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## CULTIVATION OF THE RICKETTSIAE OF ROCKY MOUNTAIN SPOTTED FEVER IN VITRO

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The cultivation of the rickettsiae of Rocky Mountain spotted fever, *Rickettsia rickettsi*, has been reported by Wolbach and Schlesinger (1), Pinkerton (2), Pinkerton and Hass (3), da Cunha (4), Breinl (5), Bengtson and Dyer (6), Bengtson (7), and Breinl and Chrobok (8). Wolbach and Schlesinger, Pinkerton, and Pinkerton and Hass employed plasma clot tissue cultures; da Cunha, and Bengtson and Dyer, the chorio-allantoic membrane of living chick embryo; and Breinl and Bengtson, the Maitland medium with minced chick embryo in a mixture of a guinea pig or rabbit serum and Tyrode's solution. Breinl and Chrobok have recently reported their results using Maitland medium with guinea pig tunica. Da Cunha cultivated the virus of typhus exanthematicus of Sao Paulo, corresponding with Rocky Mountain spotted fever in this country, in the chorio-allantoic membrane of chick embryo. Hass and Pinkerton (9) have recently reported the cultivation of the rickettsiae of boutonneuse fever, a member of the Rocky Mountain spotted fever group, both in plasma clot tissue cultures and in Maitland media.

### EXPERIMENTAL

The work here reported is concerned with cultivation of the rickettsiae of Rocky Mountain spotted fever in modified Maitland (10) media.

The media were prepared by combining 1 cc of fresh guinea pig serum with 4 cc of Tyrode's solution or Baker's (11) solution using (a) minced chorio-allantoic membrane of the chick embryo and (b) guinea pig tunica vaginalis. Fifty-cc Erlenmeyer flasks were used as containers.

In the early part of the work with the chick embryo membrane as tissue, Tyrode's solution was employed. More numerous rickettsiae were obtained with Baker's solution and this solution was therefore substituted for the Tyrode's solution for the remainder of the study. The solution was prepared according to the formula of Baker for the

cultivation of fibroblasts and epithelial cells.<sup>1</sup> It may be that the solution has the effect of prolonging the viability of the tissue, though this point requires further investigation.

Breinl, who used minced 10-day-old chick embryo tissue with Tyrode's solution in the Maitland media, was not able to demonstrate rickettsiae, though the virus was kept alive through seven passages, as shown by animal inoculations. In the studies here reported, in which Maitland media with chick embryo chorio-allantoic membrane was employed, rickettsiae were demonstrated with great difficulty when Tyrode's solution was employed but usually rather readily after Baker's solution was used. In Breinl's later work in collaboration with Chrobok, in which guinea pig tunica with guinea pig serum and Tyrode's solution were used, rickettsiae were not demonstrated in the early passages and first appeared after the 8th passage in one series and after the 5th passage in another. In our work, using Baker's solution instead of Tyrode's solution, rickettsiae were seen from the beginning.

The strain employed for transplanting was the Bitterroot strain of Rocky Mountain spotted fever which has been carried in guinea pigs for a number of years at the National Institute of Health.

(1) CULTIVATION IN MAITLAND MEDIA IN WHICH CHICK EMBRYO CHORIO-ALLANTOIC MEMBRANE WAS EMPLOYED AS TISSUE

The first generation of growth was obtained on the chorio-allantoic membrane of the living chick embryo. Embryos incubated for 10 to 12 days were inoculated with infected guinea pig spleen, blood, or serum. After 4 or 5 days' further incubation, the chorio-allantoic membrane was removed, minced, and transferred to Erlenmeyer flasks containing the mixtures of guinea pig serum and Tyrode's or Baker's solution. Incubator temperatures of 30° and 37° C. were used, and the periods of incubation varied from 10 to 14 days. Sub-

	Per 100 cc
<sup>1</sup> Witte's peptone.....	675.00 mg.
Cysteine hydrochloride.....	9.00 mg.
Hemin.....	0.0036 mg.
Insulin.....	0.09 units.
Thyroxine.....	0.0009 mg.
Glucose.....	100.00 mg.
Serum homologous to the tissue.....	10.00 cc.
Vitamin A.....	500.00 to 1,800.00 units.
Vitamin D.....	About 15.00 to 30.00 units.
Vitamin C (crystalline ascorbic acid).....	0.25 mg.
Glutathione.....	1.00 mg.
Phenol red.....	5.00 mg.
Sodium chloride.....	720.00 mg.
Potassium chloride.....	18.00 mg.
Calcium chloride, anhydrous.....	18.00 mg.
Magnesium chloride, 6H <sub>2</sub> O.....	9.00 mg.
Sodium dihydrogen phosphate.....	4.50 mg.
Sodium bicarbonate, anhydrous.....	100.00 mg.

The writer is indebted to Dr. A. Packchanian for the preparation of the Baker's solution.

sequent transplants were made to flasks containing fresh minced chorio-allantoic membrane from 13- to 14-day-old chick embryos. In making transplants, 0.1 cc of the suspension of tissue was placed in a sterile watch glass, and to this was added a portion of fresh chorio-allantoic membrane. The mixture was minced very fine and allowed to stand at room temperature for 15 to 20 minutes, and then it was distributed among 3 or 4 flasks of medium. The flasks were closed with rubber stoppers and sealed with paraffin. At the time of transplanting, a portion of tissue was prepared for microscopic examination and some of the culture was inoculated into guinea pigs to determine virulence.

**Results.**—In 6 series of transplants the cultures were maintained through passages varying from 4 to 14. At the time of transplanting, 1 cc of culture was inoculated intraperitoneally into each of 2 guinea pigs. The results of the inoculations are shown in table 1. Positive results were obtained in 81 percent of the animals inoculated. Typical temperature elevations, often with scrotal redness and swelling, followed by death, occurred in 113 of the 172 animals inoculated. The 59 survivals were tested for immunity by injecting 2 cc of guinea pig blood virus. Thirty-five of the survivals were found to be immune, while 14 were nonimmune, indicating lack of growth or not sufficient growth in the particular flasks containing the cultures with which these animals were inoculated.

TABLE 1.—Summary of 6 experiments on the cultivation of *Rickettsia rickettsi*<sup>1</sup>

Experiment no.	Culture no.	Temperature of incubator °C	Number of generations	Number of guinea pigs inoculated	Number of deaths with typical symptoms	Number of survivals	Immune survivals	Nonimmune survivals
1.....	BR 616 (13).....	30	4	8	6	2	1	1
2.....	BR 616 (15).....	30	5	32	25	7	4	3
3.....	BR 616 (16).....	30	7	14	7	7	5	2
4.....	BR 704.....	30	6	22	11	11	7	4
5.....	BR 711 (7b).....	30	14	68	46	22	14	13
6.....	BR 909.....	37	4	28	18	10	9	1
	Total.....			172	113	59	35	14

<sup>1</sup> 5 died from other causes before immunity tests were made.

The temperature curves and the results of the immunity tests in three of the transplants in series BR 711 (7b) are shown in figure 1. As a rule, in all the series of transplants the majority of animals developed symptoms of such severity that death ensued, indicating no diminution in virulence of the strain. In one series of transplants, however, BR 704 (9a), 7 of 10 animals inoculated with cultures in 5 transplants survived and were immune. In the 6th passage the 2 animals inoculated with culture survived after presenting atypical temperature curves and were found to be nonimmune when inoculated with blood virus. In this series apparently the virus had diminished in virulence.

*Rickettsiae*.—Material to be examined for rickettsiae was spread in a thin layer on slides and stained with Giemsa. A few observations were also made on sections, but these appeared less satisfactory for determination of rickettsiae. In the early transfers, in which Tyrode's solution was employed, the rickettsiae were not numerous, and it was often difficult to find them. In the later transfers, in which Baker's solution was substituted for the Tyrode's solution, rickettsiae were more numerous, and in a few specimens so numerous that they were present in most of the fields. However, they were not always present even when Baker's solution was used.

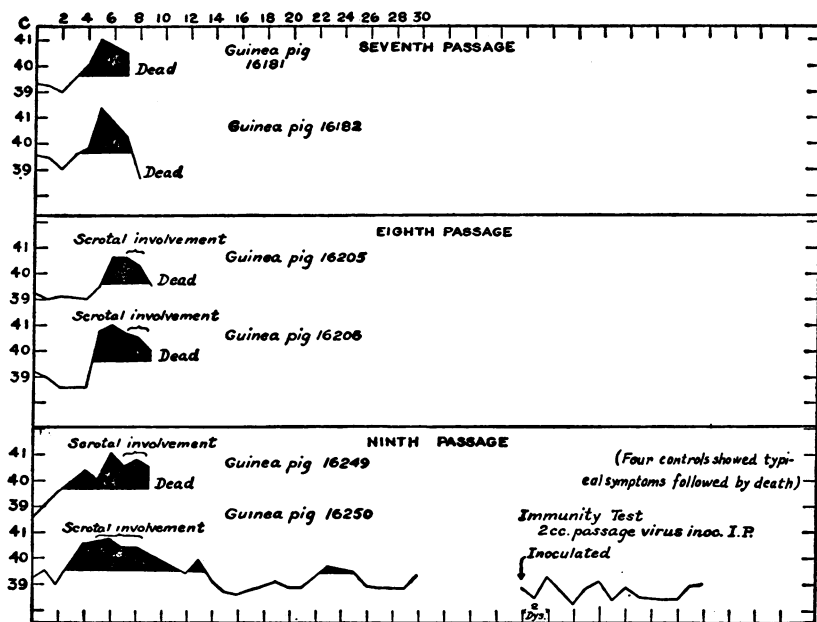
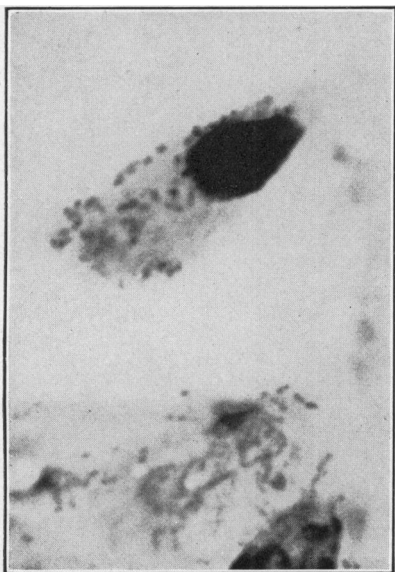


FIGURE 1.—Daily temperature record. B. R. 711 (7b)—Cultures inoculated intraperitoneally.

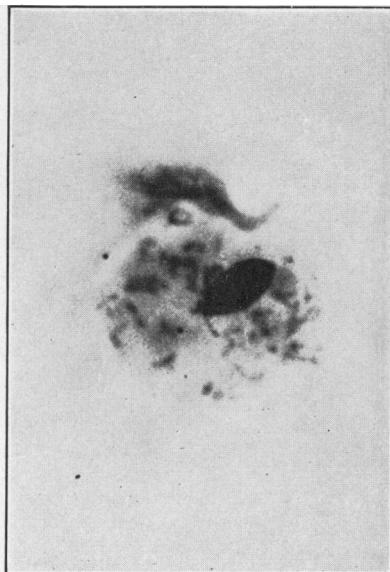
Contrary to the findings of Pinkerton, who employed plasma clot tissue cultures, the rickettsiae were not found definitely in the nucleus, but they were readily demonstrated in the cytoplasm of certain cells (pls. I and II). The cells involved were principally of two varieties—one a cell with a comparatively large, oval, lightly stained, mottled nucleus with definite nucleolus, representing the ectodermal epithelial cells, and the other a smaller cell with a small dense flattened nucleus, or with small multiple nuclei, which probably corresponds with the endothelial cells lining the capillaries and blood vessels. The organisms within the cells were never very numerous, certainly not packed. Quite frequently rickettsiae were observed in tissues showing no definite cellular structure and also at distances considerably removed from the tissue. There was no evidence however, to indicate



Rickettsiae of Rocky Mountain spotted fever in Maitland medium with chick embryo chorio-allantoic membrane. ( $\times 1900$ , approx.)



