions of hogs are trimmed out in butcher shops, hotels, homes, and elsewhere for various reasons—spoilage, discoloration, etc.—and these trimmings and other discards are thrown into the garbage. Between 1 and 5 of every 100 of these discards, on an average, will contain live trichinae, and the total scraps, from almost 100,000 hogs daily, which will contain live trichinae from approximately an indicated 1,000 to 5,000 infested hogs, will run into many thousands daily. The feeding to swine of such scraps, as constituents of garbage or swill, constitutes a dependable, large-scale, year-round source of trichinae

for swine. At times the feeding of pork scraps in garbage takes the form of a case reported in the New Jersey press in 1933, in which part of the sausage responsible for 28 clinical cases of human trichinosis, with at least 1 death, was thrown into garbage cans and the garbage distributed to many hog pens. Compared with pork scraps as a regular constituent of the feed of large numbers of swine, it seems probable that rats are merely an incidental and accidental bit of food.

In view of this, the garbage-feeding industry deserves our attention. This industry has a number of dubious features. In general, garbage feeding, as usually practiced, is (1) a public health problem because garbage is a highly important source of human trichinosis; (2) a danger to domesticated animals as a source of porcine trichinosis, hog cholera, foot-and-mouth disease, and other diseases; (3) an esthetically objectionable and insanitary affair, since the large majority of garbage-feeding plants are offensive to the eyes and nose of the public, are quite generally infested with rats, and are notable breeders of flies; and (4) is often economically unsound or, at least, a relatively unprofitable enterprise.

The evident role of garbage in connection with human trichinosis has been discussed in the preceding statements. Its role in the spread of diseases of domesticated animals is common knowledge among veterinarians. It is credited with a majority in some places, and a large minority in others, of outbreaks of hog cholera, and with some part of the 10 outbreaks of foot-and-mouth disease or a somewhat similar disease in the United States. The objectionableness of most garbage-feeding plants from an esthetic point of view is known to everyone who is familiar with them, and can be ascertained by anyone who wishes to visit them. As regards some of their various features, we cite the recent testimony of two of the outstanding and highly competent veterinarians in the public service, Dr. W. J. Butler, State veterinary surgeon of Montana, and Dr. Leslie M. Hurt, county live stock inspector of the Los Angeles County Live Stock Department.

Butler (1936) stated with regard to hog cholera: "Unless in garbage-fed animals, it may be considered a negligible disease in the hog population of Montana. The feeding of garbage may appear to some people to be economically sound, and it probably is under certain restrictions and under competent veterinary observation. However, in the ordinary skip and miss fashion of feeding garbage, it is not economically sound and is an abomination from a sanitary standpoint. Practically every outbreak of hog cholera in Montana during the past 15 or 20 years has been directly traced to the feeding of contaminated garbage. We have made this statement in many previous reports. We have endeavored to have the legislature pass a law governing the feeding of garbage, but the feeding of garbage still continues. The sanitary

board has certain restrictions governing garbage feeding, but does not have the authority to prohibit the practice."

Hurt (1936) stated: "There are 34 licensed garbage-feeding hog ranches in the unincorporated areas of Los Angeles County, and 9 located either in unincorporated areas or maintained by public institutions. The total hog population on these ranches is approximately 47,000 head * * *. The nutritional value of garbage has been at a low level during the last few years. Gains which may be expected from feeding local municipal garbage vary from 27 to 35 pounds live weight of pork per ton garbage." Obviously, gains of approximately 30 pounds per ton of feed can be profitable only on the basis of feed which costs little or nothing, and garbage feeding is sometimes a subsidized industry which is paid to collect and remove garbage, and any profits that may be made by feeding the garbage to hogs merely supplement this payment. In other words, the garbage must be disposed of, and feeding it to hogs is an alternative to burning it, converting it into fertilizer, or otherwise disposing of it. On the other hand, if its objectionable features can be eliminated, garbage feeding may be regarded as a conservation measure of some importance. Thus, Mr. Lloyd Aldrich, city engineer of Los Angeles, states that Los Angeles receives almost $1 a ton for its garbage, instead of paying $1.50 a ton to incinerate it, an item of approximately $450,000 benefit to Los Angeles annually.

In 1933, the Delaware State Legislature passed a law prohibiting the deposit of garbage under any circumstances on certain water sheds, and the maintenance of insanitary conditions in piggeries was made an infringement of the State law relating to nuisances. The bringing of garbage or household refuse into the State was made permissible only after a permit had been obtained and a bond prepared, the bond being forfeitable if sanitary conditions were not maintained at the piggery. There are ample reasons for keeping both pigs and garbage off those water sheds or, at least, those parts specifically involved, from which supplies of drinking water are obtained.

From both the esthetic and sanitary points of view, it appears that swine growers in general have not given adequate consideration to cleanliness as a matter influencing the consumption of pork. Although the consumer buys his pork as he sees it at the butcher shop, it seems probable that there are, in the aggregate, many persons in the United States who do not eat pork because they have seen pigs in filthy hog pens or garbage-feeding plants, and many others who would eat more pork if all the pigs they saw were the clean, sleek, uniform lots produced by a rigid adherence to the swine-sanitation system developed by the Federal Bureau of Animal Industry and known as the McLean County Swine Sanitation System (fig. 1, *c*, *c*). In this matter the

swine industry is very definitely out of step with the times. The dairy industry has moved away from its old position in which milk producers accepted the presence of cow manure in milk as an unavoidable necessity, and were satisfied that all reasonable demands had been met when the manure was strained out. Poultry production is now, to a large extent, on the basis of clean and sanitary buildings and grounds for fowls. Abattoirs are relatively clean and sanitary, as a rule, especially those under Federal inspection. At a time when foods of all sorts, animal or vegetable, are being produced under cleanly and attractive surroundings, and marketed in a large variety of protective packages and wrappings, the swine industry is not showing the business sagacity that might be expected of an industry of such magnitude when it continues to produce swine under conditions, visible to the public eye, that justify the ancient and still current use of the term "filthy swine." Under favorable conditions, swine are as clean as other animals in general, and under the swine sanitation system they are definitely presentable and in marked contrast to their unfortunate comrades of the usual garbage-feeding plant and the dirty pigsty. Those who raise swine under the sanitation system have a legitimate grievance against any practice that implies, falsely, that swine belong in the same category as the buzzard, the carrion crow, the maggot, and the dung beetle. Swine are naturally pasture animals, and not the scavengers that man sometimes makes of them.

It appears to be only a question of time when the swine industry will have to choose between voluntarily bringing its general business procedures into line with those of the better swine breeders and producers and of food industries in general, on the basis of better business management and conformity to public taste, or being subjected to restrictive legislation and the possibility of lessened profits. Public interest requires that dangers and nuisances be abated or abolished as completely and promptly as possible, with the minimum of injury to those who may be responsible when they have acted innocently and in good faith.

Specifically, what could be done about the garbage-feeding industry in the interests of the industry and of the public? Since garbage carries pork scraps which are, apparently, the basic source of trichinosis in man and the direct source of trichinosis and hog cholera in swine, as well as a source of foot-and-mouth disease outbreaks, all garbage fed to swine could be cooked to remove these dangers (fig. 1, *d*); Canada requires the cooking of all garbage not produced on the premises where it is fed. In 1936, the total of all Canadian swine fed such garbage, 46,000, was less than the number, 47,000, given by Hurt (1936) as fed near Los Angeles. Swine can and do thrive on boiled or steam-cooked garbage of good grade, such as hotel or institutional garbage, provided such constituents as are objectionable to

swine (coffee grounds, citrus fruit rinds, etc.) are removed or are present in only relatively small amounts. However, since the use of boiling water or steam adds to the general messiness of garbage and lowers its already low content by weight of useable food, something might be done in the way of developing a dry-cooking process for garbage, perhaps along the line of the process used for desiccating cut feed for cattle or the dry rendering process of the packing plants. Industry in general depends on research for its advancement, and some of the State agricultural experiment stations or other agencies could probably carry out the research necessary to develop better methods of handling garbage, in the interest of the swine industry. Trichinae and hog-cholera virus are quickly destroyed at the temperature of boiling water, or even lower temperatures, and it should be easy to attain this amount of dry heat, especially in shredded material. Trichinae are killed at 55° C., and the Federal Bureau of Animal Industry requires a temperature of 58.33° C. (137° F.) in packing-house procedures for killing trichinae.

As regards the esthetic objections to garbage feeding, the use of dry-cooked garbage, and the more general use of concrete, ratproofing and rat trapping (fig. 1, *e*), and cleaning, with frequent inspections by competent authorities, would overcome these esthetically objectionable features. There are, in this country, clean garbage-feeding plants, and although they are very much in the minority, the clean, sanitary garbage-feeding plant is not an unattainable ideal. There is ample reason, from the standpoint of public health and public taste, for asking that our pork supply come from pigs which are protected from trichinosis and raised under cleanly and sanitary surroundings. It is desirable that these requirements be met by the industry, rather than that the public, collectively or as individuals, demand assurance that the pork it buys is not from garbage-fed swine, thus moving in the direction of the abolition of the garbage-feeding industry rather than of its reform and improvement.

As regards the feeding of garbage, table scraps, and swill, with their content of pork scraps, to swine on farms, what has been said about garbage-feeding plants applies, in some measure, to this practice. The three population groups which stand out most conspicuously in epidemics of trichinosis in the United States are Germans, Italians, and the rural group of farmers and inhabitants of villages and small towns in agricultural regions. In this rural group, the story of a hog-killing, followed, especially around the holiday season, by a big family party at which fresh pork and pork sausage are served, and the subsequent outbreak of an epidemic of trichinosis traceable to this pork and sausage, is an old and oft-repeated story. In such cases, the hog responsible for the outbreak is usually one which has been fed garbage and similar things. The remedies that should be applied on the farm

are substantially the same as for garbage-feeding plants, with the emphasis on the abolition of the dirty hog-lot and the use of the swine-sanitation system. In the case of the family with only one pig or a few pigs, to which table scraps are fed, pork scraps should be excluded from the garbage or else thoroughly cooked before being fed. Kitchen swill is a food of so little value that its danger as a source of trichinosis far outweighs its usefulness. The feeding of table scraps to chickens is a safe and profitable substitute for feeding them to swine.

The problem of the garbage-fed hog is one that deserves the attention of public health officers. It offers an opportunity for the engineer to effect fundamental improvements. It is especially within the province of the intelligent meat packers to establish requirements for sanitary conditions in the swine industry. The collaboration of physicians, veterinarians, engineers, and packers with the more progressive groups in the swine industry should lead to an early development of control measures that will begin to lower the incidence of human and porcine trichinosis in the United States.

The problem of trichinosis and its control in the United States, as it shapes up at the present moment, is about of this order:

The available evidence establishes definitely that there is a high incidence of trichina infestation in man in this country. The precise incidence varies in different States, with enough evidence to suggest that over the country as a whole between 1 person in 10 and 1 person in 20 of those over 20 years old may be infested with trichinae. No more precise figure is necessary to establish trichinosis as one of our major public health problems.

This block of human trichinosis rests on a basis of swine trichinosis, and the incidence of live trichinae in swine over the country as a whole is apparently between 1 and 2 percent. This incidence will vary, apparently, from 0 percent in swine raised under the swine-sanitation system, through a small fraction of 1 percent in Southern swine and 1.5 percent in so-called grain-fed swine, to between 4 and 5 percent in garbage-fed hogs. The incidence of 1.5 percent in so-called grain-fed swine of the Middle West is probably a component of a block of pasture-raised hogs, free or almost free from trichinae, and a block of garbage-fed hogs or hogs fed on table scraps, swill or offal, with an indicated 4 to 5 percent of these infested with live trichinae.

The status of trichinosis in these groups of swine in the United States does not appear to have changed materially in the past 50 years, except for a decline in incidence in what were probably hogs fed on offal, a group now reduced to relatively small proportions. Some relevant information on this subject is summarized by de Pietra Santa (1884). Grouping the summarized information, we have the following: Apparently pasture-raised swine—100 from Indiana, no

trichinae (Detmers; 1883). Southern swine: 4,146 southern swine, no trichinae; 241 swine from Louisville, Ky., 0.83 percent trichinous; of a total of 5,400 swine examined at New Orleans, 22, or 0.4 percent, trichinous (Deverson; 1881); 30 swine at Atlanta (stated as in Tennessee), no trichinae (Simpson; ante 1884); 180 swine at Nashville, Tenn., no trichinae (Steger; ante 1884); 330 swine at San Antonio, Tex., 0.6 percent trichinous (Meyers; ante 1884). Grain-fed swine—At Chicago, 2 percent trichinous (Atwood and Belfield; 1886); at Chicago, 3,331 swine, 80, or 2.4 percent, trichinous (Detmers; 1883). Apparently garbage-fed, offal-fed, or mixtures of these with grain-fed swine—In Dearborn County, Ind., in 1874, 16.3 percent trichinous, and between 1874 and 1884, 6.5 percent trichinous (Harding and Robbins; ante 1884); 8,773 swine at Boston, Mass., 347, or 4 percent, trichinous (Billings; 1879–81); 529 swine from St. Louis, Mo., 3.4 percent trichinous (Deverson, 1881).

