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A NOTE ON THE INCIDENCE OF ENDEMIC GOITER IN NORTHERN IRELAND

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Opinions vary widely as to the incidence of endemic goiter in Northern Ireland. According to some of the physicians practicing in this section, simple goiter is rare; others assert that the disease is relatively frequent. Probably an intermediate estimate is more in accordance with the facts.

During the course of routine physical and mental examinations of aliens applying for visas to enter the United States from Northern Ireland, the writers were able to observe the thyroid status of each applicant. From July, 1929, to June, 1930, the thyroid glands of 4,648 male applicants and 3,992 female applicants were examined. The findings, classified according to arbitrary standards previously employed on a large scale in the United States, afford interesting information concerning the incidence of simple goiter in the northern part of Ireland. It also makes possible a comparison of goiter incidence in the new and old worlds by the use of similar methods of examination and record.

Northern Ireland, or Ulster, comprises six counties and is that portion of Ireland lying north of the Irish Free State. Practically all of the persons examined came from this northern section, only a few residing in the border counties of the Free State. The goiter statistics are of particular interest, because of the proximity of the ocean to much of this territory, an association believed by some to confer considerable protection against goiter because of the supposed iodine-enrichment of drinking water and foodstuffs. However, if these factors are effective, their extent is difficult of determination, for simple goiter is found among individuals coming from all parts of Northern Ireland.

The method of examining and classifying thyroid enlargements has been described in previous publications.[1,2] These same methods

[1] Robert Olesen: Thyroid survey of 47,493 elementary school children in Cincinnati. Pub. Health Rep., Vol. 39, No. 30, pp. 1777-1802 (July 23, 1924). (Reprint No. 941.)

[2] Robert Olesen: Endemic goiter in Colorado. Pub. Health Rep., Vol. 40, No. 1, pp. 1-29 (Jan. 1, 1925). (Reprint No. 983.)

were employed during the examinations made in Belfast, to which point all applicants for visas came.

Results.—In all, 4,648 males and 3,992 females, ranging in age from a few weeks to more than 80 years, were examined. Thus, 75 males and 61 females under 5 years of age, as well as 138 males and 249 females over 50 years of age, were included in the examinations.

TABLE 1.—*Numbers and degrees of thyroid enlargement (by age groups) among applicants for visas in Belfast, Northern Ireland*

4,648 MALES

Age group	With enlarged thyroids						Normal	Total
	Degree of enlargement				Total	Per cent		
	Very slight	Slight	Moderate	Adenomas				
Under 5	1			1	2	2.6	73	75
5 to 9	1				1	1.2	78	79
10 to 14	6	1			7	11.5	54	61
15 to 19	92	18	3		113	14.6	660	773
20 to 24	205	41	8	6	260	15.3	1,434	1,694
25 to 29	79	9	5	6	99	10.8	816	915
30 to 34	34	5		2	41	9.1	409	450
35 to 39	18	2		4	24	9.5	227	251
40 to 44	1			1	2	1.6	120	122
45 to 49	1	1			2	2.2	88	90
Over 50				1	1	.7	137	138
Total	438	77	16	21	552		4,096	4,648
Per cent	9.4	1.6	.3	.4		11.8		100.0