A



B

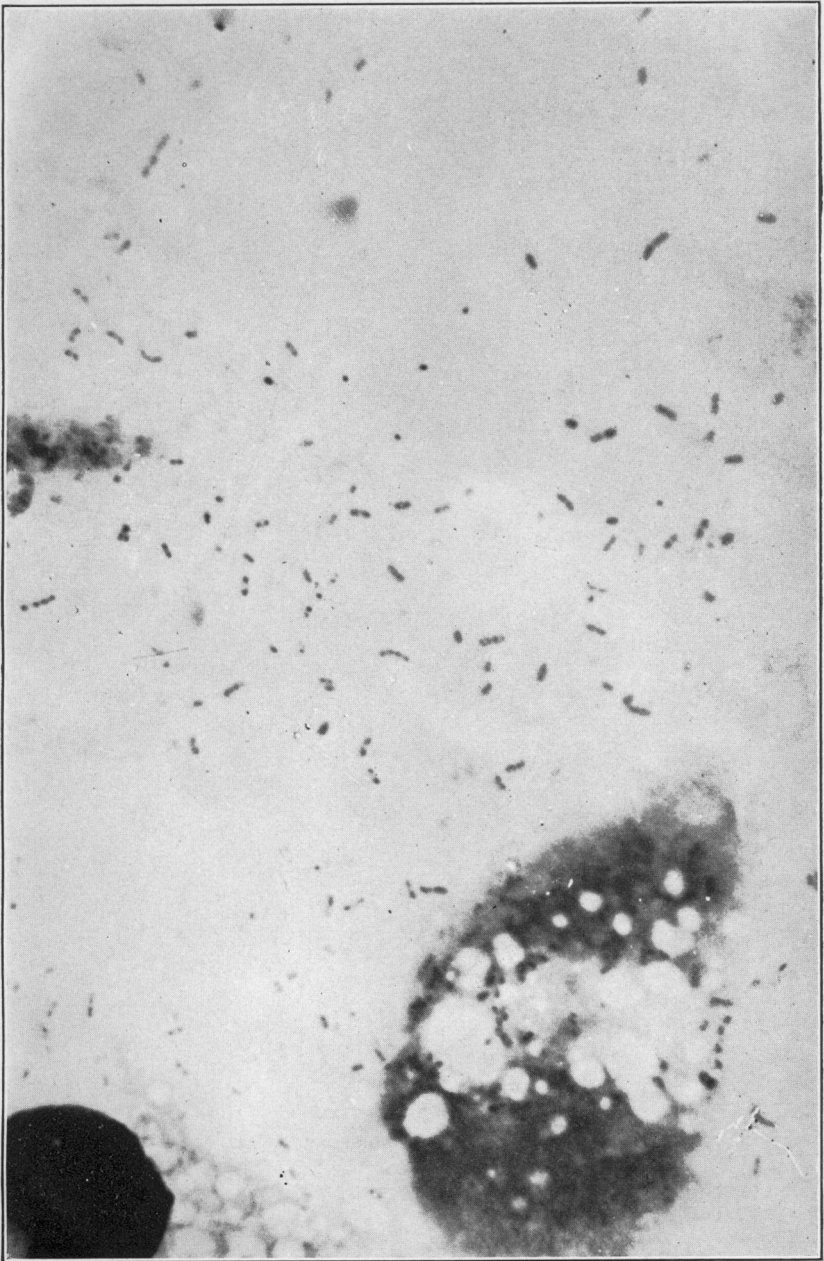


C



D

Rickettsiae of Rocky Mountain spotted fever in Maitland medium with chick embryo chorio-allantoic membrane. ( $\times 1900$ , approx.)



Rickettsiae of Rocky Mountain spotted fever in Maitland medium with guinea pig tunica.  
( $\times 1900$ , approx.)



Rickettsiae of Rocky Mountain spotted fever in Maitland medium with guinea pig tunica. ( $\times 1900$ , approx.)



that the rickettsiae had multiplied outside the cells. Efforts to cultivate the organism without tissue were not successful. Also it was not possible to transplant the culture by employing the supernatant fluid of centrifuged cultures.

(2) CULTIVATION IN MAITLAND MEDIA IN WHICH GUINEA PIG TUNICA WAS EMPLOYED AS TISSUE

The technique employed in these cultures was similar to that used with the chick embryo tissue. One guinea pig tunica was divided among four flasks. Usually the parietal tunica was employed, but growth was also obtained with visceral tunica. Cultures were initiated from infected guinea pig tunica, one (BR 1150) on the 7th day of fever and another (BR 1163) on the 3d day of fever. Guinea pig BR 1150 showed scrotal lesions covering an area of about 0.25 cm diameter over each testicle. The infected tunica was used as tissue in the culture medium, and transfers were made at intervals of 7 to 10 days to media containing fresh tunica. One series was continued through 7 transplants and the other through 15. Film preparations were made on slides from material in all flasks, and transplants were made from those showing the most numerous rickettsiae. The first 11 transplants were incubated at 37° C. and the subsequent transplants at both 37° and 32° C.

Rickettsiae were usually found without difficulty (pls. III and IV). In some preparations they were so numerous that several hundred appeared in one field, and most fields contained some. It cannot be said, however, that they approached in numbers the rickettsiae in cultures of endemic typhus. Table 2 indicates the relative numbers of rickettsiae in preparations from the various flasks in one series of cultures. The results at 32° C. are apparently slightly better than those at 37° C.

In contrast to the rickettsiae seen in the chick embryo material, those found in the guinea pig tunica medium were often not so closely associated with the cells. They appeared rather to be scattered throughout the preparation. They were probably more numerous in fields where tissue was present, but they were often found in localities where there was no tissue. As no conclusive evidence was obtained to indicate that multiplication occurred outside the cells, it may be assumed that the cells of the guinea pig tunica were more susceptible to disintegration when grown in the Maitland medium with Baker's solution, with the consequent extrusion of the rickettsiae, than were those of the chick embryo chorio-allantoic membrane. Breinl and Chrobok, on the other hand, illustrate a "viruszelle" in which there is a mass of rickettsiae in the cytoplasm of the cell. As with the chick embryo media no organisms were definitely seen in the nuclei of cells, even when incubated at a temperature of 32° C.

TABLE 2.—*Relative numbers of rickettsiae in preparations from the various flasks*

Passage no.	Tissue	Temperature of incubator	Rickettsiae in flasks
1.....	Tp	37	1+, 2++, 3+, 4+
2.....	Tp	37	1+, 2+, 3++++
3.....	Tp	37	1++, 2-, 3+, 4++++, 5++, 6-, 7-, 8+
4.....	Tp	37	1++, 2++, 3++++, 4-
5.....	Tp	37	1++++, 2++, 3+, 4++, 5++, 6+, 7++++, 8+
6.....	Tv	37	9+, 10-, 11++, 12++++, 13++, 14++++, 15-, 16++++
6.....	Tp	37	1C, 2++, 3-, 4±, 5-, 6++, 7±, 8±
6.....	Tv	37	9++, 10++, 11++++, 12-
7.....	Tp	37	1++++, 2+, 3±, 4++, 5±, 6+, 7++, 8++++
7.....	Tv	37	9++, 10±, 11-, 12±, 13±, 14±, 15++++, 16±
8.....	Tp	37	1-, 2++++, 3-, 4-, 5+, 6-, 7-, 8-
9.....	Tp	37	1+, 2++, 3+, 4++
10.....	Tp	37	1+, 2++, 3++++, 4-
10.....	Tv	37	5±, 6++, 7+, 8++++
11.....	Tp	37	1++++, 2++, 3+, 4++
11.....	Tv	37	5++, 6++++, 7+, 8+
12.....	Tp	37	1±, 2±, 3++++, 4±
12.....	Tv	37	5++, 6++, 7++, 8±
12.....	Tp	32	1++++, 2+, 3C, 4++++
12.....	Tv	32	5±, 6±, 7++, 8±
13.....	Tp	37	1++++, 2±, 3±, 4+
13.....	Tv	37	5±, 6++, 7+, 8++, 9±, 10++, 11C, 12++++
13.....	Tp	32	1C, 2±, 3++, 4++++
13.....	Tv	32	5++, 10++, 11++, 12+
14.....	Tp	37	1C, 2C, 3+, 4C
14.....	Tv	37	5++, 6±, 7±, 8±
14.....	Tp	32	1++, 2±, 3++, 4++
14.....	Tv	32	5++++, 10+, 11++, 12±
15.....	Tp	37	1C, 2C, 3++, 4C
15.....	Tv	37	5+, 6+, 7+, 8++++

Tp = Parietal tunica.

Tv = Visceral tunica.

++++ = Rather numerous rickettsiae, 200-300 to a field, rickettsiae in most fields.

++ = Rickettsiae less numerous, not in all fields.

+ = Rickettsiae found without difficulty.

± = Very few rickettsiae.

- = No rickettsiae seen.

C = Contaminated.

**Morphology.**—In numerous preparations the rickettsiae were found outside the cells, and it was possible to discern clearly the morphological characteristics of the organism. Contrasted with those of endemic typhus, the rickettsiae of Rocky Mountain spotted fever are rather definitely larger, the ends are more rounded, and they occur more often in pairs and sometimes in short chains resembling a streptococcus or pneumococcus. Diploforms separated by an intervening unstained portion, resembling bipolar organisms, were often present. Except for their small size, they bear a close resemblance morphologically to ordinary bacteria. With Giemsa stain they stain less intensely than bacteria, though apparently somewhat more intensely than the rickettsiae of endemic typhus.

**Virulence.**—Cultures in the 1st and 11th passages were tested on guinea pigs for virulence (fig. 2). Animals inoculated with 1 cc of the tissue suspension of the 1st passage developed typical symptoms and died. The tissue (about one-fourth tunica) of the 11th passage culture was precipitated by low speed centrifugation for 10 minutes, macerated, and then suspended in salt solution and inoculated into

2 guinea pigs. The supernatant fluid was also inoculated into 2 animals. All developed characteristic symptoms, with elevated temperature for 5 or 6 days and all died in 8 to 10 days. The results show no reduction in the virulence of the culture.

#### SUMMARY

The rickettsiae of Rocky Mountain spotted fever have been cultivated through 15 passages in modified Maitland media, using as tissue the chorio-allantoic membrane of chick embryos and guinea pig tunica. Substitution of Baker's for Tyrode's solution brought about an increase in the number of rickettsiae in media containing chick embryo tissue and also gave good results in media with guinea pig

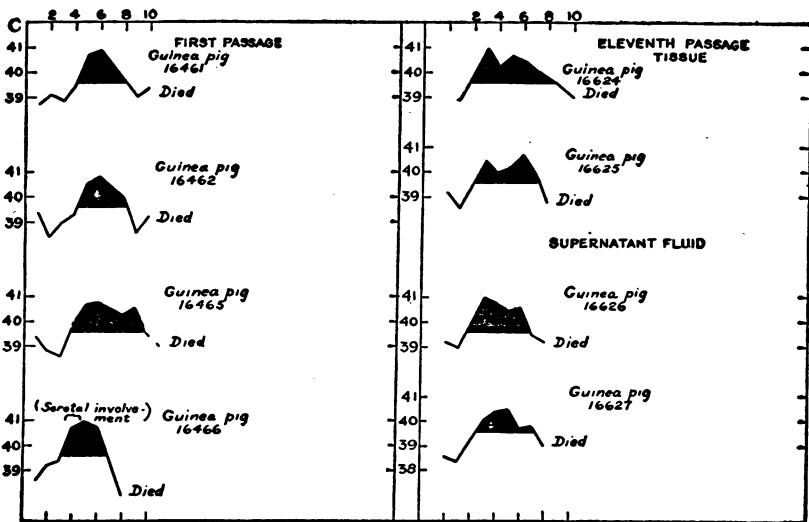


FIGURE 2.—Daily temperature record. B. R. 1150—Cultures inoculated intraperitoneally.

tunica. There was no loss of virulence in the rickettsiae thus cultivated, both tissue and supernatant fluid causing typical symptoms in guinea pigs followed by death.

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## CULTIVATION OF THE RICKETTSIAE OF ENDEMIC (MURINE) AND EPIDEMIC (EUROPEAN) TYPHUS FEVER IN VITRO

By IDA A. BENGTON, *Senior Bacteriologist, National Institute of Health, United States Public Health Service*

Cultivation of the rickettsiae of endemic (murine) as well as epidemic (European) typhus fever has been reported by a number of workers. The most successful results by *in vitro* methods have been obtained by the use of the technique employed first by Nigg and Landsteiner (1), in which Maitland medium with Tyrode's solution, fresh guinea pig serum, and tunica vaginalis of the guinea pig was used. This method has been used by Kligler and Aschner (2), Plotz and Giroud (3), Zinsser and Machiavello (4), Breinl and Chrobok (5), and Nigg (6), and all report good growth without great difficulty.

The present report concerns the cultivation of the rickettsiae of endemic and European typhus fevers in the Maitland medium in which Baker's solution was substituted for Tyrode's solution. Previous experiments had shown that the growth of Rocky Mountain spotted fever rickettsiae had been enhanced by the use of Baker's solution in the medium, and it therefore seemed justifiable to employ the same medium for obtaining cultures of typhus fever rickettsiae.