Mark's (1889) incidence of 12.86 percent is specified as for swine fed on offal, among other things, and his incidence of 17.95 percent and Harding and Robbins' (ante 1884) incidences of 16.3 percent and 6.5 percent are probably for swine fed on offal. The decline in offal feeding and in the incidence of trichinae resulting from it is not due to our control measures for trichinosis, but to improvements in the swine industry and the packing industry and to the Federal meat inspection activities in developing sanitary conditions around packing plants. This improvement is our one visible achievement in the control of trichinosis.

Swine trichinosis, then, finds its roots in a swine industry which has as its component parts, so far as trichinosis is concerned, the following groups: Swine-sanitation or pasture-raised swine, southern swine, pig-pen or hog-lot swine fed table scraps, swill, and slops containing pork scraps, and garbage-fed swine. The radical solution of the trichinosis problem appears to be this: *Keep all uncooked or inadequately cooked pork of all sorts out of the feed of swine.* This is obviously a matter of either feeding no material containing pork to swine or cooking it thoroughly before feeding it.

So far as we have data available on which to formulate conclusions, there has been no evident decline in the incidence of either human or porcine trichinosis in the United States in the course of the past 40 years. Hence, it appears that our control measures have been of no value except as they may have prevented a rise in incidence, and, so far as real control is concerned, this possibility is of only academic interest and its consideration would be purely a matter of speculation.

Real control is something which must come from the swine industry itself. If that industry were well organized on a Nation-wide basis, the problem might well be put up to such an organization. However, the industry is not so organized, and swine are raised by many

thousands of unorganized and highly individualistic farmers, stockmen, and garbage feeders. To undertake to reach and instruct all of these persons, and to bring into line any recalcitrant and indifferent individuals by governmental and legislative measures, is not a realistic program at this time.

A more realistic program is to put the problem in the hands of the packers. The packing industry is a highly organized industry, with a far-flung corps of efficient employees over the entire country. Its approach to the swine industry is one based on mutual interests and on long and adequate acquaintance. It has the control that follows from its position as the purchaser of the swine industry's product.

It is highly probable that the packing industry would accept the task of bringing about improvements in the swine-raising industry. The advantage to both the packer and the swine raiser of removing the stigma of trichinosis from pork is fairly evident. No less evident is the advantage of better advertising in the way of universal exhibits of swine raised under sanitary conditions. Adverse court decisions, sustaining the law of implied warranty as applying to pork in trichinosis cases, even though the pork is of a sort customarily cooked before being eaten, in States having large numbers of cases of diagnosed trichinosis, is tending to make the sale of pork in such States a hazardous proceeding. Finally, the studies on trichinosis already under way or being initiated will probably result, within the next 5 or 10 years, in the finding of thousands, instead of two or three hundred cases of clinical trichinosis annually, as a result of more interest, greater clinical knowledge, and better diagnostic methods. When that happens, it will be very definitely to the interest of the packer to be able to show that he has achieved, at least, a measure of control that has not been achieved by other agencies up to the present time. His task will be simplified by the fact that the large majority of swine are slaughtered within the first year of life, and that control measures applied in any year will be effective and their results demonstrable the next year.

If the packer will cooperate in this way, scientists, public health officials, legislators, and the public generally should cooperate by giving him a fair chance to carry out his program. It will serve no useful purpose to frighten the public by newspaper publicity about a situation that has existed for many years. It would inevitably injure thousands of innocent farmers and stockmen, but it would not control trichinosis, and what we want is effective and permanent control of trichinosis, not useless and transient scares. It will serve no useful purpose to enact laws that have no sound basis in reality and practicability. Wherever the farmer or garbage feeder maintains a public nuisance, adequate laws covering such offenses should be

passed and adequately enforced; and, in all probability, the packers as a matter of self-interest, would support such action.

Meanwhile, the scientist has the task of cooperating with the physician to establish the epidemiology of trichinosis, to clarify its confusing clinical picture, to devise better diagnostic methods, and to develop a rational therapy. When these activities enable us to sort out clinical trichinosis from the many diseases with which it is confused, our studies of incidence in man and swine should show that the activities of the packers and swine industry are lowering an incidence that has not been lowered by the too casual methods employed up to date.

The problem of control is presented diagrammatically in figure 1. The relatively closed circle of rat trichinosis, maintained by cannibalism, supplemented, at B, by rats eating pork scraps in garbage,

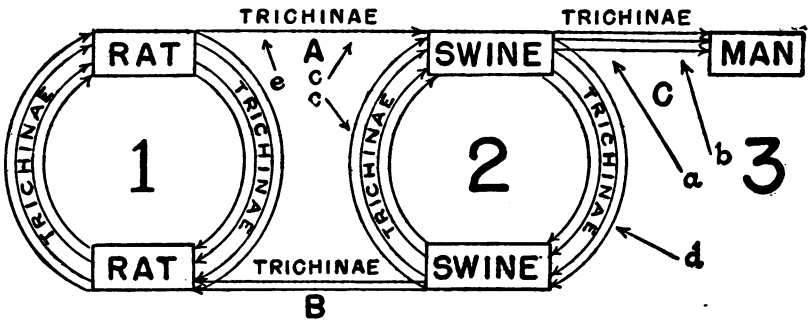

FIGURE 1.—Diagram showing the transfer of trichinae from host to host, and the points of application of control measures. 1. The relatively closed circle of rat trichinosis. 2. The circle of swine trichinosis. 3. The closed channel of human trichinosis. A. Transfer of trichinae from rat to swine. B. Transfer of trichinae from swine to rat. C. Transfer of trichinae from swine to man. *a*. Application of meat inspection. *b*. Application of cooking. *c, c*. Application of swine sanitation system. *d*. Application of cooking of garbage. *e*. Application of rat-control measures.

and supplying, at A, a relatively small amount of trichinae to swine that eat rats, is shown at 1. The circle of swine trichinosis, maintained mostly by swine eating pork scraps in garbage, supplemented, at A, by a relatively small amount of trichinae from rats eaten by swine, and supplying, at B, larger amounts of trichinae in pork scraps in garbage to rats, and supplying, at C, much larger amounts to man in his consumption of raw or improperly cooked pork or inadequately processed pork products, is shown at 2. Human trichinosis, as a terminal status in the life of trichinae, is shown at 3. The points of application of control measures are shown by arrows, as follows: Meat inspection (proper processing of pork products customarily eaten without cooking), at *a*; thorough cooking of pork and of pork products customarily cooked before being eaten, at *b*; the use of the swine sanitation system, to obviate the eating of pork scraps, swine carcasses, or rats by swine on farms, at *c, c*; the cooking of garbage, by

present methods or methods to be developed, to destroy trichinae in pork scraps in garbage, at *d*; and the use of concrete rat-proofing, and the trapping and poisoning of rats to prevent the eating of rats by garbage-fed swine, and to some extent by other swine, at *e*.

SUMMARY

Garbage-fed swine have trichinae between three and five times as frequently as do grain-fed swine, and hence are specially important as sources of human trichinosis.

Trichinosis in swine is apparently traceable to the eating of uncooked pork scraps in garbage, table scraps, swill, and similar things, much more often than it is traceable to the eating of rats by swine.

The garbage-feeding industry, as ordinarily carried on, is dangerous to the health of man and livestock, esthetically objectionable, and often economically unsound.

Suggestions are made for the elimination of the dangers and nuisances associated with the garbage-feeding industry and with the feeding of table scraps and similar things on the farm. Cooperation between scientists, practicing physicians, engineers, packers, and the swine industry is recommended as the best attack on the problem.

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A LOW TEMPERATURE BALL MILL FOR THE LIBERATION OF LABILE CELLULAR PRODUCTS[1]

By Stuart Mudd, *Professor of Bacteriology, University of Pennsylvania*, C. H. Shaw, E. J. Czarnetsky, and Earl W. Flosdorf, *Department of Bacteriology, University of Pennsylvania*

The problem of disintegration of cells and tissues for the purpose of liberating intracellular substances arises in many fields. It has become increasingly apparent, particularly in the field of bacteriology, that classical methods to this end have been only partially successful, and that many of the products obtained have been in reality artefacts, degradation products of the more complex and biologically active substances present in the intact cells.

A short time ago, an article by one of us (E. J. C.) appeared in Science, in which the extraction of labile bacterial antigen by disruption of the lyophile-dried bacterial cells at low temperature (*1*) was described. This method utilized liquid air to bring the bacteria to a temperature beyond a critical point at which the dry bacteria become brittle and are easily disrupted by mechanical agitation with a mortar and pestle.

Since that time it has been found that the critical temperature is not as low as was previously believed, and liquid air with its attending hazards could be eliminated and other refrigeration could be substituted. Dry ice in methyl cellosolve produces a temperature of about −80° C., which temperature is well below the critical temperature required, and it can therefore be substituted for liquid air. However, as contact between methyl cellosolve and the bacteria is undesirable, it is necessary to place the bacteria in a vessel, which is in turn immersed in the refrigeration mixture. As some bacteria are still resistant at this temperature, and require an hour or more of grinding for disruption of the cells, a ball mill utilizing the low temperature principle has been designed for refrigeration and agitation of the dry bacterial cells.

The accompanying sketch (fig. 1) shows the design of such a low temperature ball mill. It consists, essentially, of a monel metal grinding chamber attached to a combined one-sixth horsepower motor and speed reducer geared to 72 r. p. m. The grinding chamber contains two stainless steel balls, 1½ inches in diameter, whose curvature approximates that of the inner surface of the circumference of the grinding chamber. The motor, speed reducer, and grinding chamber rest on a hinged base in the normal position for grinding, but can be tilted to a vertical position for loading or emptying the grinding chamber, and for filling the insulated refrigeration bath. The grinding

[1] This work has been aided by grants from the U. S. Public Health Service and from the Abington Memorial Hospital.

chamber is detachable from the motor and is fitted with an airtight gland with an opening just large enough for putting in or removing the balls. This opening is tapered, and contains a tapered rubber stopper, which can be secured by the threaded gland cover. The rubber stopper has an opening just large enough to admit the slotted access tube.[2]

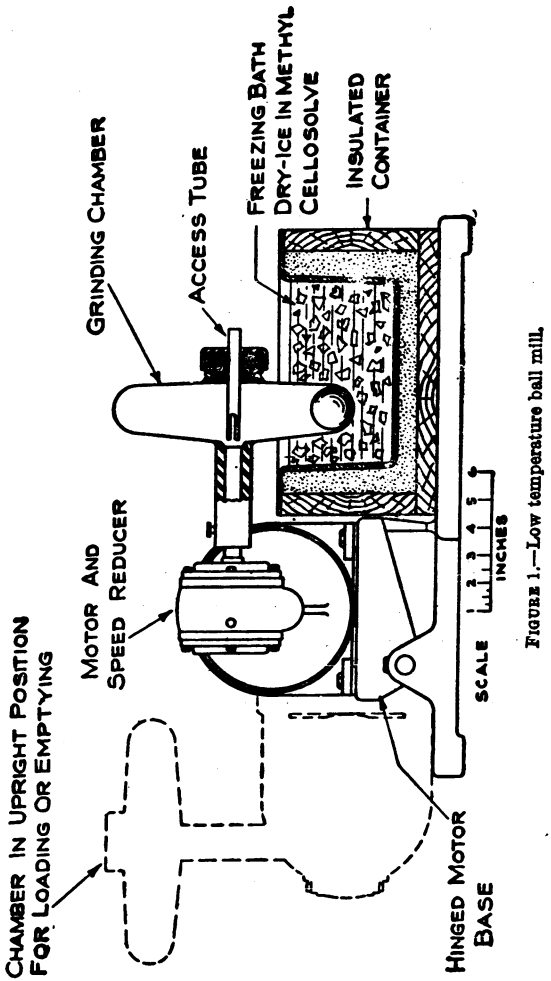

FIGURE 1.—Low temperature ball mill.