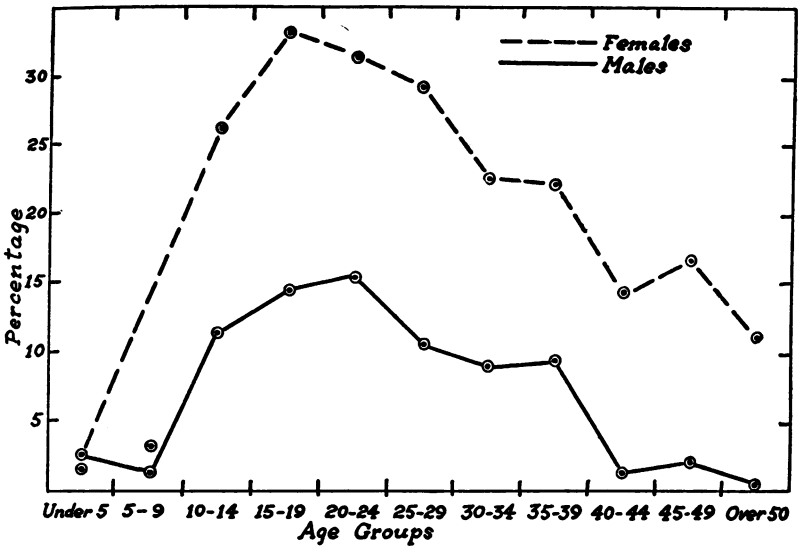
3,992 FEMALES

Age group	With enlarged thyroids							Normal	Total
	Degree of enlargement					Total	Per cent		
	Very slight	Slight	Moderate	Marked	Adenomas				
Under 5					1	1	1.6	60	61
5 to 9	2					2	3.2	60	62
10 to 14	14	2	3		1	20	26.3	56	76
15 to 19	197	94	32		10	333	33.1	662	1,005
20 to 24	231	106	38		8	383	31.6	829	1,212
25 to 29	112	43	18	2	8	183	29.2	444	627
30 to 34	48	16	4	1	5	74	22.9	250	324
35 to 39	23	10	3		6	42	22.2	147	189
40 to 44	9	2	1		3	15	14.4	89	104
45 to 49	5	3	2		4	14	16.9	69	83
50 and over	9	6	2		11	28	11.2	221	249
Total	650	282	103	3	57	1,095		2,887	3,992
Per cent	16.3	7.1	2.5	0.07	1.4		27.4		100.0

The results of this thyroid survey are set forth in Table 1, the sex, age groups, and degrees of thyroid enlargement being indicated. It will be noted that there were 552 definite thyroid enlargements among the 4,648 males examined, a percentage of 11.8. However, the greater number of these enlargements, amounting to 9.4 per cent, were very slight in character The number of adenomatous enlarge-

ments among the males was 21. Among the 3,992 females inspected there were 1,095 enlargements of the thyroid gland, a percentage of 27.4. The number of adenomatous enlargements encountered among the females was 57. As is usually the case, more enlargements were found among the females and the enlargements were of greater size than among the males.

The data are displayed graphically in the chart. It will be seen that the percentage incidence is consistently greater among females of each age group after the age of 9 years. The greatest amount of goiter in both sexes is found between the ages of 15 and 24 years.



Percentage of all grades of thyroid enlargement found among 4,648 males and 3,992 females, by age groups, in Northern Ireland, examined during the period July, 1929–June, 1930

After this period there is a comparatively rapid decline in the incidence rate among males. However, among the females, goiter continues to prevail to a considerable extent even after the age of 50. It is evident that among females, at least, goiter prevails to a considerable extent in northern Ireland.

Goiter and intelligence.—In view of the interest which still attaches to the possible relationship between intelligence and goiter, the special observations made on this point in Belfast will prove of interest. One of us (R. O.), after a comparison of percentile ranks of thyroid-normal and thyroid-enlarged school children in Cincinnati, Ohio, reached the conclusion that the differences were not of sufficient magnitude to warrant the conclusion that thyroid-normal individuals have a keener mentality than those whose thyroids are enlarged.[3]

[3] Robert Olesen and Mabel R. Fernald: Endemic Goiter and Intelligence. Pub. Health Rep., Vol. 41, No. 21, pp. 971-986 (May 21, 1926). (Reprint No. 1081.)

This conclusion is amply supported by the experience in Belfast, where, after intensive intelligence tests applied to approximately 600 persons, 142 were finally certified as mentally defective. Among the 112 defective females there were 31 thyroid enlargements, a percentage of 27.7. Among the 30 males who were mentally defective there were only 4 thyroid enlargements, a percentage of 13.3. Comparison of these figures with the percentages of general goiter incidence among the individuals regarded as mentally normal discloses a very close approximation. Therefore, it must again be concluded that intelligence is not demonstrably associated with the presence or absence of thyroid enlargement.

Conclusion.—In a previous publication,[4] it was tentatively suggested that when the percentages of all degrees of simple thyroid enlargement, as determined by Public Health Service standards, range between 10 and 20 per cent among the males and between 20 and 30 per cent among the females, widespread prophylaxis is probably an optional public health measure. However, these tentative suggestions should not deter physicians and public health authorities from providing prophylaxis and treatment in specific instances. In view of the considerable incidence of goiter among females between 19 and 24 years of age in Northern Ireland, it would appear particularly desirable that prophylactic measures be instituted prior to that time.

THE INFLUENCE OF THE SIZE OF THE EXPLANT UPON CULTURES OF CHICK FIBROBLASTS IN VITRO

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INTRODUCTION

The recognition and isolation of any factor playing a major rôle in the metabolism of the cell or in the initiation of cell cleavage is obviously of great importance. Not only is it of significance because of its biological interest, but also because of its importance in defining more closely the factors responsible for the differences in the relative rates of cell cleavage in normal and malignant tissues, and the differences in the degree of organization found in these tissues.