### ENDEMIC TYPHUS

#### THE STRAIN USED FOR CULTIVATION

The Wilmington strain of endemic typhus which has been maintained in guinea pigs at the National Institute of Health for a number of years was used for initiating cultures. One series of transplants was started with infected tunica vaginalis from a guinea pig (W 6208) on the 5th day of fever and the 4th day of testicular swelling. Another series was from a guinea pig (W 6219) on the 4th day of fever and the 1st day of testicular swelling. In both cases the infected tissue was minced and used as the tissue component of the Maitland medium.

#### TECHNIQUE

Maitland medium was prepared by combining 1 part of fresh guinea pig serum with 4 parts of Baker's solution. Usually 1 cc of serum and 4 cc of Baker's solution were used in 50-cc Erlenmeyer flasks. Occasionally four times these amounts were used in 200-cc flasks. Fresh guinea pig tunica was used as tissue. All cultures were incubated at 37° C. and transferred at intervals of 7 to 12 days. In making transfers the culture from the flask was removed to a small, pointed centrifuge tube containing a small amount of powdered pyrex glass and centrifuged at low speed for about 10 minutes to precipitate the tissue. The supernatant fluid was then removed and

the infected tissue was macerated with a glass rod. An amount of Baker's solution measuring about 0.5 cc was added to the macerated tissue, the tube was shaken, and the coarser particles of tissue were allowed to settle. The supernatant fluid was then transferred to the sterile watch glass containing the fresh tunica in a small amount of Baker's solution. In some cases a suspension of the macerated tissue instead of the extract was used as inoculum. After the material had been minced and allowed to stand for 10 to 15 minutes, it was divided among 4 Erlenmeyer flasks containing 5 cc of the fluid medium. Incubation was continued for 7 to 10 days at 37° C. Slide preparations were made from all flasks and stained with Giemsa, and transfers were made from those showing the largest numbers of rickettsiae.

## RESULTS

Growth of rickettsiae was good from the beginning. In the two series referred to, the number of rickettsiae increased after one or two transplants. In another series, which was not continued, the number of rickettsiae was recorded as 4 plus in the first passage. Two series of cultures were carried through 17 transplants each. The relative number of rickettsiae in the first 15 passages of one of the series of transplants is shown in table 1.

TABLE 1.—*Relative number of rickettsia in the first 15 passages of one series of transplants*

Passage No.	Tissue	Rickettsiae in flasks
1.....	Tp	1+, 2++, 3C, 4++++, 5C, 6++
2.....	Tp	1+, 2+, 3+, 4+, 5++, 6++
3.....	Tp	1++++, 2+, 3C, 4C, 5++++, 6++++, 7++++, 8++++
4.....	Tp	1++++, 2++++, 3++++, 4++++, 5C, 6+, 7+++
	Tv	8++++, 9++++, 10++++, 11++++, 12++++, 13++++, 14++++, 15++++, 16++++
5.....	Tp	1++++, 2C, 3+, 4+, 5++++, 6++++, 7++++, 8++++
	Tv	9+, 10+, 11+, 12+, 13+, 14++++, 15++++, 16+++
6.....	Tp	1++++, 2++++, 3++++, 4++++, 5++, 6+, 7+, 8++
	Tv	9+, 10+, 11+, 12+, 13+, 14++++, 15++++
7.....	Tp	1+, 2++++, 3++++, 4C, 5++++, 6+, 7++++, 8++++
	Tv	9C, 10C, 11++++, 12++++, 13++++, 14++++, 15C, 16++++
8.....	Tp	1C, 2+, 3+, 4++++, 5++++, 6++++, 7+, 8C
	Tv	9++++, 10++++, 11+, 12++++
9.....	Tp	1++++, 2++++, 3++++, 4++++
	Tv	5+, 6+, 7+, 8+, 9++++, 10+, 11+, 12+++
10.....	Tp	1++++, 2+, 3+, 4+, 5+, 6+, 7+, 8+
	Tv	9+, 10+, 11+, 12+, 13+, 14+, 15+, 16++
11.....	Tp	1C, 2+, 3+, 4+, 5++++, 6++++, 7++++, 8++++
	Tv	9+, 10+, 11+, 12+
12.....	Tp	1+, 2C, 3+, 4+, 5++++, 6C, 7++++, 8++++
	Tv	9++++, 10+, 11+, 12+, 13+, 14++++, 15+, 16+++
13.....	Tp	1C, 2++++, 3+, 4C, 5++++, 6++++, 7++++, 8++++
	Tv	9+, 10+, 11+, 12+, 13+, 14+, 15C, 16+++
14.....	Tp	1++++, 2++++, 3+, 4C, 5++++, 6++++, 7+, 8+++
	Tv	9++++, 10+, 11+, 12+, 13+, 14+, 15++++, 16++++
15 <sup>1</sup> .....	Tp	1++++, 2+, 3+, 4+, 5+, 6+, 7+, 8+
	Tv	9+, 10+, 11+, 12+, 13++++, 14+, 15++++, 16++++

<sup>1</sup> In passage 15, nos. 1-4, 13-16, planted with extract of macerated tissue; 5-8, 9-12, planted with supernatant fluid.

Tp=Parietal tunica.

Tv=Visceral tunica.

++++ to + = Numbers of rickettsiae grading from very numerous to very few.

C=contaminated.

The results obtained in media planted with the suspended macerated tissue of the previous passage and in those planted with extracts of the tissue or suspensions in which there was very little tissue did not vary greatly. The presence of the tissue, probably nonviable at the end of 8 to 10 days, might be thought to be detrimental to the continued viability of the fresh tissue. On the other hand, the possibility was considered whether the organisms might become more adapted to nonliving tissue. However, the results varied very little with the different methods used and therefore no conclusions could be drawn.

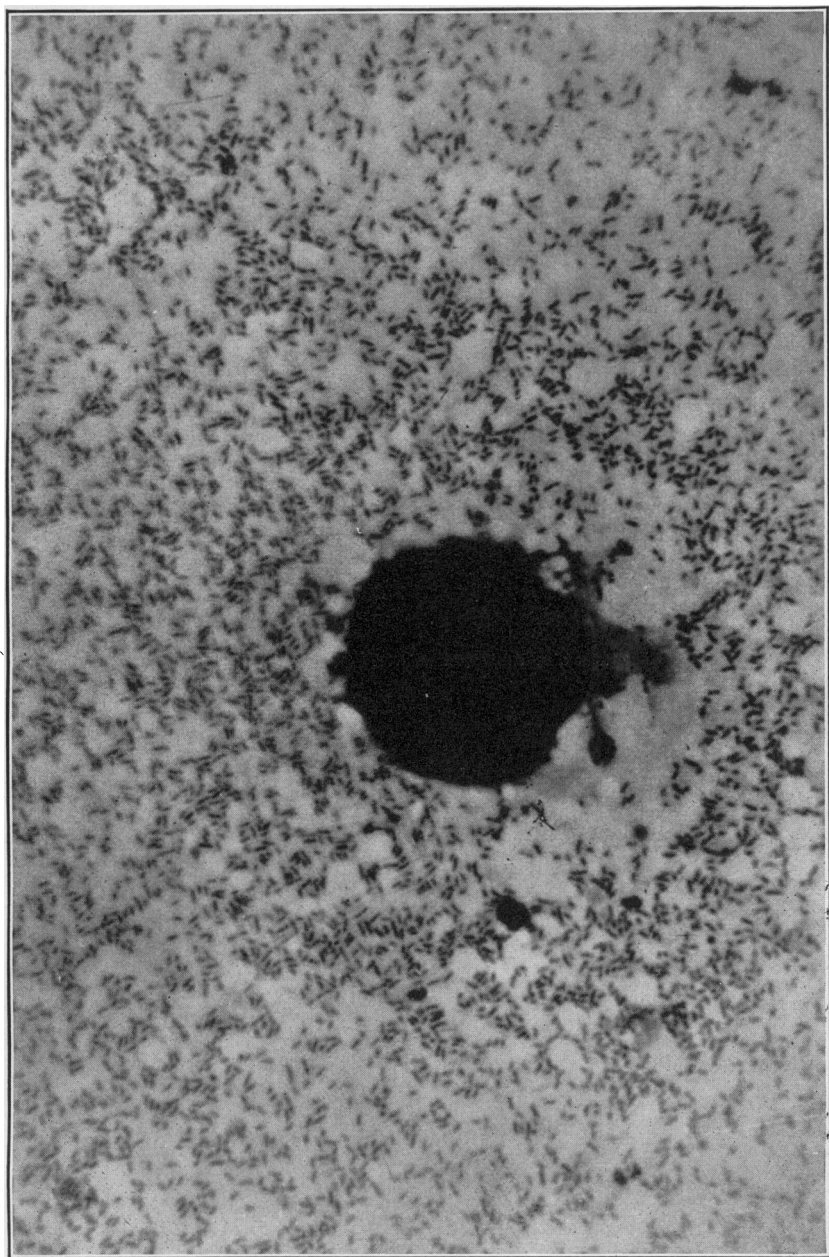
For the 15th passage, half of the flasks were planted with extract of the macerated tissue in the usual way and the remaining flasks with 0.5 cc of the supernatant fluid in flasks which had been vigorously shaken and then centrifuged at low speed for 10 minutes to precipitate the tissue. There were comparatively few rickettsiae in the flasks planted with the supernatant fluid (+ to ++), indicating that the organisms were not numerous in the fluid portion of the cultures used for transplanting and that a rather heavy inoculum, such as is found in the tissue, is necessary for good growth.

#### RICKETTSIAE

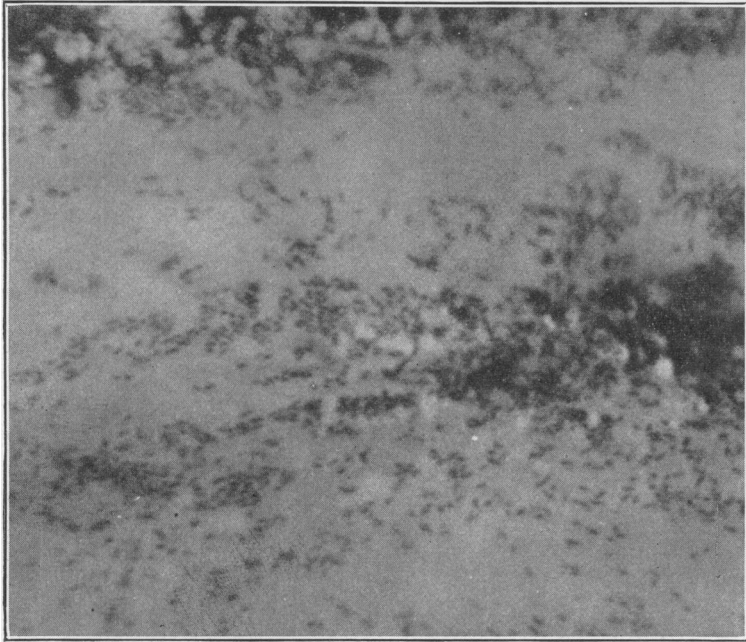
*Technique for staining.*<sup>1</sup>—In the preparation of the films on slides for demonstrating rickettsiae several pieces of infected tissue are removed from the flask with a platinum loop, taking care to free the tissue from excess fluid by touching it to the side of the flask. After placing the tissue on the slide, the slide is warmed slightly by passing over the flame. This causes the evaporation of the remaining fluid and allows better maceration of the tissue, which is spread out with the loop in a very thin layer. After being dried in the air the preparation is covered with methyl alcohol, which, after about 30 seconds, is removed for the most part by blotting. The slide is then passed through the pilot flame of the Bunsen burner to remove all further traces of the methyl alcohol. The slides are then stained by flooding with Giemsa in a 1 to 10 dilution, the stain remaining on for 1 to 2 hours. They are then rinsed with tap water and slightly decolorized with 95-percent ethyl alcohol (2 to 3 seconds) and blotted with blotting paper. Preparations are thus obtained which are free from precipitate and in which the rickettsiae are sharply defined though stained lightly.