The method for disrupting bacterial cells is as follows: The organisms are grown in mass culture, centrifugalized at high speed, resuspended in a minimal volume of saline, and then placed directly into the grinding chamber together with the balls. The rubber stopper carrying the access tube is lubricated with water and is placed in the gland and the gland cover is screwed on loosely. A cotton plug

[2] The access tube is made of copper or other metal of high thermal conductivity; this construction prevents clogging with condensate during lyophile-processing.

is then placed in the access tube. The grinding chamber is attached to the motor ensemble and is then lowered into the freezing pan. The freezing pan is then filled to the top with cracked dry ice, and methyl cellosolve is slowly poured in to within a half-inch of the top of the pan. The grinding chamber is allowed to rotate in the freezing bath for 15 minutes. This procedure causes the material to freeze on the periphery of the chamber and is a preliminary step in drying the

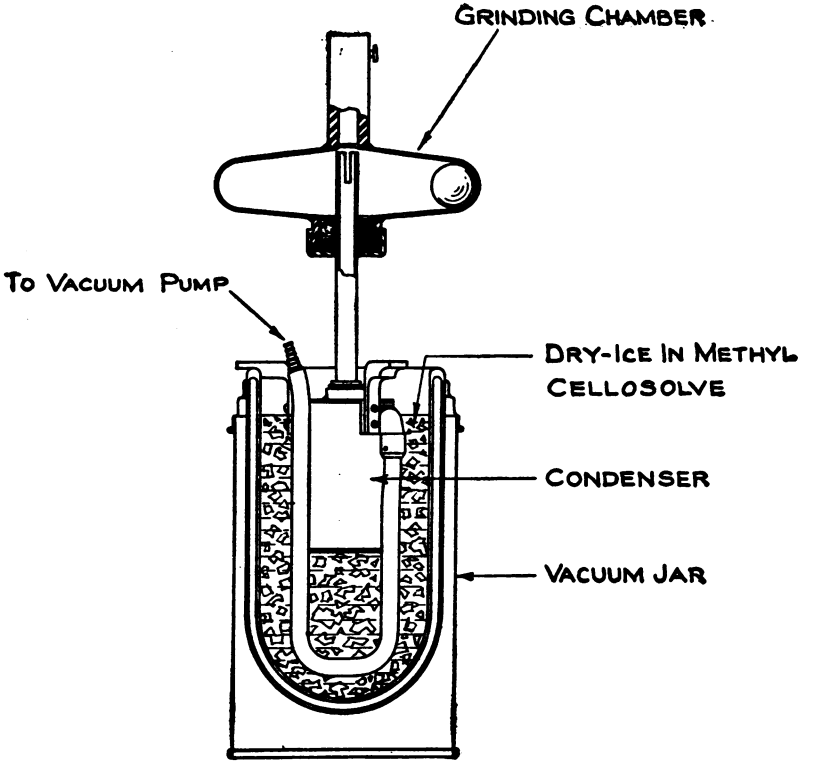

FIGURE 2.—Assembly for drying frozen organisms directly in ball mill chamber.

bacteria by the lyophile process directly in the grinding chamber, thus avoiding transfer of viable dry bacteria.

The second step consists in removing the cotton plug from the access tube and then attaching the loaded grinding chamber by means of the stopper on the other end of the access tube to a metal miniature lyophile process condenser. The condenser is immersed in a 1-gallon thermos jar, which is then packed with a dry-ice and methyl cellosolve mixture to one-half to three-fourths inch below the flat top of the condenser, as shown in figure 2. All connections of rubber to metal must be made either before the metal is cooled below room temperature, or if not, only after wiping off microscopic ice crystals from

the metal surface with alcohol; otherwise a high-vacuum-tight fit cannot be obtained. The entire system is then evacuated by a high vacuum pump, conditions being maintained as outlined in the lyophile procedure of Flosdorf and Mudd (*2*). The drying must be started at a time to permit repacking of the condenser in about 18 hours. If it is repacked much sooner than this, the condenser is likely to become plugged and not function to its full capacity. The slowly changing level of the freezing bath mixture during the 18 hours causes a resublimation of the condensate to the bottom of the condenser which permits its full volume to be available. At the end of 22 hours the bacteria are completely dried and are in a condition in which they can easily be ground by the procedure to be described below. The grinding chamber-lyophile condenser assembly has a capacity for 200 ml of fluid.

An alternative method of drying the bacteria consists in desiccating them in glass containers by the lyophile process with subsequent transfer to the grinding chamber. The amount of bacterial suspension placed in the glass container should be such as not to disturb the proper surface to volume relationship in lyophile processing (*2*). If the containers are held in an upright position during the preliminary freezing, and have straight sides and no constricted necks, the bacteria are in the form of a loose button after the lyophile processing, and can usually be transferred to the grinding chamber by allowing the button to fall out of the lyophile tubes directly into the chamber, with little danger of scattering the bacteria.

The necessity for drying the bacteria before grinding arises from the plasticity of water-ice even at low temperatures. After the bacteria are dried by either procedure and are in the ball mill, a fresh cotton plug must be placed in the exposed end of the access tube. The grinding chamber and motor ensemble are then lowered to the position with axis horizontal, which places the grinding chamber in the freezing bath. The freezing bath is prepared in the same manner as was the freezing bath for the original precooling before lyophile drying. The grinding is then allowed to proceed for an hour or longer, depending on the resistance of the material being ground.

The mill is then returned to the position in which its axis is vertical, wiped with a dry cloth, and allowed to warm to above 0° C. Water or saline is then added through the access tube, which is large enough to admit a 10-cc bacteriological pipette. The cotton plug is replaced in the access tube, and the mill is returned to the horizontal position, the refrigerating bath having been removed meanwhile. The mill is then allowed to rotate for 30 minutes to effect solution or suspension of the bacterial components, as some dried bacteria resist wetting.

The ball mill is again returned to the vertical position, and the dissolved and suspended contents are removed by means of a pipette.

Repeated washings can be made by adding more saline or water, and allowing the mill to rotate for a few minutes, the rotating always taking place on a horizontal axis.

For purposes of cleaning, the grinding chamber can be taken off the shaft and autoclaved or sterilized in any suitable manner, and then dried. After sterilization, it is advisable to boil the grinding chamber in a sodium bicarbonate solution, followed by a thorough rinsing to dissolve any protein which may adhere to the walls. As soft solder has been used in the construction of the grinding chamber, no heating above 150° C. should be used.

Experimental.—Six grams of dried hemolytic streptococci were ground for 1 hour. A nitrogen determination on the original material and on the ground, soluble material showed that 80 to 85 percent of the total nitrogen was brought into solution by this method. A stained smear of the insoluble material remaining after grinding showed many shadow cells, amorphous debris, and many broken cell fragments, together with a few normal-appearing cells, but no chains. The impression was gained that the cell wall itself was not soluble but that the contents of the cells had been spilled out by disruption of the cell wall. After being passed through a Berkefeld filter, the material appeared to be in true solution and was clear.

The extremely labile antigen of the hemolytic streptococcus is now isolated by this method as a matter of routine in this laboratory (*3*).

Mr. H. J. Henderson, of the Henry Phipps Institute, grew Johne's bacillus on Long's synthetic medium for a period of approximately 11 months. Even after this long period the medium failed to yield protein when tested by the method ordinarily employed in the preparation of "purified protein derivative" (*4*). The bacteria were filtered off, washed in sterile distilled water, lyophile-processed, and ground for 105 minutes as previously described. After filtration through a Seitz filter, protein was recovered from the filtrate in an amount equivalent to 606 mg per liter.

Tubercle bacilli were grown on Long's medium by Mr. Henderson for a period of 80 days; a sample of the medium was filtered and yielded protein equivalent to 256 mg per liter. This is about the usual yield obtained in the preparation of tuberculoprotein (*4*). The remaining medium and bacillary mass was lyophile-processed and ground in the low temperature ball mill for 90 minutes, filtered through a Seitz filter and the filtrate tested for protein. A yield equivalent to 809 mg protein per liter was obtained.

Materials other than bacteria, e. g., tissues, wool, hair, pollen, and rubber, can also be ground to a very fine powder in the low temperature ball mill.

In contrast with the sonic method of Chambers and Flosdorf (*5*) for disruption of bacterial cells, only soluble material is liberated by the low temperature method. Upon disrupting bacterial cells by the sonic method, insoluble material is also put into colloidal suspension and some of this material passes a Berkefeld N filter.

It is to be noted that the organisms are subjected to a freezing temperature during most of the process, and are in the dry state during grinding. As a low temperature and absence of water are the two conditions which are usually associated with the prevention of chemical reactions, it is believed that the low temperature ball mill can disrupt bacterial cells without chemical alteration of their labile components.

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MORTALITY IN CERTAIN STATES DURING THE FIRST QUARTER OF 1937 [1]

The following mortality rates are based upon current, preliminary reports from the State departments of health of 34 States, the District of Columbia, and Hawaii. In addition, comparative data for 18 States and the District of Columbia are shown for the three immediately preceding years.

Because of lack of uniformity in the method of classifying deaths according to cause in the various States, and because a number of death certificates were not filed in time to be included, these mortality rates are preliminary and are intended to serve as an index of current mortality conditions only within the same area for which previous reports are available. The comparison of one State with another is subject to error, owing to the varying practices in tabulation procedure and to the fact that crude rates are affected by differences in the age, sex, and racial characteristics of the population.

Mortality from all causes during the first quarter of 1937 was 6.7 percent higher than during the first quarters of 1934 and 1935 and 1.6 percent higher than during the first quarter of 1936. Important factors in this showing were minor influenza epidemics in the first quarters of both 1937 and 1936. Considering 1937 in relation to 1934 and 1935, which years were relatively free from influenza epidemics, the increases in 1937 were generally less in the Southern than in the North Central States represented in this report.

[1] From the Division of Public Health Methods, National Institute of Health.

The increased mortality from influenza was reported by 20 of the 23 States; only 3 southern States reported a decrease in mortality from last year. For the entire group of States the rate for 1937 was 89 percent greater than the rate for 1936. The relative number of deaths attributed to pneumonia increased only slightly over 1936, but even so it was about 15 percent above the number for 1934 and 1935.

Except for the influenza epidemic, mortality reports were more favorable for the first 3 months of 1937 than for the corresponding period of 1936. In fact, if the increase in influenza and pneumonia is excluded, the death rate decreased slightly from last year, although it was still well above the rates for 1934 and 1935. Among the four important communicable diseases of childhood—measles, scarlet fever, whooping cough, diphtheria—only whooping cough caused more deaths, relatively, than in 1936. Tuberculosis registered a slight increase in mortality, indicating that the check in the decline of the death rate from this disease which was first noticed in the reports for 1936 is continuing into the present year.

The birth rate continued to decline, only 5 of the 23 States with data for the preceding year reporting an increase. Although the infant mortality rate increased slightly over that for last year, it was below the average of preceding years.