As in the Rocky Mountain spotted fever cultures, rickettsiae did not appear as closely associated with the cells as has been described by other workers (Kligler and Aschner, Plotz and Giroud, and others) (pls. I and II). It was rare to find rickettsiae which were confined to the cytoplasm of the cells. Rather they were distributed through-

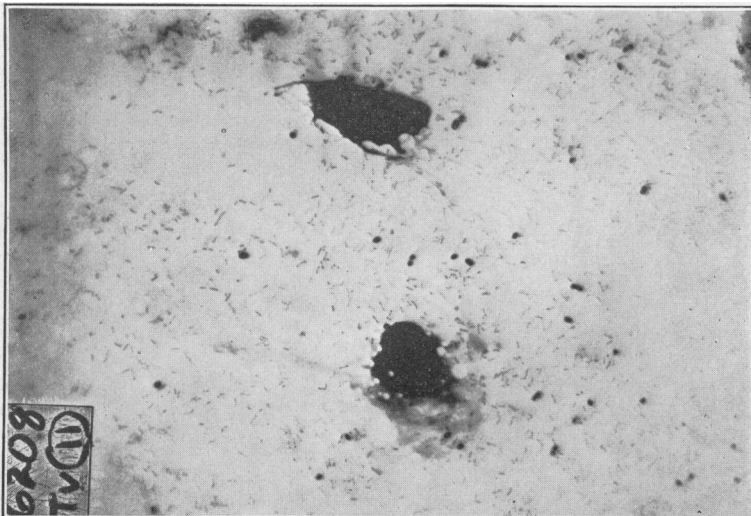
<sup>1</sup> The writer is indebted to R. D. Reed, bacteriological technician, for development of this method of staining.



Rickettsiae of endemic typhus fever. ( $\times 1900$ , approximately.)

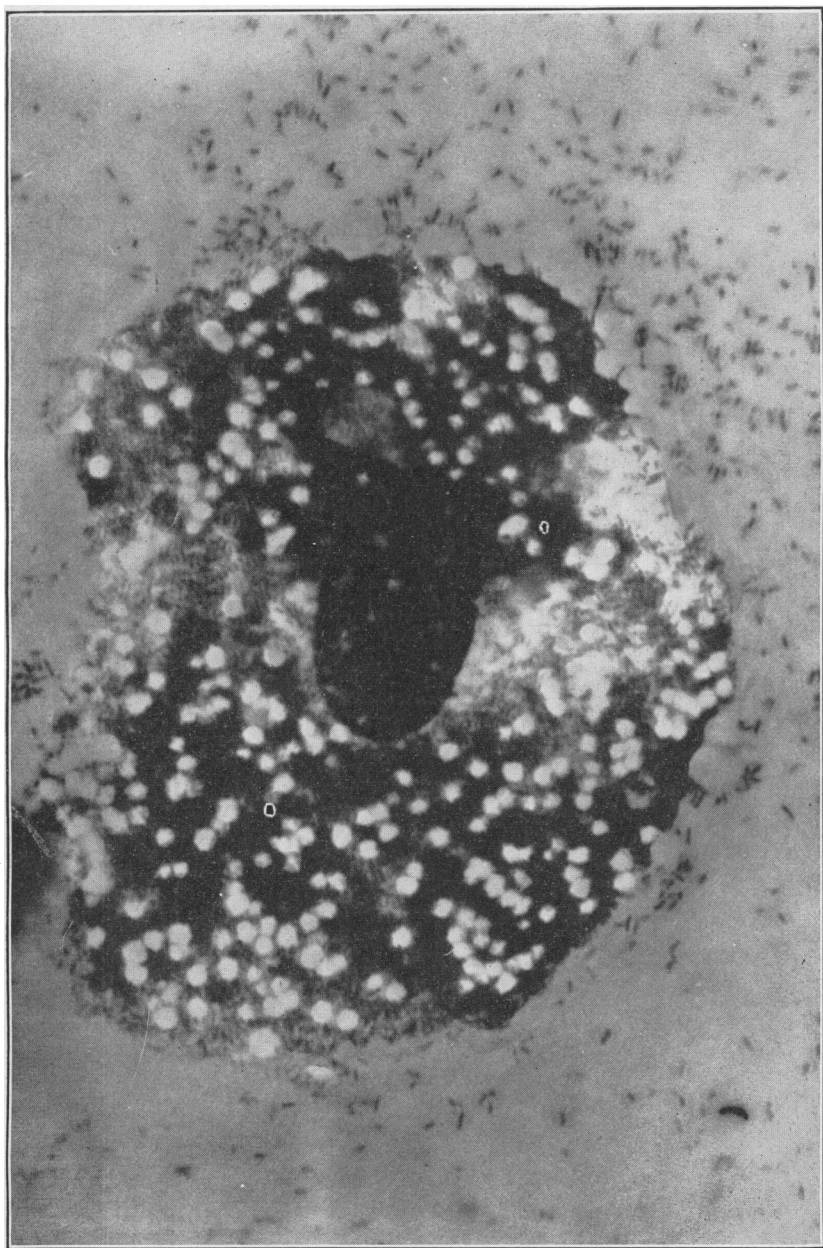


Rickettsiae of endemic typhus fever. ( $\times 1900$ , approximately.)

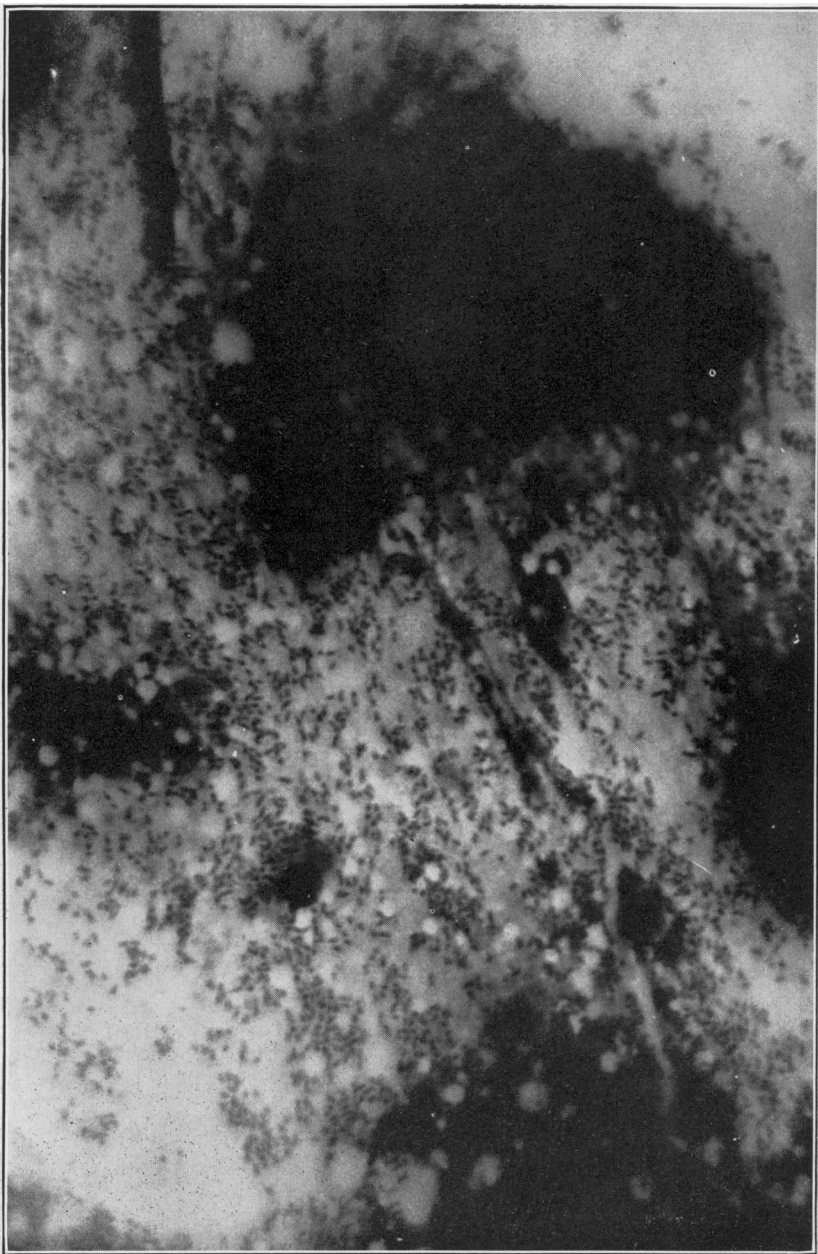


Culture of rickettsiae of endemic typhus fever with a contaminating organism. Shows contrast in size and staining properties of rickettsiae and ordinary bacteria. ( $\times 750$ .)





Rickettsiae of endemic typhus fever packed in cytoplasm of cell. ( $\times 1900$ , approximately.)



Rickettsiae of European typhus.

out the preparations, perhaps more often in the neighborhood of tissue but also frequently in localities where there was no tissue. Often the distribution of the rickettsiae on the slide resembled that of a culture of bacteria. Apparently the cells or rather the cytoplasm of the cells disintegrated easily in preparing the smear. One of the few cells showing rickettsiae in the intact cytoplasm is shown in plate III.

Although the appearance of the film preparations suggested that multiplication of the rickettsiae might occur to some extent outside the cells, there was no evidence of turbidity in the fluid portion of the medium. Tests of the fluid by inoculation into guinea pigs showed that, though the disease could be produced with this material, it was

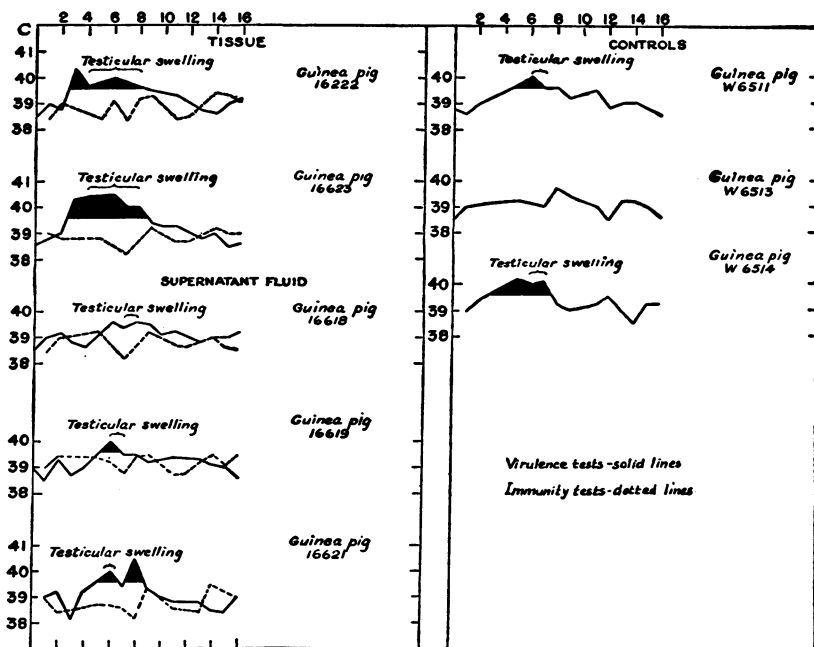


FIGURE 1.—Daily temperature record, W. 6219. Cultures inoculated intraperitoneally.

less severe than that produced by the tissue. Cultures in the eleventh passage were centrifuged for about 10 minutes at the lowest speed of the centrifuge and the supernatant fluid was removed. The macerated precipitate suspended in salt solution and the supernatant fluid were inoculated into guinea pigs. The macerated tissue (1 culture) brought about typical symptoms in 2 guinea pigs, the temperature becoming elevated on the 3d day after inoculation and continuing for 6 days, with testicular swelling lasting 5 days (fig. 1). The 4 animals inoculated with the supernatant fluid (from 2 flasks) showed a temperature rise beginning on the sixth or seventh day and continuing for 1 or 2 days. Redness and swelling of the testicles was present for 1 or 2

days. Immunity tests carried out a month later, however, showed all 6 animals to be immune.

#### EPIDEMIC (EUROPEAN) TYPHUS

The Breinl strain of European typhus maintained in guinea pigs in this laboratory was used for cultivation purposes. The infected tunica vaginalis of a guinea pig on the second day of fever (40.5° C.) was used for initiating growth.

The technique employed was the same as that used for endemic typhus, transfers being made at intervals of from 8 to 11 days.

The results obtained with transfers made through 6 passages are shown in table 2. The number of rickettsiae increased after the first three generations, and after the fourth they were almost as numerous in some flasks as were those of the endemic typhus. There was a tendency for these rickettsiae to be more closely associated with the cells than was the case with the endemic typhus, but large numbers of rickettsiae were found also outside the cells. Morphologically the two were indistinguishable (pl. IV). Virulence tests were not made on animals.

TABLE 2.—Relative numbers of rickettsiae in 6 transplants of European typhus (W4502)

Passage No.	Tissue	Rickettsiae in flasks
1	Tp	1+, 2C, 3+, 4+, 5+, 6+, 7++++, 8+
2	Tp	1+++, 2+, 3+, 4C
3	Tp	1-, 2+, 3+++, 4-
4	Tp	1+, 2+, 3++++, 4++
	Tv	5+, 6+, 7++++, 8++
5	Tp	1++++, 2++++, 3+, 4-
	Tv	5++++, 6+, 7+, 8++
6	Tp	1+, 2++, 3++, 4++++
	Tv	5+++, 6++++, 7++++, 8++++

Tp= Parietal tunica.

Tv= Visceral tunica.

#### SUMMARY

The rickettsiae of endemic typhus fever has been cultivated *in vitro* through 17 passages. Luxuriant growths were obtained in modified Maitland media in which Baker's solution was substituted for Tyrode's solution. The rickettsiae of European typhus grew almost as luxuriantly in similar media.

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## CHOLERA IN CHINA

Since the middle of August, numbers of reports of cholera prevalence in Chinese cities and seaports have reached the Public Health Service, indicating that this disease is at present rather widespread in China, involving, to date, Shanghai, Hong Kong, Canton, Hoihow, Macao, and probably other cities, in particular Amoy and Foochow being under suspicion. It is now feared that military operations in China may cause a further spread of the disease. Cases of the disease were reported in Hong Kong during the latter part of July and the number of cases and deaths increased rapidly from the second week in August. From July 26 to August 24, 1937, 802 cases, with 427 deaths, were reported in Hong Kong, and over 500 cases from the latter date to September 11.

To prevent the introduction of cholera into the Philippine Islands, the chief quarantine officer detailed to this duty by the United States Public Health Service has directed all quarantine officers to carry out very careful inspection of ships, passengers, and crew from infected or suspected ports, including bacteriological examination to detect carriers. He is acting in close cooperation with the Public Health Service officer stationed at Hong Kong, the Chinese Quarantine Service, and with the Eastern Bureau of the League of Nations, with headquarters at Singapore. Principally, these cooperative efforts are to institute measures that will prevent embarkation of infected persons.

It is not believed by Public Health Service quarantine officers that the west coast seaports of the United States are likely to become infected, for the reason that, since the incubation period of cholera is only 5 days, outbreaks on shipboard will occur and the disease will become manifest long before a ship from infected ports could reach any United States seaport. However, the possibility of introduction of the disease by carrier is not being overlooked, and bacteriological search is being conducted for carriers whenever indicated. Ships from cholera-infected areas are not granted radio pratique.

Through passengers from infected areas traveling by Pan American Clipper airships will probably not be inconvenienced, since they will have completed the incubation period by the time they reach San Francisco, but those stopping off en route will be held at stop-over points to complete the incubation period.

Because protected water supplies and protected milk supplies are the rule instead of the exception in American cities today, cholera is no longer the menace to this country that it was during the last century.

**DEATHS DURING WEEK ENDED SEPT. 4, 1937**

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

	Week ended Sept. 4, 1937	Correspond- ing week, 1936
<b>Data from 85 large cities of the United States:</b>		
Total deaths.....	7,465	6,867
Average for 3 prior years.....	6,875	
Total deaths, first 35 weeks of year.....	308,437	308,781
Deaths under 1 year of age.....	504	485
Average for 3 prior years.....	516	
Deaths under 1 year of age, first 35 weeks of year.....	19,757	19,447
<b>Data from industrial insurance companies:</b>		
Policies in force.....	69,770,573	68,372,148
Number of death claims.....	11,041	10,527
Death claims per 1,000 policies in force, annual rate.....	8.3	8.1
Death claims per 1,000 policies, first 35 weeks of year, annual rate.....	10.1	10.2

# 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 Sept. 11, 1937, and Sept. 12, 1936*

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936
New England States:								
Maine.....					1		1	0
New Hampshire.....					3	2	0	0
Vermont.....	1				12		0	0
Massachusetts.....	2	6			11	30	0	1
Rhode Island.....						1	1	0
Connecticut.....	6	4	1		3	4	0	0
Middle Atlantic States:								
New York.....	13	10	12	17	92	44	3	10
New Jersey.....	3	2	7	7	17	20	0	2
Pennsylvania.....	10	11			115	14	2	5
East North Central States:								
Ohio <sup>1</sup> .....	22	14	14	14	36	9	2	2
Indiana.....	12	10	11	9	7	3	1	1
Illinois <sup>2</sup> .....	8	19	7	3	45	6	1	3
Michigan.....	20	12			21	9	2	3
Wisconsin.....	4	2	30	6	28	12	1	1
West North Central States:								
Minnesota.....		5		2	10	6	0	0
Iowa.....	1	2			3		1	1
Missouri.....	12	10	19	14	23	1	2	2
North Dakota.....	1	1		5		2	2	0
South Dakota.....						5	0	0
Nebraska.....	1	6			2	3	0	0
Kansas.....	8	9	4	1	1	4	0	0
South Atlantic States:								
Delaware.....							0	0
Maryland <sup>4</sup> .....	6	4	2	1	4	9	1	3
District of Columbia.....	1	9	2		2		2	1
Virginia <sup>2</sup> .....	37	33			14	7	2	3
West Virginia.....	7	7	15	14	12		1	3
North Carolina <sup>2</sup> .....	36	65		6	9		2	4
South Carolina <sup>2</sup> .....	24	18	91	67	5		0	1
Georgia <sup>5</sup> .....	31	28					1	0
Florida <sup>5</sup> .....	4	10				3	1	0

See footnotes at end of table.

*Cases of certain communicable diseases reported by telegraph by State health officer for weeks ended Sept. 11, 1937, and Sept. 12, 1936—Continued*

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936
<b>East South Central States:</b>								
Kentucky.....	14	9	3	-----	17	17	2	10
Tennessee <sup>1</sup> .....	26	29	6	7	64	3	1	5
Alabama <sup>1</sup> .....	31	31	3	13	3	-----	2	2
Mississippi <sup>1</sup> .....	19	15	-----	-----	-----	-----	0	2
<b>West South Central States:</b>								
Arkansas.....	9	17	-----	3	2	-----	0	0
Louisiana.....	4	7	3	17	5	-----	0	1
Oklahoma <sup>1</sup> .....	11	10	20	7	2	1	0	0
Texas <sup>1</sup> .....	29	33	58	24	30	9	6	1
<b>Mountain States:</b>								
Montana.....	1	8	-----	-----	2	1	0	0
Idaho.....	1	1	2	-----	1	-----	0	0
Wyoming.....	-----	1	-----	-----	-----	-----	0	0
Colorado.....	5	-----	-----	-----	18	2	1	0
New Mexico.....	5	2	-----	-----	4	3	0	0
Arizona.....	-----	3	12	23	3	1	0	0
Utah <sup>1</sup> .....	4	-----	-----	-----	3	3	0	0
<b>Pacific States:</b>								
Washington.....	3	-----	-----	-----	29	18	1	0
Oregon.....	1	1	7	1	2	3	1	1
California <sup>1</sup> <sup>1</sup> .....	20	22	11	18	23	18	1	0
<b>Total.....</b>	<b>453</b>	<b>486</b>	<b>330</b>	<b>269</b>	<b>684</b>	<b>273</b>	<b>44</b>	<b>68</b>
<b>First 36 weeks of year.....</b>	<b>14, 870</b>	<b>15, 975</b>	<b>275, 454</b>	<b>140, 787</b>	<b>243, 237</b>	<b>268, 372</b>	<b>4, 336</b>	<b>6, 061</b>

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936
<b>New England States:</b>								
Maine.....	12	4	8	6	0	0	8	0
New Hampshire.....	0	0	-----	3	0	0	0	0
Vermont.....	1	0	1	1	0	0	0	0
Massachusetts.....	44	4	18	34	0	0	2	6
Rhode Island.....	0	0	5	5	0	0	1	3
Connecticut.....	13	0	7	10	0	0	5	2
<b>Middle Atlantic States:</b>								
New York.....	91	11	55	100	0	0	20	20
New Jersey.....	13	1	18	17	0	0	14	19
Pennsylvania.....	37	7	52	82	0	0	33	43
<b>East North Central States:</b>								
Ohio <sup>1</sup> .....	66	18	88	83	0	0	101	69
Indiana.....	18	2	17	26	3	0	3	13
Illinois <sup>1</sup> .....	130	52	78	66	0	3	35	20
Michigan.....	49	2	61	47	0	0	10	14
Wisconsin.....	19	4	26	55	0	1	3	1
<b>West North Central States:</b>								
Minnesota.....	30	1	18	19	4	0	2	0
Iowa.....	26	7	25	24	1	1	2	2
Missouri.....	36	5	43	18	3	0	23	31
North Dakota.....	1	0	-----	4	2	0	3	1
South Dakota.....	4	0	3	10	0	0	2	3
Nebraska.....	27	3	1	5	1	1	0	1
Kansas.....	20	5	37	26	1	0	9	9
<b>South Atlantic States:</b>								
Delaware.....	5	0	-----	-----	0	0	1	1
Maryland <sup>1</sup> .....	11	1	15	15	0	0	12	11
District of Columbia.....	0	0	3	10	0	0	0	1
Virginia <sup>1</sup> .....	3	2	16	11	0	0	13	27
West Virginia.....	2	4	29	30	0	0	19	23
North Carolina <sup>1</sup> .....	1	2	20	23	0	0	9	13
South Carolina <sup>1</sup> .....	1	0	1	5	0	0	19	16
Georgia <sup>1</sup> .....	0	12	15	2	0	0	23	88
Florida <sup>1</sup> .....	4	0	1	2	0	0	6	2

See footnotes at end of table.



*Cases of certain communicable diseases reported by telegraph by State health officers  
for weeks ended Sept. 11, 1937, and Sept. 12, 1936—Continued*

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936
<b>East South Central States:</b>								
Kentucky.....	4	1	26	28	0	0	40	43
Tennessee.....	3	21	25	25	0	0	39	44
Alabama.....	7	15	17	11	0	0	21	28
Mississippi.....	10	5	12	8	0	1	13	24
<b>West South Central States:</b>								
Arkansas.....	12	0	9	3	0	0	12	17
Louisiana.....	7	1	3	4	0	0	19	26
Oklahoma.....	14	1	8	6	4	0	18	28
Texas.....	21	1	24	19	0	0	48	29
<b>Mountain States:</b>								
Montana.....	1	1	5	11	5	10	4	6
Idaho.....	0	2	2	1	10	0	0	1
Wyoming.....	2	1	2	6	1	0	1	1
Colorado.....	21	4	8	8	4	2	2	2
New Mexico.....	1	0	5	5	0	0	6	10
Arizona.....	2	0	5	1	0	0	2	0
Utah.....	5	1	12	13	0	1	1	1
<b>Pacific States:</b>								
Washington.....	2	2	14	13	11	2	3	5
Oregon.....	4	2	7	10	4	0	3	8
California.....	37	13	65	75	2	0	27	7
<b>Total.....</b>	<b>817</b>	<b>218</b>	<b>910</b>	<b>986</b>	<b>56</b>	<b>22</b>	<b>636</b>	<b>669</b>
<b>First 36 weeks of year.....</b>	<b>5,512</b>	<b>2,019</b>	<b>167,490</b>	<b>181,410</b>	<b>8,136</b>	<b>6,026</b>	<b>10,010</b>	<b>9,169</b>

<sup>1</sup> New York City only.

<sup>2</sup> Rocky Mountain spotted fever, week ended Sept. 11, 1937, 6 cases, as follows: Ohio, 1; Virginia, 3; North Carolina, 1; California, 1.

<sup>3</sup> Figures include delayed reports from Chicago for the preceding week.

<sup>4</sup> Week ended earlier than Saturday.

<sup>5</sup> Typhus fever, week ended Sept. 11, 1937, 100 cases, as follows: South Carolina, 8; Georgia, 37; Florida, 8; Tennessee, 1; Alabama, 32; Texas, 13; California, 1.

<sup>6</sup> Figures for 1936 are exclusive of Oklahoma City and Tulsa.