Mortality from certain causes in the first 3 months of 1937, with comparative data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																		
			Total infant mortality	Maternal mortality	Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (80–86)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–126)	Diarrhea and enteritis under 2 years (119)	Nephritis (130–132)	All accidents (176–196, 201–214) [3]	Automobile accidents (200, 202, 210) [3]
19 States: [1]																							
1937	12.8	15.2	62	5.3	0.6	0.8	2.6	3.1	1.8	66.9	0.2	0.7	2.4	54.8	116.9	30.9	90.0	316.8	144.7	60.4	4.3	87.5	66.6	22.6
1936	12.6	15.6	58	5.8	.8	.9	3.4	2.0	2.1	35.4	.2	.6	3.5	54.3	114.8	30.5	97.8	313.9	142.8	61.7	4.9	91.9	------	------
1935	12.0	15.5	64	6.0	.9	4.6	3.3	4.0	2.4	43.0	.2	.6	2.4	55.4	110.3	27.2	89.8	282.3	126.7	63.0	4.2	88.1	------	------
1934	12.0	15.0	65	6.0	.9	5.6	3.4	4.0	2.5	27.3	.3	.6	1.0	56.0	108.5	27.4	85.3	283.7	122.9	63.7	5.9	93.4	------	------
Alabama:																								
1937	12.2	21.4	78	5.6	1.1	[2]	[2]	5.3	2.7	114.8	.4	.3	5.3	65.0	59.3	12.8	74.2	165.6	146.9	50.0	6.6	85.4	73.3	20.3
1936	12.8	22.4	76	6.8	.8	.8	.4	2.7	4.1	113.4	.4	[2]	1.4	71.2	54.5	14.6	74.4	157.9	192.2	50.1	7.9	87.0	------	------
Colorado:																								
1937	16.5	17.9	79	7.2	.8	[2]	3.0	8.3	3.8	153.9	1.5	.8	2.6	75.0	121.7	19.0	95.9	253.9	351.7	81.1	6.8	86.0	70.1	21.6
Connecticut:																								
1937	11.9	12.0	50	3.8	.5	1.6	1.4	2.8	.9	35.7	[2]	.5	1.2	37.5	134.8	39.4	97.0	265.9	127.2	54.9	2.8	92.9	64.4	21.3
1936	11.8	12.4	47	4.8	[2]	.5	1.1	2.1	.7	20.9	.2	.7	.9	41.3	135.7	35.5	[2]	269.3	132.4	[2]	3.5	100.2	------	------
1935	11.4	12.8	48	5.7	.7	2.8	2.1	1.4	.9	20.3	.2	.5	1.2	44.6	120.2	35.0	[2]	250.8	115.0	[2]	1.2	93.3	------	------
Delaware:																								
1937	16.0	16.2	80	3.8	3.1	4.6	[2]	6.2	1.5	66.6	[2]	[2]	3.1	48.0	97.5	35.6	116.1	452.0	165.6	54.2	10.8	131.6	82.0	34.0
District of Columbia:																								
1937	16.7	19.0	76	6.0	.6	2.5	1.2	5.7	5.0	51.0	[2]	.6	7.6	99.5	143.0	36.5	113.4	371.5	243.1	73.0	5.0	103.9	86.3	32.1
1936	17.1	19.2	68	6.4	3.2	[2]	1.3	2.6	6.5	21.4	.6	.6	14.8	122.8	136.4	33.8	126.1	395.7	220.3	82.5	5.8	105.3	------	------
1935	16.2	19.2	67	3.5	.7	[2]	2.7	[2]	6.1	31.4	[2]	[2]	17.1	108.6	123.6	35.5	121.5	372.1	224.6	88.1	8.2	99.7	------	------
Florida:																								
1937	14.1	16.8	64	7.5	3.4	.5	.2	1.9	2.4	79.5	.2	.2	8.5	62.7	90.2	24.1	119.8	274.3	100.6	94.5	13.8	104.5	116.9	48.8
1936	14.8	16.4	67	8.2	1.2	.2	.2	1.2	3.9	101.6	.7	.7	3.9	55.8	88.2	24.0	118.1	305.0	139.6	84.5	5.1	124.4	------	------
1935	14.1	16.6	68	9.7	1.3	5.3	[2]	3.3	4.5	95.7	.8	[2]	.3	58.0	89.5	26.4	110.8	276.4	106.5	82.7	8.0	120.1	------	------
Georgia:																								
1937	10.7	17.7	69	7.5	1.7	.3	.4	2.4	2.6	94.8	.5	.4	1.8	47.6	50.0	11.6	83.8	156.4	120.2	47.3	4.6	94.9	63.5	25.1
1936	12.3	17.9	76	7.9	2.4	.1	.7	2.1	3.4	136.3	.3	.3	3.3	52.4	47.8	13.5	80.3	174.5	190.6	49.3	3.5	104.0	------	------
1935	11.7	18.4	79	8.9	1.9	1.3	.8	6.4	4.3	110.0	.9	[2]	1.2	55.6	49.2	13.4	76.4	164.9	150.2	64.9	4.5	106.5	------	------
Hawaii:																								
1937	9.5	20.4	82	5.3	3.6	102.3	[2]	.9	1.8	9.1	[2]	.9	.9	79.7	62.5	19.0	47.1	124.9	109.5	75.1	19.0	65.2	53.4	16.8
1936	8.0	20.5	75	5.0	3.7	[2]	[2]	1.8	1.8	21.2	[2]	.9	4.6	70.9	63.5	10.1	40.5	142.7	75.5	67.2	19.3	65.3	------	------
1935	8.4	22.4	73	5.5	1.0	[2]	[2]	2.9	[2]	7.6	[2]	[2]	2.9	77.1	61.9	14.3	44.7	115.2	78.1	68.5	19.0	80.0	------	------

Idaho:																								
1937	12.0	20.4	57	3.6	.8	6.6	2.5	1.6	(2)	118.9	(2)	.8	2.5	28.1	93.3	11.6	78.5	189.1	128.8	67.7	5.8	37.2	66.1	20.6
1936	11.5	20.2	48	2.9	.8	1.6	17.4	1.6	.8	27.4	(2)	(2)	12.4	28.2	82.1	10.8	76.3	209.0	161.7	58.0	.8	26.5	------	------
1935	10.3	18.8	77	8.6	1.7	2.5	2.5	12.7	(2)	37.2	(2)	4.2	5.9	26.2	70.3	16.1	60.1	149.9	144.8	63.5	1.7	28.8	------	------
Illinois:																								
1937	12.8	13.2	57	5.1	.2	.1	3.7	2.6	2.5	51.5	.4	.5	2.5	52.4	127.2	31.8	80.5	355.5	123.9	71.5	2.8	110.3	74.1	29.2
1936	12.6	13.2	53	4.3	.2	.2	5.1	2.2	2.8	22.9	.1	.2	3.2	51.8	127.6	33.9	89.3	351.8	118.1	66.2	3.4	115.1	------	------
1935	11.9	13.1	57	5.5	.8	8.3	7.4	3.1	3.0	40.7	.2	.3	3.9	53.7	124.1	26.8	74.9	288.8	121.9	69.0	3.0	104.9	------	------
Indiana:																								
1937	13.1	14.4	64	3.4	.1	.3	5.6	5.0	1.6	90.2	.5	.5	2.8	54.6	103.0	18.7	126.9	287.4	181.1	(3)	4.0	69.7	73.0	32.5
1936	12.8	14.6	56	5.3	.5	.3	5.1	1.4	5.7	43.4	.1	1.2	1.6	51.3	102.9	20.2	140.6	283.4	157.3	(3)	3.6	88.0	81.8	25.5
1935	12.4	14.1	65	6.0	.7	6.6	6.3	5.9	3.5	58.2	(2)	.6	3.5	52.0	111.5	15.2	143.0	290.7	137.3	(3)	2.7	69.1	73.8	30.5
Iowa:																								
1937	11.4	13.5	59	6.7	(3)	.2	7.0	1.7	.3	96.5	.6	1.3	1.1	22.1	124.1	25.9	117.0	244.9	110.9	52.8	3.0	68.8	47.0	14.9
1936	10.9	17.3	47	5.2	1.3	.3	6.2	2.1	1.9	28.6	(2)	(2)	3.5	22.9	124.1	29.4	120.2	267.2	113.2	57.9	2.7	74.5	------	------
1935	10.9	14.2	62	4.8	1.1	15.8	2.7	1.4	2.6	45.4	(2)	.5	1.4	28.5	120.0	26.6	107.1	240.1	115.2	57.3	2.9	60.3	------	------
Louisiana:																								
1937	13.2	18.8	79	8.1	4.8	1.5	.8	5.7	4.0	141.3	.2	.4	2.1	72.6	79.4	19.7	72.0	222.2	159.6	65.1	9.9	112.1	69.1	23.1
1936	13.1	17.4	88	11.1	3.6	3.4	.4	5.3	5.5	80.1	.6	.4	1.9	71.6	71.8	22.0	78.6	237.0	179.0	69.1	12.1	114.0	------	------
1935	11.6	17.6	72	7.4	5.4	9.2	1.1	3.1	5.5	52.8	.8	.4	1.3	75.0	72.1	18.0	72.1	195.7	122.8	70.4	9.0	110.4	------	------
Maine:																								
1937	14.3	16.6	69	6.5	1.4	.5	.5	1.9	.5	100.3	(3)	(3)	1.4	30.1	146.0	23.6	125.8	391.4	160.1	57.9	4.7	101.3	46.2	12.2
Maryland:																								
1937	15.4	16.6	72	4.4	.7	4.3	1.2	7.0	2.4	47.8	.5	2.2	5.1	84.8	127.8	30.2	128.3	366.9	194.4	57.2	6.0	163.5	84.5	31.9
1936	15.0	16.9	65	5.2	1.2	2.9	.7	3.6	2.2	23.5	(3)	1.4	13.2	84.8	133.5	33.4	132.5	355.6	184.8	54.3	3.8	166.2	------	------
1935	14.6	17.0	68	6.4	.7	2.7	2.4	4.1	2.2	42.0	(3)	.7	4.1	86.0	127.6	31.8	127.8	330.5	178.1	62.7	6.3	140.9	------	------
Michigan:																								
1937	12.4	17.4	61	4.1	.2	(3)	5.5	3.7	1.2	50.2	(3)	.2	1.2	44.2	116.6	28.8	95.1	307.1	136.2	64.8	4.1	65.8	73.4	29.4
1936	12.0	18.0	56	6.0	.4	.4	3.7	2.4	.7	19.8	.3	.8	1.5	44.1	113.4	28.8	99.6	302.8	130.0	71.1	6.1	71.5	------	------
1935	11.9	17.7	61	5.8	.6	3.1	3.5	3.0	.7	33.6	(3)	.2	.6	45.9	112.2	29.4	95.4	281.2	124.5	70.5	4.3	70.2	------	------
Minnesota:																								
1937	11.6	17.0	53	4.3	.3	.3	3.2	1.8	.6	76.7	(3)	.9	1.4	34.4	140.9	26.7	99.6	250.3	127.7	56.5	1.5	47.9	62.6	16.7
1936	11.0	17.1	49	5.1	.8	1.5	8.8	1.1	.3	16.9	.2	.4	2.4	35.1	128.0	27.8	94.2	256.6	111.2	58.9	4.7	50.0	------	------
1935	10.6	16.9	56	5.8	(3)	3.6	4.6	3.4	.5	36.9	.2	1.1	2.5	34.3	132.0	22.8	85.2	219.1	111.5	64.4	4.0	54.8	------	------
Montana:																								
1937	14.3	18.8	69	3.7	3.0	.8	6.9	1.5	3.8	184.1	(3)	1.5	3.1	45.8	103.1	21.4	115.3	221.5	208.5	61.9	0.8	73.3	80.2	15.3
1936	12.8	18.9	53	6.8	1.5	.8	15.1	4.5	3.0	32.6	(3)	(3)	3.0	44.7	100.0	18.2	93.2	221.9	192.4	75.0	4.5	65.9	------	------
1935	12.7	18.5	78	7.0	1.5	16.0	3.0	4.6	4.6	85.5	.8	.8	1.5	48.1	105.4	16.8	80.2	211.6	196.3	94.7	7.6	85.5	------	------
Nevada:																								
1937	14.5	12.2	75	3.2	(3)	(3)	4.0	(3)	(3)	28.1	(3)	(3)	(3)	72.2	100.4	4.0	100.4	273.0	212.8	44.2	8.0	40.2	136.5	36.1
New Jersey:																								
1937	11.6	12.2	51	4.4	.3	1.8	.4	1.7	.8	26.2	.1	.8	2.0	50.4	118.4	34.9	82.5	360.3	119.0	54.3	3.3	79.6	63.0	25.7
1936	11.4	12.5	49	4.8	.5	.2	1.3	1.7	.6	15.3	.5	.6	2.4	53.8	123.5	37.6	90.4	339.9	114.4	54.1	3.2	83.0	------	------
1935	11.0	12.6	55	4.4	.5	1.1	.7	3.2	.9	22.3	.3	.6	.6	49.1	109.7	31.8	85.3	322.0	100.5	55.0	3.7	89.8	------	------

* Data not compiled for these reports prior to 1937.

[1] States included are Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Louisiana, Maryland, Michigan, Minnesota, Montana, New Jersey, New York, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin (estimated population as of July 1, 1937, 69,603,000). List includes all of the States with available data for the 4 years covered in this summary.

[2] No deaths.

[3] Data not available.