### 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	Menin- gococ- cus menin- gitis	Diph- theria	Influ- enza	Mala- ria	Mea- sles	Pel- lagra	Poli- mye- litis	Scarlet fever	Small- pox	Ty- phoid fever
<i>July 1937</i>										
South Dakota.....	1	2	2		5		1	42	1	4
<i>August 1937</i>										
Connecticut.....	1	25	2		51		19	38	0	5
Delaware.....					2		1	9	0	7
Idaho.....	1	5	9		7		0	28	17	5
Iowa.....	1	5	3		20		37	71	16	22
North Carolina.....	11	94		174	130	42	23	82	0	99
Pennsylvania.....	28	70		4	756	1	78	359	0	144
West Virginia.....	6	29	52		34		17	85	1	83
Wyoming.....		1		1	9		18	6	0	2

## SUMMARY OF MONTHLY REPORTS FROM STATES—Continued

July 1937		August 1937—Continued		August 1937—Continued	
	Cases		Cases		Cases
South Dakota:		German measles:		Septic sore throat:	
Anthrax.....	3	Connecticut.....	6	Connecticut.....	7
Chicken pox.....	14	Idaho.....	1	Idaho.....	13
Mumps.....	14	Iowa.....	2	North Carolina.....	11
Septic sore throat.....	4	Pennsylvania.....	38	Wyoming.....	1
Trachoma.....	2	Impetigo contagiosa:		Tetanus:	
Undulant fever.....	1	Delaware.....	2	Connecticut.....	1
Whooping cough.....	29	Lead poisoning:		Delaware.....	1
		Connecticut.....	1	Trachoma:	
August 1937		Mumps:		Iowa.....	2
Actinomycosis:		Connecticut.....	65	Tularaemia:	
Connecticut.....	1	Delaware.....	6	North Carolina.....	1
Anthrax:		Idaho.....	25	Wyoming.....	1
Pennsylvania.....	3	Iowa.....	8	Typhus fever:	
Chicken pox:		Pennsylvania.....	38	Connecticut.....	1
Connecticut.....	23	West Virginia.....	1	Delaware.....	1
Delaware.....	1	Wyoming.....	9	North Carolina.....	5
Idaho.....	11	Ophthalmia neonatorum:		Undulant fever:	
Iowa.....	10	Connecticut.....	1	Connecticut.....	10
North Carolina.....	25	Delaware.....	2	Idaho.....	2
Pennsylvania.....	207	Pennsylvania.....	4	Iowa.....	14
West Virginia.....	11	Paratyphoid fever:		North Carolina.....	2
Wyoming.....	7	Connecticut.....	1	Pennsylvania.....	12
Colorado tick fever:		Iowa.....	1	West Virginia.....	1
Wyoming.....	1	North Carolina.....	1	Vincent's infection:	
Dysentery:		Rabies in animals:		Idaho.....	5
Connecticut (bacillary).....	1	Connecticut.....	4	Iowa.....	1
Delaware (amoebic).....	3	West Virginia.....	1	Whooping cough:	
Delaware (bacillary).....	1	Rocky Mountain spotted		Connecticut.....	122
Pennsylvania (amoebic).....	13	fever:		Delaware.....	30
Encephalitis, epidemic or		Iowa.....	2	Idaho.....	29
lethargic:		North Carolina.....	6	Iowa.....	130
Pennsylvania.....	5	Pennsylvania.....	1	North Carolina.....	720
		West Virginia.....	1	Pennsylvania.....	1,711
		Wyoming.....	2	West Virginia.....	239
				Wyoming.....	66

## CASES OF VENEREAL DISEASES REPORTED FOR JUNE 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

## Reports from States

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama.....	696	2.43	122	0.43
Arizona.....	53	1.43	113	2.78
Arkansas <sup>1</sup> .....	296	1.46	100	.49
California.....	1,884	3.11	1,879	3.10
Colorado.....	148	1.39	61	.57
Connecticut.....	334	1.93	131	.76
Delaware.....	209	8.07	45	1.74
District of Columbia.....	197	3.18	171	2.76
Florida.....	89	.54	31	.19
Georgia.....	1,866	6.10	499	1.63
Idaho.....	36	.74	45	.93
Illinois.....	2,130	2.72	1,269	1.62
Indiana.....	187	.54	131	.38
Iowa <sup>1</sup> .....	306	1.20	220	.87
Kansas.....	169	.90	78	.41
Kentucky.....	537	1.85	319	1.21
Louisiana.....	286	1.35	164	.77
Maine <sup>1</sup> .....	34	.40	46	.54
Maryland <sup>1</sup> .....	835	4.99	329	1.97
Massachusetts.....	511	1.15	472	1.07
Michigan.....	588	1.23	586	1.23
Minnesota.....	351	1.33	244	.93
Mississippi.....	1,999	9.96	2,466	12.28
Missouri.....	341	.86	488	1.23
Montana <sup>1</sup> .....				
Nebraska <sup>1</sup> .....	153	1.12	132	.97
Nevada <sup>1</sup> .....				
New Hampshire <sup>1</sup> .....				
New Jersey.....	801	1.85	321	.74

See footnotes at end of table.

## Reports from States—Continued

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
New Mexico <sup>1</sup>				
New York	8,172	6.32	2,088	1.61
North Carolina	2,544	7.36	465	1.35
North Dakota	41	.58	46	.65
Ohio <sup>1</sup>	1,351	2.03	371	.55
Oklahoma <sup>1</sup>	349	1.38	364	1.44
Oregon	99	.97	200	1.97
Pennsylvania <sup>1</sup>	2,057	2.03	269	.27
Rhode Island	108	1.59	59	.87
South Carolina <sup>1</sup>	389	2.09	373	2.01
South Dakota	36	.52	24	.35
Tennessee	652	2.28	293	1.02
Texas	1,010	1.65	384	.63
Utah <sup>1</sup>				
Vermont	12	.32	22	.58
Virginia	1,427	5.34	306	1.15
Washington	253	1.54	398	2.42
West Virginia	361	1.97	92	.50
Wisconsin <sup>1</sup>	21	.07	175	.60
Wyoming <sup>1</sup>				
Total	33,733	2.67	16,419	1.30

## Reports from cities of 200,000 population or over

Akron, Ohio <sup>1</sup>				
Atlanta, Ga.	143	4.98	144	5.02
Baltimore, Md.	525	6.36	237	2.87
Birmingham, Ala.	150	5.31	63	2.23
Boston, Mass.	190	2.40	203	2.57
Buffalo, N. Y.	185	3.13	100	1.69
Chicago, Ill.	1,157	3.24	837	2.35
Cincinnati, Ohio	185	3.97	79	1.70
Cleveland, Ohio	330	3.55	104	1.12
Columbus, Ohio	115	3.76	22	.72
Dallas, Tex.	206	7.11	75	2.59
Dayton, Ohio	86	4.09	29	1.36
Denver, Colo.	94	3.17	37	1.25
Detroit, Mich. <sup>1</sup>				
Houston, Tex. <sup>1</sup>	212	6.33	72	2.15
Indianapolis, Ind.	21	.56	34	.90
Jersey City, N. J. <sup>1</sup>				
Kansas City, Mo.	40	.95	5	.12
Los Angeles, Calif. <sup>1</sup>				
Louisville, Ky.	203	6.27	133	4.10
Memphis, Tenn.	208	7.79	60	2.25
Milwaukee, Wis. <sup>1</sup>				
Minneapolis, Minn.	94	1.93	94	1.93
Newark, N. J.	276	5.96	123	2.65
New Orleans, La. <sup>1</sup>				
New York, N. Y.	6,580	9.01	1,386	1.90
Oakland, Calif.	32	1.06	31	1.02
Omaha, Nebr.	68	3.08	50	2.27
Philadelphia, Pa.	436	2.19	71	.36
Pittsburgh, Pa.	76	1.11	22	.32
Portland, Oreg. <sup>1</sup>				
Providence, R. I.	59	2.28	31	1.20
Rochester, N. Y.	50	1.48	45	1.33
St. Louis, Mo.	188	2.25	153	1.83
St. Paul, Minn.	42	1.49	29	1.03
San Antonio, Tex. <sup>1</sup>				
San Francisco, Calif.	114	1.70	145	2.16
Seattle, Wash.	130	3.42	201	5.30
Syracuse, N. Y.	107	4.91	69	3.17
Toledo, Ohio <sup>1</sup>				
Washington, D. C. <sup>1</sup>	197	3.18	171	2.76

<sup>1</sup> Incomplete.<sup>2</sup> No report for current month.<sup>3</sup> Not reporting.<sup>4</sup> Only cases of syphilis in the infectious stage are reported.<sup>5</sup> Reported by Jefferson Davis Hospital; physicians are not required to report venereal diseases.<sup>6</sup> Reported by the Social Hygiene Clinic.

## WEEKLY REPORTS FROM CITIES

*City reports for week ended Sept. 4, 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	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities: 5-year average.....	128	60	14	138	280	287	3	352	107	969	
Current week.....	70	20	10	205	316	233	1	267	88	1,205	
<b>Maine:</b>											
Portland.....	0		0	0	2	0	0	0	0	5	32
<b>New Hampshire:</b>											
Concord.....	0		0	0	0	0	0	1	0	0	8
Manchester.....	0		0	0	0	0	0	0	0	0	10
Nashua.....	0		0	0	0	0	0	0	0	2	9
<b>Vermont:</b>											
Barre.....	0		0	0	1	0	0	1	0	0	5
Burlington.....	0		0	0	0	0	0	0	0	0	7
Rutland.....	0		0	0	0	0	0	0	0	0	
<b>Massachusetts:</b>											
Boston.....	1		0	4	11	3	0	8	2	16	227
Fall River.....	1		1	1	0	0	0	1	0	15	17
Springfield.....	0		0	0	0	1	0	0	0	9	21
Worcester.....	1		0	1	5	1	0	2	0	4	48
<b>Rhode Island:</b>											
Providence.....	1		0	0	3	3	0	4	0	72	59
<b>Connecticut:</b>											
Bridgeport.....	0		0	0	0	0	0	2	0	1	37
Hartford.....	0		0	0	1	1	0	3	0	5	42
New Haven.....	0		0	1	0	1	0	0	1	7	28
<b>New York:</b>											
Buffalo.....	1		0	2	8	5	0	6	0	18	138
New York.....	10		1	38	62	24	0		16	149	1,201
Rochester.....	0		0	0	2	0	0	0	0	3	58
Syracuse.....	0		0	0	1	3	0	1	0	10	49
<b>New Jersey:</b>											
Camden.....	0		0	0	0	1	0	1	0	0	28
Newark.....	0		0	3	1	0	0	2	0	16	82
Trenton.....	0		0	1	2	0	0	2	0	4	22
<b>Pennsylvania:</b>											
Philadelphia.....	2	1	1	6	12	5	0	21	16	31	351
Pittsburgh.....	1		0	17	9	12	0	8	2	64	165
Reading.....	0		0	1	0	0	0	0	0	0	20
Scranton.....	0			0		1	0		0	5	
<b>Ohio:</b>											
Cincinnati.....											
Cleveland.....	1	5	1	15	8	13	0	9	0	26	177
Columbus.....	1	2	2	1	4	1	0	0	2	2	74
Toledo.....	0	1	1	1	1	1	0	6	5	5	84
<b>Indiana:</b>											
Anderson.....	0		0	1	0	1	0	0	0	1	11
Fort Wayne.....	0		0	0	2	0	0	0	0	3	23
Indianapolis.....	1		0	5	4	5	0	5	0	34	95
South Bend.....	0		0	1	1	1	0	0	0	3	17
Terre Haute.....	0		0	0	0	0	0	0	0	0	11
<b>Illinois:</b>											
Alton.....	0		0	1	0	0	0	0	0	0	9
Chicago.....	5	2	0	29	21	35	0	48	0	64	711
Elgin.....	0		0	0	1	0	0	0	0	0	8
Moline.....	0		0	0	0	0	0	1	0	6	6
Springfield.....	0		0	0	3	2	0	0	0	8	24
<b>Michigan:</b>											
Detroit.....	5		0	12	7	17	0	22	3	91	226
Flint.....	0		0	0	1	6	0	0	1	15	36
Grand Rapids.....	0		0	0	0	4	0	2	0	17	36
<b>Wisconsin:</b>											
Kenosha.....	0		0	0	0	1	0	0	0	4	8
Madison.....	0		0	0	0	1	0	0	0	7	17
Milwaukee.....	1		0	13	2	4	0	5	0	58	100
Racine.....	0		0	3	0	0	0	0	0	1	17
Superior.....	0		0	0	0	0	0	0	0	1	10

<sup>1</sup> Figures for Cincinnati, Little Rock, and Boise estimated; reports not received.

<sup>2</sup> The report of 11 cases of smallpox in Buffalo for the week ended Feb. 20, 1937 (Pub. Health Rep. Mar. 12, 1937, p. 319), was an error. These were cases of chicken pox.

## City reports for week ended Sept. 4, 1937—Continued

State and city	Diph- theria cases	Influenza		Meas- les cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth.....	0	-----	0	0	2	1	0	0	0	16	23
Minneapolis.....	0	-----	0	2	2	3	0	2	0	8	97
St. Paul.....	0	-----	0	0	5	1	0	2	0	11	49
Iowa:											
Cedar Rapids.....	0	-----	-----	1	-----	0	0	-----	0	2	-----
Davenport.....	0	-----	-----	0	-----	1	0	-----	0	0	-----
Des Moines.....	0	-----	-----	0	-----	4	0	-----	0	0	25
Sioux City.....	1	-----	-----	0	-----	5	0	1	0	1	-----
Waterloo.....	0	-----	-----	0	-----	2	0	-----	0	1	-----
Missouri:											
Kansas City.....	4	-----	0	0	4	3	0	2	0	2	65
St. Joseph.....	0	-----	0	0	3	0	0	0	0	0	31
St. Louis.....	3	-----	0	11	10	10	0	8	2	8	241
North Dakota:											
Fargo.....	0	-----	0	0	0	0	0	0	0	9	12
Grand Forks.....	0	-----	-----	0	-----	0	1	-----	0	0	-----
Minot.....	0	-----	-----	0	-----	0	0	-----	0	0	7
South Dakota:											
Aberdeen.....	0	-----	-----	0	-----	0	0	-----	0	7	-----
Nebraska:											
Omaha.....	0	-----	0	0	3	0	0	0	1	0	47
Kansas:											
Lawrence.....	0	-----	0	0	0	0	0	0	0	0	3
Topeka.....	0	-----	1	0	1	1	0	0	0	7	14
Wichita.....	1	-----	0	1	1	1	0	1	0	7	-----
Delaware:											
Wilmington.....	0	-----	0	0	2	0	0	0	0	3	23
Maryland:											
Baltimore.....	2	2	0	1	8	7	0	13	3	69	210
Cumberland.....	0	-----	0	0	0	0	0	0	0	8	10
Frederick.....	0	-----	0	0	0	0	0	0	0	0	5
Dist. of Col.:											
Washington.....	5	-----	0	4	8	2	0	11	5	13	136
Virginia:											
Lynchburg.....	1	-----	0	0	0	0	0	0	1	0	6
Norfolk.....	0	-----	0	0	0	0	0	1	1	1	22
Richmond.....	0	-----	0	0	1	1	0	1	0	1	36
Roanoke.....	0	-----	0	0	0	1	0	1	0	2	14
West Virginia:											
Charleston.....	1	-----	0	0	2	0	0	1	1	0	13
Huntington.....	1	-----	-----	0	-----	2	0	-----	0	0	-----
Wheeling.....	0	-----	0	0	0	0	0	0	0	3	20
North Carolina:											
Gastonia.....	0	-----	-----	0	-----	0	0	-----	0	0	-----
Raleigh.....	0	-----	0	0	0	0	0	0	0	21	15
Wilmington.....	0	-----	0	0	1	0	0	0	0	1	8
Winston-Salem.....	0	-----	0	0	2	1	0	0	2	8	-----
South Carolina:											
Charleston.....	0	-----	1	0	0	1	0	0	3	0	18
Columbia.....	0	-----	0	0	1	0	0	2	0	0	8
Florence.....	0	-----	0	0	0	0	0	0	0	0	13
Greenville.....	0	-----	0	1	0	0	0	0	0	4	6
Georgia:											
Atlanta.....	1	-----	0	0	3	1	0	1	2	16	63
Brunswick.....	0	-----	0	0	0	0	0	0	0	0	3
Savannah.....	2	-----	0	0	0	0	0	2	4	0	17
Florida:											
Miami.....	0	-----	0	6	3	0	0	2	2	0	50
Tampa.....	0	-----	0	0	0	1	0	0	0	5	20
Kentucky:											
Covington.....	0	-----	0	0	1	1	0	0	0	0	15
Lexington.....	0	-----	0	0	0	0	0	2	0	5	23
Louisville.....	1	-----	0	0	4	3	0	3	0	14	67
Tennessee:											
Knoxville.....	1	-----	0	0	0	0	0	2	1	0	17
Memphis.....	0	-----	0	1	2	4	0	3	4	12	73
Nashville.....	0	-----	0	2	3	2	0	1	3	13	45
Alabama:											
Birmingham.....	3	1	0	0	2	2	0	9	3	3	75
Mobile.....	1	-----	0	0	4	1	0	1	0	0	32
Montgomery.....	0	1	-----	0	-----	2	0	-----	0	1	-----

\* The report of 16 cases of typhoid fever in Louisville for the week ended Mar. 27, 1937 (Pub. Health Rep., Apr. 16, 1937, p. 503), was an error. These were cases of whooping cough.

## City reports for week ended Sept. 4, 1937—Continued

State and city	Diph- theria cases	Influenza		Meas- sles cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Arkansas:											
Fort Smith.....	0			0		2	0		1	1	
Little Rock.....											
Louisiana:											
Lake Charles.....	0		0	0	1	0	0	0	0	0	10
New Orleans.....	3		0	0	13	2	0	15	2	9	170
Shreveport.....	0		0	0	1	0	0	2	0	0	36
Oklahoma:											
Muskogee.....	0			0		0	0		0	0	
Oklahoma City.....	0		0	0	1	4	0	2	2	0	32
Tulsa.....	1			0		0	0		0	5	
Texas:											
Dallas.....	2		0	1	1	2	0	1	5	17	31
Fort Worth.....	1		0	0	0	0	0	3	1	6	28
Galveston.....	0		0	0	2	0	0	0	0	0	16
Houston.....	0		0	0	5	0	0	3	0	0	68
San Antonio.....	1		1	0	2	0	0	8	1	0	54
Montana:											
Billings.....	0		0	0	0	0	0	0	0	0	8
Great Falls.....	0		0	0	0	0	0	0	0	4	10
Helena.....	0		0	0	0	2	0	0	0	3	9
Missoula.....	0		0	0	1	1	0	0	0	0	17
Idaho:											
Boise.....											
Colorado:											
Colorado Springs	0			0	0	2	0	0	0	0	8
Denver.....	2		0	7	5	10	0	4	1	18	88
Pueblo.....	1		0	0	0	0	0	0	0	0	2
New Mexico:											
Albuquerque.....	0		0	0		0	0	2	1	1	10
Utah:											
Salt Lake City..	2		0	3	5	4	0	0	0	13	36
Washington:											
Seattle.....	0		0	3	5	2	0	3	0	10	84
Spokane.....	0		0	1	4	3	0	1	0	5	27
Tacoma.....	0		1	0	1	0	0	0	0	1	36
Oregon:											
Portland.....	0		0	0	2	2	0	3	0	4	68
Salem.....	0		0	0		0	0		0	0	
California:											
Los Angeles.....	1	4	0	5	14	6	1	17	1	47	287
Sacramento.....	1		0	0	1	1	0	4	1	7	20
San Francisco.....	0	3	0	2	4	2	0	6	0	39	157

## City reports for week ended Sept. 4, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
<b>Maine:</b>				<b>Iowa:</b>			
Portland.....	0	0	8	Des Moines.....	0	0	3
<b>New Hampshire:</b>				Sioux City.....	0	0	2
Nashua.....	0	0	1	<b>Missouri:</b>			
<b>Massachusetts:</b>				Kansas City.....	1	1	12
Boston.....	0	0	21	St. Joseph.....	0	0	1
Springfield.....	0	0	1	St. Louis.....	1	0	8
Worcester.....	0	0	3	<b>North Dakota:</b>			
<b>Rhode Island:</b>				Minot.....	0	0	2
Providence.....	0	0	3	<b>Nebraska:</b>			
<b>Connecticut:</b>				Omaha.....	0	0	15
Hartford.....	0	0	2	<b>Kansas:</b>			
<b>New York:</b>				Lawrence.....	0	0	1
Buffalo.....	0	0	2	Wichita.....	0	0	2
New York.....	1	1	24	<b>Maryland:</b>			
Syracuse.....	0	0	1	Baltimore.....	0	0	3
<b>New Jersey:</b>				District of Columbia:			
Newark.....	0	0	2	Washington.....	1	1	4
<b>Pennsylvania:</b>				<b>Georgia:</b>			
Philadelphia.....	1	0	3	Atlanta.....	0	0	1
Pittsburgh.....	0	0	2	<b>Florida:</b>			
<b>Ohio:</b>				Tampa.....	0	0	1
Cleveland.....	2	1	10	<b>Kentucky:</b>			
Columbus.....	0	0	2	Lexington.....	1	0	0
Toledo.....	0	0	2	Louisville.....	1	0	1
<b>Indiana:</b>				<b>Tennessee:</b>			
Fort Wayne.....	0	0	1	Memphis.....	0	0	1
Indianapolis.....	0	0	2	<b>Louisiana:</b>			
<b>Illinois:</b>				Shreveport.....	0	0	1
Chicago.....	1	1	57	<b>Oklahoma:</b>			
Elgin.....	0	0	2	Oklahoma City.....	0	0	1
Moline.....	0	0	1	Tulsa.....	0	0	1
<b>Michigan:</b>				<b>Colorado:</b>			
Detroit.....	0	0	22	Colorado Springs.....	0	0	3
Flint.....	0	0	1	Denver.....	0	0	5
Grand Rapids.....	0	0	1	Pueblo.....	0	0	7
<b>Wisconsin:</b>				<b>Washington:</b>			
Madison.....	0	0	1	Tacoma.....	1	0	0
Milwaukee.....	0	0	13	<b>California:</b>			
Racine.....	0	0	1	Los Angeles.....	1	0	14
<b>Minnesota:</b>				Sacramento.....	0	0	2
Minneapolis.....	0	0	6				
St. Paul.....	0	0	6				

*Encephalitis, epidemic or lethargic.*—Cases: Philadelphia, 1; Toledo, 1; Minneapolis, 1; St. Louis, 52; Sacramento, 1; San Francisco, 1.

*Pellagra.*—Cases: Boston, 1; Philadelphia, 1; Atlanta, 2; Birmingham, 1; New Orleans, 1.

*Typhus fever.*—Cases: Charleston, S. C., 1; Atlanta, 1; Miami, 3; Mobile, 1; Montgomery, 1; Fort Worth, 1; Los Angeles, 1.

## FOREIGN AND INSULAR

### CANADA

*Provinces—Communicable diseases—2 weeks ended August 28, 1937.*—During the 2 weeks ended August 28, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				3	4	1	1		1	10
Chicken pox				20	69	11	23	3	13	139
Diphtheria		2	2	60	5	9	3			81
Dysentery				3	4					7
Erysipelas				1	2		3	3	2	11
Influenza	3	4		1		3			2	13
Lethargic encephalitis				1			1			2
Measles		5	1	47	118	14	107	36	30	358
Mumps					50	2	1	2	10	65
Paratyphoid fever					6			1		7
Pneumonia	4				34		2		5	45
Poliomyelitis		9	2	34	566	18	37	13	1	680
Scarlet fever		9	3	88	78	11	21	36	22	268
Smallpox							1			1
Trachoma									1	1
Tuberculosis	1	54	15	105	71	3		1	25	275
Typhoid fever		3	7	55	22	2	4	3	3	99
Undulant fever				1	4				1	6
Whooping cough				307	215	119	21	3	12	677

### CUBA

*Habana—Communicable diseases—4 weeks ended August 28, 1937.*—During the 4 weeks ended August 28, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	16	1	Tuberculosis	15	1
Malaria	23		Typhoid fever	25	3
Poliomyelitis	1		Undulant fever	1	

<sup>1</sup> Includes imported cases.



## LATVIA

*Notifiable diseases—June 1937.*—During the month of June 1937, cases of certain notifiable diseases were reported in Latvia as follows:

Disease	Cases	Disease	Cases
Botulism.....	3	Mumps.....	26
Cerebrospinal meningitis.....	10	Paratyphoid fever.....	15
Diphtheria.....	62	Puerperal septicemia.....	7
Dysentery.....	1	Scarlet fever.....	253
Erysipelas.....	62	Tetanus.....	3
Influenza.....	27	Trachoma.....	45
Leprosy.....	2	Tuberculosis (respiratory).....	282
Lethargic encephalitis.....	4	Typhoid fever.....	45
Malaria.....	1	Whooping cough.....	362
Measles.....	3		

## SWEDEN

*Notifiable diseases—July 1937.*—During the month of July 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis.....	6	Poliomyelitis.....	<sup>1</sup> 116
Diphtheria.....	18	Scarlet fever.....	865
Dysentery.....	21	Syphilis.....	22
Epidemic encephalitis.....	1	Typhoid fever.....	17
Gonorrhea.....	1, 164	Undulant fever.....	14
Paratyphoid fever.....	54	Weil's disease.....	3

<sup>1</sup> Includes 8 cases nonparalytic at time of notification.