Mortality from certain causes in the first 3 months of 1937, with comparative data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (50)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90–95)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–138)	Diarrhea and enteritis under 2 years (119)	Nephritis (130–132)	All accidents (176–195, 201–214)	Automobile accidents (206, 208, 210)
New York:																								
1937	13.9	14.2	54	4.4	0.3	0.5	1.4	1.5	0.9	29.0	(4)	0.7	2.1	64.4	153.8	44.2	77.2	413.1	160.3	71.8	6.4	86.3	68.3	20.3
1936	13.5	14.2	52	5.6	.7	1.6	2.5	1.0	.3	12.6	(4)	.8	3.5	62.1	147.0	40.4	89.8	401.8	153.7	70.3	5.7	92.1	------	------
1935	12.8	14.3	56	5.4	.4	1.3	2.2	3.0	1.1	16.4	.1	.6	1.7	60.8	139.9	36.8	83.8	369.0	122.0	69.2	5.3	92.2	------	------
North Carolina:																								
1937	10.4	22.2	70	5.8	1.0	.9	.6	2.6	4.9	57.9	.3	.9	1.2	61.7	52.3	11.4	84.4	168.0	130.8	44.5	5.3	88.1	69.0	26.1
1936	11.8	22.8	72	6.3	.8	.2	.7	1.2	4.8	75.0	.3	.3	1.5	58.3	53.3	12.7	(3)	(3)	186.0	(3)	6.2	------	------	------
1935	11.3	23.3	73	7.0	.5	4.3	.9	12.8	4.7	78.2	1.1	.4	1.4	63.1	48.4	12.0	(3)	(3)	155.2	(3)	4.4	------	------	------
North Dakota:																								
1937	9.6	19.5	69	6.2	(3)	(3)	1.7	(3)	1.7	68.9	(3)	.6	4.0	30.4	90.8	24.7	87.3	181.5	113.7	53.4	12.1	41.4	53.4	9.8
Oklahoma:																								
1937	10.6	16.1	72	7.2	1.9	1.0	2.1	1.6	3.3	121.7	1.0	.3	4.5	55.8	70.9	15.1	73.6	153.4	150.2	53.0	2.2	71.2	62.0	22.6
Oregon:																								
1937	14.6	14.8	49	4.3	.8	.4	2.4	3.2	.4	98.8	(3)	.8	.8	39.5	126.9	28.5	115.0	351.8	122.5	63.6	.4	126.9	74.7	24.1
Pennsylvania:																								
1937	13.3	15.6	61	5.6	.4	.4	2.5	3.4	1.6	76.8	.1	1.0	1.9	53.0	114.3	37.0	86.5	355.2	135.2	54.4	3.8	97.5	60.4	20.4
1936	12.6	15.9	54	5.2	.5	.6	2.3	1.4	1.8	27.0	.1	.5	1.8	46.7	113.1	34.3	101.7	344.1	124.9	57.6	6.3	94.8	------	------
1935	12.1	16.1	63	6.0	.5	3.4	2.9	2.6	2.3	43.8	.2	1.0	1.2	49.6	105.2	31.8	91.2	308.8	127.4	55.4	4.2	95.2	------	------
South Carolina: [5]																								
1937	8.9	14.6	107	9.9	1.6	1.0	(3)	1.0	4.9	65.5	(3)	.6	1.6	37.9	40.5	9.2	80.3	150.8	111.0	11.9	4.0	69.1	42.5	21.4
1936	10.7	15.6	105	9.4	2.0	.6	.6	2.8	3.3	82.0	.3	(3)	3.6	49.2	41.3	12.1	95.1	165.3	172.8	18.4	1.6	75.1	------	------
1935	11.7	16.7	98	10.9	3.0	1.0	(3)	11.1	3.0	135.8	.3	.3	1.3	51.1	31.9	11.1	91.4	186.9	130.4	13.4	4.0	87.8	------	------
South Dakota: [5]																								
1937	11.0	16.4	78	6.0	.9	(3)	6.2	.9	(3)	172.5	(3)	.9	4.5	33.1	84.0	29.5	75.1	170.8	154.7	34.9	1.8	57.2	42.9	6.2
1936	9.6	17.3	55	4.6	.9	.9	4.4	1.8	1.8	25.6	(3)	(3)	(3)	37.0	94.3	23.8	82.0	169.2	107.5	52.9	5.3	80.2	------	------
1935	10.4	19.6	65	5.5	.9	12.5	2.7	1.8	.9	76.0	2.7	(3)	.9	32.2	91.2	15.2	89.4	139.5	151.1	51.0	4.5	77.8	------	------
Tennessee:																								
1937	11.2	14.2	78	9.2	1.1	1.1	1.0	3.8	4.9	116.8	.3	.7	4.0	35.2	61.5	12.9	81.3	164.3	164.2	47.6	2.6	60.4	63.3	22.5
1936	12.1	14.9	75	7.9	1.1	.7	2.0	3.2	4.6	107.0	.6	.4	6.6	90.8	62.1	12.8	79.5	172.3	204.6	54.2	3.7	67.3	------	------
1935	10.8	15.1	80	8.8	1.9	2.0	.6	8.2	5.0	86.3	.4	.6	5.9	88.8	59.9	12.4	79.3	140.3	149.2	52.6	3.2	59.4	------	------
Utah: [5]																								
1937	11.9	20.5	55	6.4	(3)	(3)	3.6	4.8	1.2	83.8	(3)	1.2	3.6	21.5	86.2	28.7	79.0	303.9	119.7	68.2	3.6	67.0	80.2	29.9

Vermont:																						
1937	13.5	11.8	58	15.2	2.1	(3)	(3)	2.1	2.1	93.2	(3)	(3)	1.0	54.0	136.6	19.1	119.6	349.4	151.4	60.4	5.3	74.1	70.9	16.9
Virginia:																						
1937	12.7	17.6	81	5.5	.9	2.8	.6	6.6	3.1	107.1	.6	.9	7.2	67.2	69.6	18.1	99.7	244.8	191.4	39.3	2.4	96.6	59.1	21.9
1936	13.4	19.2	70	6.7	1.3	1.1	.9	4.4	4.7	83.1	.5	.5	10.0	71.0	70.0	20.2	108.7	262.1	173.2	44.1	3.9	106.6	------	------
1935	12.9	18.3	82	6.6	.8	13.2	1.2	11.7	4.9	95.5	.2	.3	4.0	80.7	68.1	19.4	100.4	244.1	136.1	44.8	2.9	94.4	------	------
Washington:																						
1937	13.1	12.7	56	5.2	1.0	2.0	2.2	.2	1.2	75.3	.2	2.0	1.5	45.1	126.6	29.0	114.6	322.4	121.7	57.2	1.0	88.8	80.2	23.1
1936	13.5	13.8	48	4.6	.5	4.2	3.2	.7	.5	56.5	.7	2.4	2.9	58.0	128.2	29.1	116.5	323.9	124.8	66.5	1.0	87.6	91.7	31.8
1935	12.0	13.8	46	4.5	.2	1.2	1.7	3.7	1.5	35.8	.5	2.5	2.2	53.9	136.3	29.8	103.3	292.8	67.6	66.8	2.2	85.2	------	------
West Virginia:																						
1937	11.5	18.8	69	7.8	2.0	.4	3.1	10.1	4.6	111.1	.9	.2	5.5	54.1	69.1	16.0	80.7	195.1	156.4	48.6	5.7	70.2	89.7	18.7
1936	11.3	18.3	77	7.3	1.8	2.0	2.4	3.3	6.6	52.7	.9	.2	6.4	52.9	64.1	18.7	88.7	187.4	156.2	54.0	4.8	79.7	------	------
1935	10.8	19.5	79	7.6	3.6	10.7	5.8	13.2	8.9	65.0	.2	.4	4.5	60.3	67.4	10.9	77.0	140.5	136.4	55.2	3.3	70.3	------	------
Wisconsin:																						
1937	12.9	16.4	56	4.6	.3	.1	4.7	1.0	1.0	73.8	(3)	.3	1.1	39.6	131.5	35.0	106.7	320.5	115.6	(3)	3.9	82.3	64.4	19.1
1936	11.7	16.3	55	4.4	.4	.7	7.6	2.1	.1	25.4	(3)	.3	1.9	39.3	132.6	29.2	106.8	310.6	103.2	(3)	4.4	77.0	------	------
1935	10.9	16.1	63	4.5	.1	2.5	6.0	.4	.6	25.8	.3	1.0	2.0	38.4	122.2	26.6	89.7	271.7	93.2	(3)	4.0	75.7	------	------
Wyoming:																						
1937	13.4	18.0	71	8.7	1.7	1.7	12.1	3.5	(3)	159.4	1.7	1.7	5.2	15.6	57.2	6.9	65.8	254.8	202.8	71.0	13.9	22.5	90.1	20.8

[3] No deaths. [3] Data not available. [4] Less than 1/10 of 1 per 100,000 population. [5] January and February

ILLNESS AND MEDICAL CARE IN PUERTO RICO

The rate of bed illness is about one and one-third times higher in Puerto Rico than it is in the United States and the death rate is twice as high. Furthermore, the average duration of illness on the island is 11 days, as compared with 7 days on the continent. Low incomes, crowded and insanitary homes, inadequate diet, and the prevalence of certain endemic diseases are factors which contribute to the high rate of illness in Puerto Rico. These are some of the findings included in a report [1] recently issued by the Public Health Service, in which the authors describe the amount and character of illness in Puerto Rico and a system of medical organization on which most of the people depend for care. The report is based on morbidity and mortality records of local health authorities, published findings of previous investigators, and data secured by a special family survey covering a representative sample of the population.

About 90 percent of the families included in the survey reported an annual income of less than $500. Naturally the amount that such families can devote to medical care is exceedingly small. Because of this widespread condition, an attempt has been made to provide, at public expense, some measure of medical service to a large part of the population. This service, locally known as "Beneficencia", is supported by each municipality with varying degrees of success, depending primarily upon the resources of the individual municipality. In the smaller third-class municipalities, service to several thousand people is limited to that which a single physician can furnish. Larger municipalities are likely to employ professional and lay assistants and to provide some type of hospital facility.

Weaknesses in the beneficencia system are revealed in the excessive patient load of municipal physicians which results in a failure to establish the right kind of contacts with patients and in the frequent replacement of physicians that leads to a lack of continuity of service. The deterioration of existing municipal hospitals is another evidence of the unsatisfactoriness of the present scheme. Practically all municipal hospitals are in need of repair, and only half of them possess equipment which might be used for major surgery. X-ray facilities, laboratory equipment, and an ambulance are found in relatively few municipal hospitals. Equipment in most clinics for ambulatory patients is not sufficient for ordinary diagnostic and treatment purposes. These deficiencies are especially applicable to third-class municipalities which have relatively small public revenues.

[1] Illness and medical care in Puerto Rico. By Joseph W. Mountin, Elliott H. Pennell, and Evelyn Flook. Public Health Bulletin No. 237. Government Printing Office, Washington, 1937.

In the more wealthy first- and second-class municipalities, facilities and services are somewhat better, yet even here they fail to meet the situation.

Professional groups on the island are of the opinion that public medical care would be more effectively and evenly distributed if the insular, rather than the municipal, government assumed primary responsibility for its administration. This opinion is supported by the performance of the insular government in administering public health service and the insular institutions.

Since the survey described in the Bulletin was made, money has become available for the construction of four district hospitals which will be under insular control. It is hoped that, eventually, most of the smaller municipal hospitals can be abandoned except for use as first-aid stations and as quarters for the municipal physician, dentist, pharmacy, and public health unit.

The insular government already has the major responsibility for the institutional care of the insane, the tuberculous, and the leprous, and it operates the only hospital on the island for the care of persons with acute communicable disease. The Insular Hospital for the Insane should be enlarged by approximately 500 beds if it is to meet the demand placed upon it.

It is recognized, of course, that a complete medical service would cost several times the amount now being spent. Since there is little hope of securing such additional funds, the insular health department should concentrate on programs to bring under control such preventable diseases as malaria, hookworm disease, dysentery, and tuberculosis. Thus the sickness burden would be reduced and the demands upon existing medical facilities lessened.

The possibility of greatly improving medical service for the population as a whole appears to lie in a higher centralization of power and responsibility. To the commissioner of health, in conjunction with the insular health department, must eventually fall duties of determining standards of care and of seeing that these standards are observed in the several municipalities. Under this type of professional supervision the municipal physician may be insured greater latitude in planning his individual program and in selecting for attention those patients who are most in need of his services.

This Bulletin, which describes and appraises a system of public medical service that has been in operation for many years, should be of interest to those who are in any way concerned with public medical care.

PROVISIONAL SUMMARY OF NATALITY STATISTICS FOR 1936

A provisional tabulation, recently issued by the Bureau of the Census [1], shows a total of 2,136,059 registered births in the United States in 1936—a decrease of 19,046 from the 2,155,105 births recorded in 1935. In terms of the birth rate (number of live births per 1,000 estimated population), 1936 marks the second consecutive year of decrease and brings the rate, 16.6, approximately equal to the all-time low of 16.5 in 1933. While the 1936 rate is not the low point of the past decade, it indicates a continuation of a general birth rate decline.

Thirty-one States show a decrease in the birth rate, 3 States show no change, and 14 States and the District of Columbia show a slight increase. In no State is the change in birth rate very great.