## YUGOSLAVIA

*Communicable diseases—4 weeks ended August 15, 1937.*—During the 4 weeks ended August 15, 1937, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax.....	77	2	Poliomyelitis.....	18	2
Cerebrospinal meningitis.....	8	1	Scarlet fever.....	246	3
Diphtheria and croup.....	567	24	Sepsis.....	8	2
Dysentery.....	455	34	Tetanus.....	55	19
Erysipelas.....	209	4	Typhoid fever.....	612	52
Measles.....	50	3	Typhus fever.....	19	-----
Paratyphoid fever.....	102	2			

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

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan-American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

## CHOLERA

[C indicates cases; D, deaths; P, present]

[illegible]

India (French):	1936												1937												May 1-10, 1937					
	December						January						February						March								April			
	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-31
Chandernagor Territory.....	3	5	8	2																										
Karikal Province.....	16																													
Pondichery Province.....	13																													
Indochina (see also table below):																														
Cochinchina.....																														
Chaudoc.....	P																													
Cholon Province.....																														
Philippine Islands: Manila.....																														
D.....																														
Bangkok.....	163	226	338	13	9	4																								
Provinces.....	1,339	1,485	796	50	72	81																								
On vessels.....																														
Straits Settlements: Penang.....																														
S. S. <i>Kedah</i> at Singapore from Penang.....		1																												
S. S. <i>Hellas</i> at Bangkok from Swatow.....		3																												
S. S. <i>Kedah</i> at Belawan-Deli.....		2																												
S. S. <i>Ellenga</i> at Penang from Negapatam.....		1																												
D.....																														
S. S. <i>Aronda</i> at Rangoon from Calcutta.....																														
S. S. <i>Badakur</i> at Rangoon from Calcutta.....																														
S. S. <i>Talamba</i> at Port Swettenham from Madras.....																														
S. S. <i>Chungking</i> at Bangkok from Hoihow.....																														
S. S. <i>Hiangsu</i> at Singapore from Hong Kong.....																														
S. S. <i>Kwantung</i> at Hong Kong from Hoihow.....																														
C.....																														
S. S. <i>Eagle</i> at Hong Kong from Kongmoon.....																														
S. S. <i>Muinam</i> at Singapore from Hong Kong.....																														
D.....																														
S. S. <i>Sandriken</i> at Hong Kong.....																														
S. S. <i>Haiching</i> at Hong Kong.....																														
C.....																														
Indochina (French) (see also table above):																														
Cambodia.....																														
C.....	1																													
D.....	1																													
Cochinchina.....																														
C.....																														
D.....																														
D.....																														

<sup>1</sup> Imported.

<sup>2</sup> Includes 3 imported cases.

<sup>3</sup> In addition for week ended July 28, 1937, 3 cases of cholera with 2 deaths in contacts.

<sup>4</sup> Reports incomplete.

## PLAGUE!

[C indicates cases; D, deaths; P, present]

[illegible]

Hawaii Territory: Plague-infected rats:													
Hawaii Island—Hamakua District:													
Hamakua Mill Sector †:													
Honokaa Sector.....	1	4	4	—	—	—	—	—	—	—	—	—	—
Paaunau Sector †.....	—	—	—	—	—	—	—	—	—	—	—	—	—
Pohakaa.....	6	—	—	—	—	—	—	—	—	—	—	—	—
India.....													
Bassein.....	C	4,931	5,980	2,402	112	65	72	67	58	118	—	—	—
Plague-infected rats.....	D	2,528	2,976	1,690	65	55	39	44	36	71	89	87	—
Bombay Presidency.....	C	7	5	8	7	3	—	3	—	—	—	—	—
Central Provinces and Berar.....	C	120	83	2	—	—	—	—	—	—	—	—	—
Karachi.....	D	62	40	37	10	3	7	4	3	5	14	11	8
Plague-infected rats.....	C	1,614	2,213	1,103	3	1	3	2	3	2	10	5	9
Madras Presidency.....	C	7	3	5	1	—	7	—	—	10	—	—	8
Punjab.....	C	94	97	53	23	4	—	—	6	22	24	27	—
Rangoon.....	D	57	64	30	12	2	—	—	7	9	14	19	—
Sind State.....	C	1	1	1	2	—	—	—	—	—	—	—	—
Indochina (see also table below):	C	6	4	2	—	—	—	—	—	—	—	—	—
Phnom-Penh.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Sadec.....	C	—	—	—	—	—	—	1	—	—	—	—	—
Madagascar. (See table below.)	C	—	—	—	—	—	—	—	—	—	—	—	—
Malta.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Northern Rhodesia.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Penn. (See table below.)	C	1	—	—	—	—	—	—	—	—	—	—	—
Senegal.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Dakar.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Tiessa.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Tivaouane.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Syria: Ras el Ain region.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Tunisia: Tunis.....	D	—	—	—	—	—	—	—	—	—	—	—	—
Plague-infected rats.....	C	—	—	—	—	—	—	—	—	—	—	—	—
Union of South Africa (see also table below):	C	4	3	17	5	—	—	—	—	—	—	—	—

† Including plague in the United States and its possessions.

‡ Suspected.

\* Plague has been reported in China as follows: Information dated Aug. 18 reports an outbreak in West Hsingan (Khingan) and Southern Lungkiang Provinces. Under date of June 1, estimated deaths from plague in Fukien Province reported to be 3,000 to 4,000. According to a report dated May 10 several hundred deaths from bubonic plague occurred in Hsintungchi.

† Plague has also been reported in Hawaii Territory. Island of Hawaii, Hamakua District, as follows: Week ended Aug. 14, 1 lot of 5 rats and 1 lot of 3 mice; by mass inoculation, and week ended Sept. 4, 3 plague infected rats, all in Hamakua Mill Sector; also week ended Sept. 4, 1 plague infected rat in Paaunau Sector.

‡ Imported.

§ Pneumonic plague.

¶ For 2 weeks.



Place	Febru- ary 1937	March 1937	April 1937	May 1937	June 1937	July 1937
<b>Argentina:</b>						
Cordoba Province.....	C	1				2
Mendoza Province.....	C				4	2
Santiago del Estero Province. C					23	
<b>Bolivia:</b>						
Chuquisaca Department.....	C				45	
La Paz Department.....	C				57	
Oruro Department.....	C				57	
Potosi Department.....	C				9	
<b>Brazil:</b>						
Parahyba State.....	C	5	11 2	11 2	12	7
Pernambuco State.....	C		11 1			
Ecuador (see also table above):		11 3	11 1			
Manabi.....	C					
Bahia.....	C	1				
Manta.....	C	2				
		7	2			
		12	13			
<b>Place</b>						
Indochina (see also table above):						
Cambodia.....	C					
Cochinchina.....	C					
Madagascar (central region)....	D					
<b>Peru:</b>						
Cajamarca Department.....	C					
Huancabamba Department.....	C					
Lambayeque Department.....	C					
Libertad Department.....	C					
Salaverry.....	C					
Lima Department.....	C	4				
Lima City.....	C	12				
Piura Department.....	C	5				
Union of South Africa (see also table above).....	C	1				
		2				
		3				
		3				

\* Plague infection proved in insect hosts as follows: *California*—Placer County, June 22; San Bernardino County, July 12-29; San Mateo County, July 1937. *Idaho*—Bannock County, July 8. *Nevada*—Douglas County, July 29-31; Ormsby County, July 2-Aug. 20. *Oregon*—Lake County, May 7; Wallowa County, June 25. *Utah*—Morgan County, reported Aug. 10. *Washington*—Adams County, Apr. 20, 1927.

<sup>9</sup> During the week ended Sept. 4, 1 fatal case of plague was reported in Fresno County, Calif.

<sup>10</sup> Number unspecified.

<sup>11</sup> Pneumonic plague.

<sup>12</sup> Includes 66 cases of pneumonic plague.









Southern Rhodesia.....	C	75	12	2	1	13	33	1	5	6	2	3	1
Sudan (Anglo-Egyptian).....	C	105							4				
Tunisia.....	C												
Turkey. (See table below.).....	C												
Unfederated Malay States: Kedah.....	C										P		
Uruguay.....	C	1					2	1					

## On vessels:

S. S. Colorado Springs at Manila from Shanghai.....	1 case	Feb. 1, 1937											1 case	Apr. 2, 1937
S. S. Nikko Maru at Moli from Tsingtao.....	1 case	Feb. 7, 1937											1 case	Apr. 13, 1937
S. S. Bhadravati at Bombay from Vengurla.....	1 case	Feb. 18, 1937											1 case	Apr. 17, 1937
S. S. Nagasaki Maru at Nagasaki from Shanghai.....	1 case	Mar. 8, 1937											1 case	Apr. 24, 1937
S. S. Kiangsu at Swatow from Bangkok.....	1 case	Mar. 13, 1937											1 case	May 7, 1937
S. S. Sumatra at Calcutta.....	2 cases	Mar. 21, 1937											1 case	June 28, 1937
S. S. Englestan at Rangoon from Chittagong.....	1 case	Mar. 25, 1937											1 case	Aug. 11, 1937
S. S. Dariken at Hong Kong.....	1 case	Mar. 31, 1937											1 case	Aug. 19, 1937
S. S. Telma at Hong Kong.....	1 case	Apr. 1, 1937											1 case	Sept. 5, 1937

## On vessels—Continued.

S. S. Jalapagal at Rangoon from Chittagong.....	1 case	Apr. 1, 1937											1 case	Apr. 2, 1937
S. S. Takung at Hong Kong.....	1 case	Apr. 13, 1937											1 case	Apr. 17, 1937
S. S. President Hoover at Yokohama from Honolulu.....	1 case	Apr. 17, 1937											1 case	Apr. 24, 1937
S. S. Hydr at Karachi.....	1 case	May 7, 1937											1 case	May 7, 1937
S. S. G. Pasquier at Singapore from Saigon.....	1 case	May 28, 1937											1 case	June 28, 1937
S. S. Charlotte at Thursday Island.....	1 case	Aug. 11, 1937											1 case	Aug. 11, 1937
S. S. Empress of Japan at Kobe from Manila.....	1 case	Aug. 19, 1937											1 case	Aug. 19, 1937
S. S. Northern Prince at New York from Rio de Janeiro.....	1 case	Sept. 5, 1937											1 case	Sept. 5, 1937
S. S. Empress of Asia at Honolulu.....	1 case												1 case	

Place	Febru- ary 1937	March 1937	April 1937	May 1937	June 1937	July 1937	Place	Febru- ary 1937	March 1937	April 1937	May 1937	June 1937	July 1937
Angola.....	11	9					Mexico—Continued:						
Belgian Congo.....	158	283	143	287			Mexico State.....		1		1		
Bolivia.....	4	5	25	48			Mexico, D. F.....		16	13	41	28	
China: Manchuria—Harbin.....		3	11	4			Mexico City.....	2					
Chosen.....	41	58	73	27	1		Nuevo Leon State—Monter- rey.....	6	3	1	10	8	
Colombia (see also table above).....	35	42	89	51	108		Queretaro State.....						
Dahomey.....	5	5	2				San Luis Potosi State—San Luis Potosi.....	1		1		1	4
Finland.....	1	1	1	1			Morocco.....	6		6	1	1	
France.....	2				2		Nyasaland.....	7	3				
Guatemala.....	382	505	316	274	273		Palestine.....	8					
Indochina (see also table above).....	70	97	46	95	50		Portugal (see also table above).....	69	27	15	29		
Mexico (see also table above):							Salvador.....	6	2	5	1		
Agascalientes State—Aguas- calientes.....	1		1	1			Senegal.....	4		4	28	33	
Chihuahua State.....	2		4				Turkey.....	15	15	4	4	1	
Colima State.....	1		1		1								
Jalisco State—Guadalajara.....	1		1										

\* Imported.

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

## TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

[illegible]







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

## YELLOW FEVER—Continued

[O indicates cases; D, death; P, present]

Place	Jan. 31- Feb. 27, 1937	Feb. 28- Mar. 27, 1937	Mar. 28- Apr. 24, 1937	Week ended—																
				May 1937					June 1937					July 1937					August 1937	
				1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21
Nigeria:																				
Aba.....																			1	
Farcados.....														1	1					
Ibadan.....														1						
Ogbomoso.....													1	1						
Ovimi.....														1						
Sapele.....																				
Paraguay:																				
Peru: Perene region (Pampa Whaley).....														P				3	1	
Senegal:																				
Bambey.....																				
Dakar.....																				
Diakhao.....																				
Diourbel.....		1																		
Gossas.....																				
Malen Hodar.....																				
Tamba-Counda.....							1													
Thies Circle—Khombole.....																				
Tilmaka.....							1													
Tivaouane.....																				
Sudan (French): Mahina.....																				

\* A dispatch dated June 4, 1937, from the United States legation in Asuncion, Paraguay, states that yellow fever has been officially reported in the northwestern part of Paraguay.

\* Jungle type.

\* Suspected.

\* During the week ended Sept. 4, 1 case of yellow fever was reported in Diourbel, Senegal.

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