All data for years prior to 1936 are final tabulations. Figures for 1936 are based on hand counts of copies of birth certificates received by the Bureau of the Census from State offices of vital statistics. For the States for which the shipment of copies to the Bureau of the Census is complete, these provisional figures will agree closely with the final tabulations. In other States it may be expected that a few delayed certificates will be added before final tabulations are completed. In Colorado, transcripts for only 10 months have been received. In Arizona and Illinois, transcripts for only 9 months have been received. In such cases, the 1936 provisional figure is based on the available 1936 data and on 1935 data for the months for which 1936 data are lacking. In the case of Massachusetts, the 1935 figures have been used for the State totals.

Number of live births in each State, 1932–36

State	1936	1935	1934	1933	1932
Registration States	2,136,059	2,155,105	2,167,636	2,081,232	2,074,042
Alabama	58,057	62,239	63,495	59,338	62,939
Arizona	10,036	9,139	8,492	8,125	8,523
Arkansas	32,237	35,684	37,515	35,800	37,450
California	84,417	80,131	78,346	75,036	78,093
Colorado	17,846	18,837	17,849	17,180	17,613
Connecticut	22,228	22,258	22,215	22,437	23,731
Delaware	3,922	4,036	3,988	3,922	4,294
District of Columbia	11,680	10,803	10,137	9,955	10,157
Florida	28,097	28,051	26,716	25,666	27,402
Georgia	61,667	63,260	64,661	60,984	63,717
Idaho	10,138	9,469	9,373	8,557	8,732
Illinois	109,653	111,884	110,226	107,910	111,512
Indiana	54,035	52,909	52,349	50,480	53,073
Iowa	42,650	41,137	42,463	39,575	40,459
Kansas	29,998	30,589	32,463	30,755	31,700
Kentucky	55,766	57,715	59,904	55,325	59,505
Louisiana	42,826	42,270	43,003	39,748	43,298
Maine	15,222	15,723	15,760	15,123	16,129
Maryland	26,587	27,236	27,340	27,440	28,820
Massachusetts	63,001	63,001	63,828	63,445	68,534

[1] Vital Statistics—Special Reports, vol. 3, no. 24, pp. 123–125, June 16, 1937. Bureau of the Census, Department of Commerce.

Number of live births in each State, 1932–36—Continued

State	1936	1935	1934	1933	1932
Michigan	88,426	87,446	83,925	80,923	85,736
Minnesota	47,576	45,962	45,921	44,514	46,377
Mississippi	49,447	48,320	47,863	44,274	46,273
Missouri	55,223	57,299	59,185	57,277	59,949
Montana	10,400	10,029	9,949	8,953	9,091
Nebraska	23,798	23,327	25,085	24,185	25,159
Nevada	1,420	1,423	1,434	1,353	1,260
New Hampshire	7,646	7,768	7,869	7,385	7,808
New Jersey	53,832	54,514	54,541	56,061	61,219
New Mexico	12,225	18,190	12,769	12,304	12,391
New York	182,401	184,344	185,615	187,158	198,431
North Carolina	76,181	78,753	79,704	75,422	77,902
North Dakota	13,385	13,655	14,549	13,189	14,047
Ohio	103,492	101,103	100,100	95,783	101,753
Oklahoma	41,827	43,691	47,302	43,697	41,039
Oregon	13,944	13,179	13,077	12,223	12,847
Pennsylvania	159,410	161,166	160,238	157,046	168,534
Rhode Island	10,190	10,215	10,349	10,352	11,171
South Carolina	39,197	40,598	44,265	40,319	41,518
South Dakota	12,570	12,850	13,173	12,859	13,241
Tennessee	50,570	53,314	52,393	50,148	52,491
Texas	111,036	114,721	116,603	107,950	(1)
Utah	12,532	12,695	12,636	11,910	11,974
Vermont	6,448	6,591	6,593	6,131	6,030
Virginia	51,252	51,487	52,375	51,254	54,582
Washington	23,376	22,396	22,540	20,882	21,379
West Virginia	40,853	41,774	41,476	36,263	38,803
Wisconsin	52,611	52,562	51,419	50,409	53,107
Wyoming	4,728	4,362	4,565	4,207	4,249

[1] Not in registration area.

Birth rates (live births per 1,000 estimated population) for each State, 1927–36

State	1936*	1935	1934	1933	1932	1931	1930	1929	1928	1927
Registration States	16.6	16.9	17.1	16.5	17.4	18.0	18.9	18.9	19.8	20.6
Alabama	20.3	22.0	22.6	21.4	23.0	23.3	24.0	24.0	24.5	26.3
Arizona	24.7	22.5	20.9	19.7	20.3	22.0	24.0	22.4	21.4	20.9
Arkansas	15.9	17.9	19.0	18.4	19.5	21.7	22.1	20.2	20.8	22.1
California	13.9	13.4	13.2	12.8	13.4	14.1	14.8	14.8	15.8	16.6
Colorado	16.7	17.7	16.9	16.3	16.8	17.7	18.1	17.4	18.8	(1)
Connecticut	12.8	13.0	13.1	13.4	14.3	15.6	17.2	17.1	18.0	18.7
Delaware	15.1	15.8	15.8	15.7	17.4	17.4	18.7	18.1	18.3	18.2
District of Columbia	18.9	18.2	18.1	18.3	19.3	18.4	19.1	18.4	18.7	19.1
Florida	17.1	17.4	16.8	16.5	17.9	18.0	18.3	18.8	21.5	25.6
Georgia	20.2	20.8	21.5	20.4	21.5	21.0	20.8	20.1	20.3	(1)
Idaho	20.9	19.8	19.8	18.4	19.0	20.0	20.5	19.8	20.5	20.8
Illinois	14.0	14.3	14.1	13.9	14.4	15.4	16.8	17.0	17.4	18.3
Indiana	15.6	15.4	15.4	15.0	15.9	17.0	18.2	18.3	18.9	19.7
Iowa	16.8	16.2	16.8	15.7	16.2	16.8	17.3	17.1	17.6	18.2
Kansas	15.9	16.3	17.4	16.4	16.9	17.5	17.9	17.4	18.2	18.8
Kentucky	19.3	20.3	21.3	20.0	21.9	21.3	22.6	21.7	23.0	24.3
Louisiana	20.2	19.9	20.3	18.8	20.5	20.5	20.4	20.3	20.5	22.9
Maine	17.8	18.6	18.8	18.2	19.7	20.1	20.2	20.0	20.8	20.7
Maryland	15.9	16.3	16.4	16.6	17.5	17.5	18.5	18.5	19.9	20.5
Massachusetts	14.2	14.4	14.8	14.7	16.0	16.2	17.3	17.5	18.9	19.9
Michigan	18.5	18.5	17.9	17.2	18.0	19.0	20.6	20.8	21.1	22.1
Minnesota	18.1	17.5	17.5	17.1	17.9	18.1	18.5	18.3	19.5	20.2
Mississippi	24.6	24.1	23.8	22.0	23.0	22.5	24.0	22.9	24.4	25.3
Missouri	13.9	14.6	15.3	15.0	15.9	16.4	17.0	16.9	17.6	18.6
Montana	19.6	18.9	18.7	16.8	17.0	18.0	18.6	18.7	18.5	18.1
Nebraska	17.4	17.1	18.4	17.7	18.3	19.4	19.6	19.4	20.5	20.5
Nevada	14.2	14.4	14.6	14.1	13.3	13.2	14.6	14.2	(1)	(1)
New Hampshire	15.1	15.5	15.9	15.1	16.2	16.3	17.8	17.6	18.8	19.2

See footnotes at end of table.

Birth rates (live births per 1,000 estimated population) for each State, 1927–36—Continued

State	1936*	1935	1934	1933	1932	1931	1930	1929	1928	1927
New Jersey	12.4	12.7	12.8	13.3	14.7	15.6	16.8	17.2	18.0	19.1
New Mexico	29.0	31.3	30.3	29.2	29.4	29.1	28.6	27.1	(1)	(1)
New York	14.1	14.3	14.4	14.6	15.6	16.2	17.1	17.5	18.3	19.0
North Carolina	22.0	23.0	23.6	22.6	23.7	23.1	24.1	24.7	26.4	27.7
North Dakota	19.0	19.5	20.9	19.0	20.4	20.9	21.7	21.6	22.2	21.9
Ohio	15.4	15.1	14.9	14.3	15.2	16.2	17.8	17.7	18.5	19.3
Oklahoma	16.5	17.4	19.0	17.7	16.8	17.8	17.7	16.8	18.4	(1)
Oregon	13.7	13.1	13.1	12.3	13.1	13.6	14.1	14.1	15.2	16.1
Pennsylvania	15.7	16.0	16.0	15.8	17.1	18.3	19.6	19.8	21.2	22.4
Rhode Island	15.0	15.0	15.2	15.2	16.3	16.5	17.7	18.0	19.3	20.6
South Carolina	21.1	22.1	24.3	22.4	23.2	22.4	23.2	22.7	25.0	(2)
South Dakota	18.2	18.6	19.0	18.6	19.1	(1)	(1)	(1)	(1)	(1)
Tennessee	17.7	18.9	18.8	18.3	19.4	19.5	20.0	19.5	19.6	21.5
Texas	18.2	18.9	19.3	18.0	(1)	(1)	(1)	(1)	(1)	(1)
Utah	24.3	24.7	24.6	23.2	23.4	23.6	25.4	24.6	26.0	26.2
Vermont	17.0	17.5	17.6	16.5	16.4	18.3	19.2	18.7	19.6	19.6
Virginia	19.2	19.5	20.1	20.0	21.7	21.3	22.5	22.4	23.5	24.3
Washington	14.2	13.7	13.9	13.0	13.4	13.9	14.7	14.6	15.2	15.5
West Virginia	22.3	23.0	23.0	20.3	21.9	22.4	24.0	23.8	25.8	27.1
Wisconsin	18.1	18.1	17.7	17.3	18.2	18.6	19.3	19.0	19.9	20.2
Wyoming	20.3	18.8	19.8	18.3	18.6	19.8	19.8	19.8	20.4	20.6

* 1936 figures are provisional.
[1] Not in registration area.
[2] Dropped from the registration area in 1925; readmitted in 1928.

DEATHS DURING WEEK ENDED JUNE 12, 1937

(From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 12, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,778	8,094
Average for 3 prior years	8,215	
Total deaths, first 23 weeks of year	218,894	215,242
Deaths under 1 year of age	479	574
Average for 3 prior years	564	
Deaths under 1 year of age, first 23 weeks of year	13,492	13,372
Data from industrial insurance companies:		
Policies in force	69,834,315	68,643,260
Number of death claims	12,892	12,498
Death claims per 1,000 policies in force, annual rate	9.6	9.5
Death claims per 1,000 policies, first 23 weeks of year, annual rate	10.9	10.8

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 19, 1937, and June 20, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
New England States:								
Maine	2	2	-------	-------	16	534	0	0
New Hampshire	-------	-------	-------	-------	76	6	0	0
Vermont	-------	-------	-------	-------	2	301	0	0
Massachusetts	-------	2	-------	-------	460	834	3	0
Rhode Island	-------	2	-------	-------	35	13	1	3
Connecticut	13	3	-------	-------	72	107	0	0
Middle Atlantic States:								
New York	42	39	[1] 9	[1] 4	1,384	1,985	4	9
New Jersey	7	8	3	9	787	647	1	1
Pennsylvania	18	40	-------	-------	1,408	587	7	7
East North Central States:								
Ohio	13	17	7	11	898	217	1	4
Indiana [2]	3	6	3	5	262	12	2	0
Illinois	26	42	19	23	427	36	3	10
Michigan	17	21	1	-------	189	86	1	3
Wisconsin	2	2	11	18	59	186	2	2
West North Central States:								
Minnesota	1	4	1	1	3	103	0	1
Iowa [3]	2	3	-------	-------	5	6	1	0
Missouri	7	13	33	32	69	9	0	1
North Dakota	2	-------	1	-------	-------	2	0	0
South Dakota	1	8	-------	-------	3	-------	0	0
Nebraska	-------	2	-------	-------	17	19	0	0
Kansas	6	5	1	11	24	5	0	0
South Atlantic States:								
Delaware	-------	-------	-------	-------	5	17	0	0
Maryland [3 4]	1	12	1	-------	123	265	0	4
District of Columbia [3]	3	14	-------	-------	93	107	3	1
Virginia [3]	6	10	-------	-------	181	112	4	9
West Virginia	9	4	13	18	75	40	1	5
North Carolina [3]	11	8	17	1	196	28	3	9
South Carolina	2	1	56	52	49	19	0	1
Georgia [3]	2	3	-------	-------	-------	-------	0	0
Florida [3]	8	-------	-------	10	-------	7	0	2
East South Central States:								
Kentucky	6	2	5	8	205	29	5	8
Tennessee	4	3	18	20	127	11	0	4
Alabama [3]	5	9	7	5	27	1	4	2
Mississippi	3	3	-------	-------	-------	-------	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 19, 1937, and June 20, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
West South Central States:								
Arkansas	3	1	4	4	3	-------	0	0
Louisiana	16	16	21	8	10	8	4	1
Oklahoma [1]	3	5	4	14	48	1	1	3
Texas [2]	35	-------	138	84	239	158	5	2
Mountain States:								
Montana [2]	-------	-------	-------	2	5	3	0	1
Idaho [2]	-------	-------	6	-------	51	18	0	0
Wyoming [2] [6]	-------	-------	-------	-------	1	-------	0	0
Colorado	3	1	-------	-------	47	21	0	0
New Mexico	5	3	-------	1	46	16	0	0
Arizona	3	4	20	18	16	52	0	0
Utah [2] [4]	-------	-------	-------	-------	77	41	0	1
Pacific States:								
Washington	2	1	-------	-------	54	178	1	0
Oregon	2	-------	7	8	3	34	0	2
California	36	22	110	517	162	1, 107	2	4
Total	330	336	516	884	8, 039	7, 968	59	101
First 24 weeks of year	10, 995	12, 089	272, 055	137, 150	210, 220	243, 679	3, 575	5, 224

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
New England States:								
Maine	0	0	5	15	0	0	0	1
New Hampshire	0	0	4	7	0	0	0	0
Vermont	0	0	4	14	0	0	1	4
Massachusetts	3	0	137	133	0	0	0	3
Rhode Island	0	1	19	24	0	0	0	0
Connecticut	0	0	85	21	0	0	1	0
Middle Atlantic States:								
New York	2	1	447	449	0	0	7	11
New Jersey	1	0	95	184	0	0	0	3
Pennsylvania	1	0	204	416	0	0	12	26
East North Central States:								
Ohio	1	0	76	92	5	0	8	6
Indiana [2]	0	0	46	49	9	1	3	1
Illinois	0	4	319	301	12	12	14	9
Michigan	3	1	576	283	2	0	5	2
Wisconsin	1	0	185	296	7	4	1	4
West North Central States:								
Minnesota	0	0	89	120	9	17	0	0
Iowa [2]	0	0	69	76	25	17	7	4
Missouri	1	0	93	80	10	0	7	14
North Dakota	0	0	11	29	13	4	0	2
South Dakota	0	0	26	14	3	17	0	0
Nebraska	0	0	16	31	1	9	0	0
Kansas	1	1	63	90	5	4	1	4
South Atlantic States:								
Delaware	0	0	2	-------	0	0	0	0
Maryland [2] [4]	0	0	19	36	0	0	6	4
District of Columbia [2]	0	0	7	5	0	0	0	0
Virginia [2]	3	0	5	19	0	0	8	6
West Virginia	0	1	28	13	0	0	4	4
North Carolina [2]	3	0	18	17	0	1	3	9
South Carolina	0	0	1	1	0	5	12	12
Georgia [2]	0	0	4	8	0	0	23	21
Florida [2]	0	0	4	3	0	0	4	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 19, 1937, and June 20, 1936

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
East South Central States:								
Kentucky	0	0	31	14	0	1	9	4
Tennessee	9	0	4	10	0	0	13	17
Alabama [2]	4	9	4	3	0	0	10	17
Mississippi	17	0	6	6	0	1	7	8
West South Central States:								
Arkansas	3	0	9	----	0	0	11	2
Louisiana	1	1	8	5	0	1	18	16
Oklahoma [3]	1	0	13	10	1	3	13	10
Texas [2]	6	1	57	27	7	2	30	10
Mountain States:								
Montana [2]	0	0	----	32	36	21	2	1
Idaho [2]	0	0	11	6	3	0	1	1
Wyoming [2] [6]	0	0	6	17	2	7	0	0
Colorado	0	0	12	18	0	0	1	0
New Mexico	0	0	17	19	0	0	1	4
Arizona	0	0	7	9	0	0	2	2
Utah [2] [4]	0	1	12	20	0	9	0	0
Pacific States:								
Washington	0	0	25	39	3	0	2	3
Oregon	2	1	16	47	13	1	0	4
California	6	6	138	219	14	7	7	19
Total	69	28	3,033	3,327	180	144	254	271
First 24 weeks of year	575	430	152,197	166,178	7,078	5,235	3,069	3,120

[1] New York City only.
[2] Typhus fever, week ended June 19, 1937, 47 cases, as follows: Indiana, 1; North Carolina, 3; Georgia, 18; Florida, 2; Alabama, 6; Texas, 17.
[3] Rocky Mountain spotted fever, week ended June 19, 1937, 18 cases, as follows: Iowa, 1; Maryland, 3; District of Columbia, including 2 cases for preceding week, 3; Virginia, 1; Montana, 4; Idaho, 3; Wyoming, 2; Utah, 1.
[4] Week ended earlier than Saturday.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[6] Colorado tick fever, week ended June 19, 1937, Wyoming, 2 cases.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1937										
Alabama	53	39	372	262	107	31	3	27	5	14
California	18	159	231	14	1,267	13	15	826	115	24
Indiana	11	29	55	----	2,677	----	2	458	73	4
Maryland	13	33	26	2	1,832	1	0	166	0	9
Michigan	9	62	3	3	770	----	5	3,191	17	13
Minnesota	10	10	4	----	58	----	0	605	105	1
Mississippi	5	9	1,507	4,462	1,407	557	19	20	3	19
Missouri	13	78	253	33	302	1	5	1,872	217	32
Nevada	----	----	11	----	43	----	0	30	1	1
New Jersey	3	47	25	2	7,282	----	----	768	0	5
New York	29	125	----	3	6,519	----	1	3,458	0	25
Ohio	21	74	100	1	7,203	----	1	1,451	2	26
Pennsylvania	28	97	----	----	6,479	2	3	2,715	0	21
South Dakota	1	3	3	----	13	----	0	201	12	0
Vermont	----	6	----	----	15	----	1	57	0	0

Summary of monthly reports from States—Continued

May 1937

	Cases
Actinomycosis:	
Michigan	1
Anthrax:	
New Jersey	1
New York	1
Pennsylvania	1
Botulism:	
California	1
Chicken pox:	
Alabama	156
California	4,310
Indiana	304
Maryland	640
Michigan	1,598
Minnesota	704
Mississippi	703
Missouri	348
Nevada	26
New Jersey	1,721
New York	3,632
Ohio	503
Pennsylvania	3,187
South Dakota	42
Vermont	129
Dengue:	
Mississippi	8
Diarrhea:	
Maryland	9
Ohio (under 2 years; (enteritis included)	9
Dysentery:	
Alabama (amoebic)	1
California (amoebic)	13
Calfornia (bacillary)	25
Maryland (bacillary)	4
Michigan (amoebic)	2
Michigan (bacillary)	1
Minnesota (amoebic)	1
Minnesota (bacillary)	1
Mississippi (amoebic)	109
Mississippi (bacillary)	2,140
Missouri	4
New Jersey (amoebic)	2
New York (amoebic)	3
New York (bacillary)	22
Ohio (bacillary)	1
Encephalitis:	
Alabama	5
California	1
Maryland	1
Missouri	1
New York	13
Ohio	7
Pennsylvania	2
Food poisoning:	
California	97
German measles:	
Alabama	14
California	170
Maryland	44
Michigan	1,321
New Jersey	270
New York	337
Ohio	90
Pennsylvania	334
Vermont	8
Granuloma, coccidioidal:	
California	2
Hookworm disease:	
Mississippi	413
Impetigo contagiosa:	
Maryland	2
Jaundice, epidemic:	
California	2
Lead poisoning:	
Ohio	18
Leprosy:	
California	1
Mumps:	
Alabama	184
California	2,967
Indiana	199
Maryland	621
Michigan	2,003
Mississippi	817
Missouri	114
Nevada	3
New Jersey	1,100
Ohio	384
Pennsylvania	2,604
South Dakota	7
Vermont	196
Ophthalmia neonatorum:	
Alabama	3
California	2
Maryland	3
Mississippi	6
Missouri	1
New Jersey	15
New York [1]	3
Ohio	70
Pennsylvania	5
Paratyphoid fever:	
California	5
Maryland	1
Michigan	3
New Jersey	2
New York	7
Ohio	1
Puerperal septicemia:	
Mississippi	37
Ohio	2
Rabies in animals:	
Alabama	118
California	227
Indiana	73
Michigan	3
Mississippi	24
Missouri	5
New Jersey	14
New York [1]	8
Rabies in man:	
Mississippi	1
Rocky Mountain spotted fever:	
California	1
Maryland	2
Nevada	5
South Dakota	2
Scabies:	
Maryland	1
Septic sore throat:	
California	12
Indiana	1
Maryland	16
Michigan	30
Septic sore throat—Con.	
Minnesota	6
Missouri	95
New York	93
Ohio	120
South Dakota	1
Tetanus:	
Alabama	3
California	5
Indiana	1
Maryland	1
Missouri	2
New York	6
Ohio	3
Trachoma:	
California	9
Michigan	1
Minnesota	4
Mississippi	5
Missouri	42
New Jersey	3
Pennsylvania	1
South Dakota	2
Trichinosis:	
California	2
New York	7
Tularaemia:	
Alabama	3
California	1
Maryland	1
Minnesota	2
Missouri	1
Typhus fever:	
Alabama	25
California	3
Undulant fever:	
Alabama	8
California	11
Indiana	1
Maryland	5
Michigan	11
Minnesota	6
Mississippi	1
Missouri	4
New Jersey	8
New York	10
Ohio	1
Pennsylvania	5
Vermont	2
Vincent's infection:	
Maryland	14
Michigan	13
New York [1]	74
Whooping cough:	
Alabama	197
California	2,497
Indiana	352
Maryland	414
Michigan	865
Minnesota	594
Mississippi	938
Missouri	621
Nevada	50
New Jersey	499
New York	1,412
Ohio	1,448
Pennsylvania	1,372
South Dakota	20
Vermont	104

[1] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 12, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	187	80	28	4,921	476	1,645	13	405	40	1,315	----
Current week	135	44	26	3,678	414	1,608	14	391	38	1,336	----
Maine:											
Portland	0	----	0	8	1	2	0	1	0	1	27
New Hampshire:											
Concord	0	----	0	0	0	1	0	0	0	0	6
Manchester	0	----	2	0	1	0	0	0	0	0	15
Nashua	1	----	----	0	----	0	0	----	0	0	5
Vermont:											
Barre	0	----	0	0	0	0	0	1	0	0	4
Burlington	0	----	0	0	0	0	0	0	0	0	6
Rutland	0	----	0	0	1	0	0	0	0	1	8
Massachusetts:											
Boston	1	----	0	46	14	35	0	7	0	46	190
Fall River	0	----	0	72	0	1	0	2	0	1	27
Springfield	0	----	0	1	0	4	0	1	0	21	29
Worcester	0	----	0	6	6	7	0	0	0	15	43
Rhode Island:											
Pawtucket	0	----	0	0	0	1	0	0	0	0	11
Providence	0	----	0	57	4	32	0	1	0	36	65
Connecticut:											
Bridgeport	0	----	0	2	2	40	0	0	0	3	26
Hartford	0	----	0	43	1	4	0	1	1	1	32
New Haven	0	1	0	3	1	3	0	0	0	0	37
New York:											
Buffalo	0	1	1	74	20	22	0	8	0	16	133
New York	39	5	2	823	80	181	0	93	6	82	1,446
Rochester	0	----	0	8	2	6	0	1	0	18	51
Syracuse	0	----	1	34	2	20	0	0	0	30	43
New Jersey:											
Camden	2	----	1	17	1	1	0	1	1	3	20
Newark	0	----	0	28	4	6	0	7	0	15	86
Trenton	0	----	0	32	5	1	0	1	0	3	32
Pennsylvania:											
Philadelphia	6	4	3	39	16	109	0	29	1	69	444
Pittsburgh	3	2	1	354	14	30	0	8	1	40	150
Reading	0	----	0	76	0	9	0	2	0	3	25
Scranton	0	----	----	1	----	7	0	----	0	0	----
Ohio:											
Cincinnati	1	----	0	75	8	14	0	5	0	17	116
Cleveland	2	1	0	592	15	88	0	10	0	39	174
Columbus	0	----	0	24	3	6	0	9	1	30	80
Toledo	1	1	1	306	2	4	0	3	0	29	72
Indiana:											
Anderson	0	----	0	29	0	1	0	1	0	0	8
Fort Wayne	0	----	1	0	2	2	0	3	0	1	33
Indianapolis	2	----	2	223	12	8	0	6	0	17	91
Muncie	0	----	0	15	2	2	0	0	0	3	11
South Bend	0	----	1	0	1	6	0	0	0	0	17
Terre Haute	0	----	0	0	0	0	1	0	0	0	14
Illinois:											
Alton	0	----	0	0	0	1	0	1	0	0	6
Chicago	20	8	1	316	30	251	0	30	1	40	629
Elgin	0	----	0	0	1	2	0	0	0	1	11
Moline	0	----	0	0	1	1	5	0	0	10	5
Springfield	0	----	1	7	0	2	0	0	1	9	15
Michigan:											
Detroit	9	1	0	94	13	363	5	21	3	60	230
Flint	1	----	0	0	4	15	0	0	0	0	26
Grand Rapids	0	----	0	52	2	6	0	0	0	20	27
Wisconsin:											
Kenosha	0	----	0	0	0	4	0	0	0	0	5
Madison	0	----	0	1	0	3	0	0	0	0	14
Milwaukee	0	----	0	10	5	60	0	3	0	23	95
Racine	0	----	0	1	0	11	0	0	0	1	12
Superior	1	----	0	0	1	1	0	0	0	8	10

City reports for week ended June 12, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	------	0	0	0	30	0	1	0	1	22
Minneapolis	1	------	1	1	5	19	0	5	0	21	89
St. Paul	0	------	0	2	5	3	0	1	0	61	48
Iowa:											
Cedar Rapids	0	------	--------	0	-------	1	0	-------	0	2	--------
Davenport	0	------	--------	0	-------	2	1	-------	0	0	--------
Des Moines	0	------	--------	0	-------	12	0	-------	0	0	33
Sioux City	0	------	--------	0	-------	7	0	-------	0	2	--------
Waterloo	1	------	--------	0	-------	3	0	-------	0	2	--------
Missouri:											
Kansas City	1	------	0	1	4	16	0	5	0	10	89
St. Joseph	0	------	0	0	0	4	0	5	0	1	26
St. Louis	4	------	1	33	7	47	1	3	1	42	219
North Dakota:											
Fargo	0	------	0	1	0	1	1	0	0	3	7
Grand Forks	0	------	--------	0	-------	1	1	-------	0	4	--------
Minot	0	------	0	0	0	0	1	0	0	0	6
South Dakota:											
Aberdeen	1	------	--------	0	-------	1	0	-------	0	0	--------
Nebraska:											
Omaha	0	------	0	0	1	4	0	2	1	10	59
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	4	3
Topeka	0	------	0	0	0	6	0	0	0	13	21
Wichita	0	------	0	5	2	0	0	1	0	9	23
Delaware:											
Wilmington	0	------	0	0	4	4	0	0	0	0	22
Maryland:											
Baltimore	3	------	0	114	16	9	0	10	4	86	218
Cumberland	0	------	0	0	0	0	0	0	0	4	4
Frederick	0	------	0	0	2	0	0	0	0	0	3
Dist. of Col.:											
Washington	7	------	0	93	6	6	0	11	0	20	152
Virginia:											
Lynchburg	0	------	0	3	1	1	0	0	0	21	13
Norfolk	0	------	0	8	3	0	0	1	0	2	33
Richmond	0	------	1	0	0	1	0	0	4	0	34
Roanoke	0	------	0	21	0	0	0	0	0	2	18
West Virginia:											
Charleston	0	------	0	1	2	1	0	1	0	0	30
Huntington	0	------	--------	0	-------	1	0	-------	0	0	--------
Wheeling	0	------	0	1	2	0	0	0	0	13	20
North Carolina:											
Gastonia	0	------	--------	0	-------	0	0	-------	0	0	--------
Raleigh	0	------	0	1	0	0	0	2	0	7	13
Wilmington	0	------	0	1	1	0	0	0	1	10	18
Winston-Salem	1	------	0	0	0	1	0	0	0	13	8
South Carolina:											
Charleston	0	2	0	0	2	0	0	0	0	3	26
Florence	0	------	0	0	0	0	0	0	0	0	6
Greenville	0	------	0	0	2	0	0	1	0	2	24
Georgia:											
Atlanta	1	------	0	1	9	1	0	4	2	18	76
Brunswick	0	------	0	0	0	0	0	0	0	2	3
Savannah	0	2	0	1	1	0	0	3	1	4	31
Florida:											
Miami	0	------	0	0	2	0	0	3	0	4	40
Tampa	0	1	1	12	1	0	0	1	0	10	26
Kentucky:											
Covington	0	0	0	36	1	0	0	0	0	5	--------
Lexington	0	------	0	5	2	0	0	2	0	10	21
Louisville	0	------	0	60	3	14	0	3	0	52	55
Tennessee:											
Knoxville	1	------	0	0	1	0	0	1	0	0	28
Memphis	1	------	0	57	3	0	0	9	0	23	72
Nashville	0	------	0	8	4	1	0	2	0	2	39
Alabama:											
Birmingham	1	4	2	13	3	0	0	7	1	5	57
Mobile	0	------	1	0	0	0	0	0	0	0	16
Montgomery	0	------	--------	0	-------	1	0	-------	1	1	--------
Arkansas:											
Fort Smith	0	------	--------	0	-------	0	0	-------	1	0	--------
Little Rock	0	------	0	0	1	2	0	0	0	0	--------
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	2	4
New Orleans	6	4	2	0	9	7	0	14	1	4	150
Shreveport	0	------	0	0	4	0	0	1	1	0	39

City reports for week ended June 12, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Muskogee	0	------	--------	2	-------	0	0	-------	0	0	--------
Oklahoma City	0	2	0	0	5	4	0	2	0	0	45
Tulsa	0	------	--------	11	-------	1	0	-------	0	5	--------
Texas:											
Dallas	7	------	0	23	3	2	0	3	2	18	55
Fort Worth	0	------	0	2	1	3	0	2	0	6	24
Galveston	0	------	0	0	1	0	0	1	0	0	19
Houston	5	------	0	0	5	2	0	4	0	2	75
San Antonio	1	------	0	0	4	0	0	5	0	0	57
Montana:											
Billings	0	------	0	0	1	0	0	0	0	0	5
Great Falls	0	------	0	0	1	2	3	0	0	3	7
Helena	0	------	0	1	0	1	0	0	0	0	3
Missoula	0	------	0	0	0	0	3	0	0	0	4
Idaho:											
Boise	0	------	0	0	0	0	0	0	0	1	8
Colorado:											
Colorado Springs	0	------	0	0	2	4	0	1	0	0	10
Denver	2	------	0	20	2	8	0	4	1	29	78
Pueblo	0	------	0	1	1	0	0	0	0	0	8
New Mexico:											
Albuquerque	1	------	0	8	0	1	0	3	0	1	10
Utah:											
Salt Lake City	0	------	1	34	0	6	0	3	0	4	32
Washington:											
Seattle	1	------	0	12	6	1	0	5	0	50	80
Spokane	0	------	0	35	1	3	0	2	0	13	25
Tacoma	0	------	0	0	1	3	0	0	0	1	19
Oregon:											
Portland	0	------	0	1	4	9	0	2	0	6	84
Salem	0	------	--------	0	-------	1	0	-------	0	1	--------
California:											
Los Angeles	2	7	1	18	13	34	0	18	1	82	335
Sacramento	1	------	0	29	4	12	0	2	1	2	30
San Francisco	3	1	0	23	7	19	0	5	0	48	160

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Maryland:			
Boston	1	0	1	Baltimore	3	0	0
Rhode Island:				Cumberland	1	0	0
Pawtucket	1	0	0	Virginia:			
New York:				Richmond	1	0	0
Buffalo	3	0	0	North Carolina:			
New York	3	3	0	Wilmington	1	0	0
Rochester	0	1	0	South Carolina:			
New Jersey:				Charleston	1	0	0
Newark	2	0	0	Florida:			
Pennsylvania:				Tampa	1	0	0
Philadelphia	3	0	0	Kentucky:			
Pittsburgh	1	0	0	Louisville	1	0	0
Ohio:				Tennessee:			
Cleveland	2	0	0	Memphis	0	1	0
Indiana:				Louisiana:			
Indianapolis	2	1	0	New Orleans	1	1	1
Illinois:				Shreveport	0	2	0
Chicago	4	0	1	Texas:			
Michigan:				Fort Worth	0	0	2
Detroit	1	0	1	Houston	1	0	1
Wisconsin:				Washington:			
Madison	0	0	1	Seattle	0	1	0
Missouri:				California:			
St. Louis	0	1	0	Los Angeles	0	0	1
Nebraska:							
Omaha	0	0	1				

Encephalitis, epidemic or lethargic.—Cases: Baltimore, 1.
Pellagra.—Cases: Boston, 1; Raleigh, 1; Wilmington, N. C., 1; Atlanta, 1; Savannah, 4; Birmingham, 2; San Francisco, 1.
Typhus fever.—Cases: Montgomery, 1; Houston, 1.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended June 5, 1937.—During the 4 weeks ended June 5, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	13	2	Scarlet fever	3	
Leprosy	1		Tuberculosis	24	3
Malaria	[1] 30	2	Typhoid fever	[1] 61	14
Poliomyelitis	[1] 5				

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended May 29, 1937.—During the 4 weeks ended May 29, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		1		8			9
Chicken pox		18	1	2		1	22
Diphtheria	1	15	2	3	2	1	24
Dysentery (amoebic)				1			1
Leprosy		3		2	1	4	10
Malaria	62	32	3	101	62	139	399
Measles			23			2	25
Poliomyelitis	1	6		1		1	9
Scarlet fever		3					3
Tracnoma				1			1
Tuberculosis	34	15	37	77	29	31	223
Typhoid fever	12	64	21	50	20	46	213

JAMAICA

Communicable diseases—4 weeks ended June 12, 1937.—During the 4 weeks ended June 12, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy		2
Chicken pox	4	55	Puerperal fever		3
Diphtheria	2	1	Tuberculosis	38	67
Dysentery	7	8	Typhoid fever	9	43
Erysipelas		1			

YUGOSLAVIA

Communicable diseases—4 weeks ended May 23, 1937.—During the 4 weeks ended May 23, 1937, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	28	3	Poliomyelitis	8	2
Cerebrospinal meningitis	57	16	Scarlet fever	255	2
Diphtheria and croup	498	32	Sepsis	9	4
Dysentery	17		Tetanus	35	17
Erysipelas	228	4	Typhoid fever	185	18
Measles	738	9	Typhus fever	136	11
Paratyphoid fever	21				

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

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 25, 1937, pages 858-871. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 30, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

Siam.—A report dated June 2, 1937, from the American Consulate General at Bangkok, Siam, relative to the cholera epidemic in Siam, states that the number of new cases and deaths declined throughout May. A total of 1,301 new cases, with 780 deaths, was reported for the entire country from May 1 to May 30, as compared with 2,954 cases and 1,928 deaths for the preceding month.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—A rat found June 17, 1937, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague-infected.

Smallpox

Uruguay.—During the week ended February 13, 1937, 1 case of smallpox was reported in Uruguay.

Typhus Fever

Chile—Iquique.—On May 19, 1937, 1 case of typhus fever was reported in Iquique, Chile.

China—Nanking.—During the week ended May 8, 1937, 3 cases of typhus fever were reported in Nanking, China.

Libya.—During the period May 21–31, 1937, 13 cases of typhus fever were reported in Libya.

Yellow Fever

Brazil.—Deaths from yellow fever have been reported in Brazil as follows: Minas Geraes State—Arary, Apr. 21, 1; Bom Successo, Apr. 29, 1. Para State—Santa Izabel, Apr. 21, 1 (first appearance). Sao Paulo State—Indaiatuba, Mar. 28, 1; Jundiai, Mar. 31, 1; Mogi das Cruzes, Apr. 17–18, 2 (first appearance); Parnaiba, Mar. 29, 1, Apr. 6, 1; Presidente Prudente, Apr. 20, 1; Presidente Wenceslau, Apr. 1–13, 6; Regente Feijo, Mar. 29–Apr. 10, 3; Santo Anastacio, Apr. 5, 1; Valparaizo, Mar. 18, 1 (first appearance).

Gold Coast.—On June 15, 1937, yellow fever was reported in Gold Coast as follows: 1 suspected fatal case at Accra, and 2 suspected fatal cases at Mepom.

Paraguay.—A dispatch dated June 4, 1937, from the United States legation in Asuncion, states that yellow fever has been officially reported in the Northwestern part of Paraguay. It was reported that arrangements had been made to renew the services of the Rockefeller Foundation, which the former Government had permitted to lapse.

Senegal—Linguere.—On June 17, 1937, 1 suspected case of yellow fever was reported in Linguere, Senegal.

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