Burrows (2), in 1923, made the observation that isolated single connective tissue or mesenchyme cells planted in plasma showed no signs

[1] This work has been carried on under the supervision of Dr. Carl Voegtlin, Chief of the Division of Pharmacology. The authors wish to express their thanks to Professor Voegtlin for his help and suggestions during the progress of the investigation. They wish also to express their appreciation of the valuable technical assistance of Mr. E. L. Schilling in carrying on this work.

[4] Robert Olesen: Endemic Goiter. Pub. Health Bull. No. 192, p. 46, 1929.

of growth. This same observation was made by Fischer (4, 6) in 1923, who used a 4-month old strain of fibroblasts from the chick. He found that such isolated cells showed no signs of cell cleavage and that the cells eventually degenerated and died. He also found that if the transplanted cell clump consisted of a few scattered cells, no growth took place, and the cells took on the aspects of degeneration at a time when the control culture, containing a much greater number of cells, seemed to be in perfect condition. In describing this degeneration he noted the accumulation of vacuoles and fat "granules" within the cells.

In trying to account for this lack of cell cleavage and occurrence of degeneration, Fischer later (1925) worked on the hypothesis that for the initiation of cell cleavage direct protoplasmic connection or anastomosis with a certain number of homologous cells of the same species was in some way significant (5). He succeeded in showing that in large cultures of fibroblasts there did appear to be some definite interaction of the cells of the culture. This interaction resulted in a definite rhythm in the occurrence of mitosis in the cells of the culture (5, 6).

In an attempt to obtain cultures from single isolated fibroblasts from the heart of the chick, our attention was attracted by a different phase of the same problem. As a result of this, an attempt was made to study the changes in the granules and lipoid[1] droplets of isolated cells, and to correlate these changes with those observed in the cells of cultures from explants of larger sizes. The results of this investigation appear to us to be of some value in understanding the conditions which accompany, and possibly result in, the death of isolated fibroblasts in culture. They also appear to be of interest in understanding conditions which prevail in cultures of fibroblasts from larger explants planted under similar conditions. The data obtained are presented in this article.

MATERIALS AND METHODS

In this work two types of fibroblasts have been used—the first from freshly explanted heart tissue of 9-day chicks, the second from a stock strain of fibroblasts, from the same source, kept growing *in vitro* in this laboratory for the past nine months.

The work has consisted of an examination of the rates of growth of cultures planted from graded sizes of explants taken from these two types of tissues, and the correlation of these rates with the cell changes observed in the cultures.

[1] In this paper the term "lipoid" is used in a general sense similar to that in which it is used by Baker and Carrel (1). In those cultures tested, the lipoid droplets within the cell showed a high refractive index, stained with Sudan III, and were soluble in chloroform or other fat solvents.

The method of preparation of cultures from the fresh chick hearts was as follows: The freshly removed heart was washed in Tyrode solution [2] adjusted, just before using, to a pH of about 7.4. A series of fragments was then cut from the heart wall with an iridectomy knife. The size of each fragment was 2 by 1 by 1 mm., or a little smaller. These fragments were set aside in Tyrode solution until wanted. As needed, a fragment was taken out and cut so as to give two fragments each 1 by 1 by 1 mm., or a little smaller. One of these was set aside as representing the largest size of explant of the set, size 1; the other was again divided into two approximately equal parts. One of these halves was set aside as the explant of size 2, and the other again divided, and so on until from the one original tissue fragment had been obtained five explants ranging in decreasing size from the largest, which was about the size of the normal explant generally used, down to the smallest size, barely visible to the eye. This smallest was cut such a size that after 48 hours' incubation from 1 to about 40 cells would have wandered out from it.

These explants were planted in hanging drops of medium on mica cover slips. This medium was made up of equal volumes of chicken plasma and chick embryo juice. Each solution was measured from a calibrated capillary pipette, and the two were mixed on the mica cover slip and spread over a circular area 20 mm. in diameter. The explant was placed in the still liquid media by means of two small iridectomy knives. As the total volume of media used was approximately 0.013 c. c. for each culture, the drop formed a very thin layer over a relatively large surface. By actual measurement of a number of cultures, this layer of medium was approximately 110 μ thick, near its center.[3] This shape and size of clot was chosen as being so thin that cells at all levels within the clot could be considered as under approximately comparable conditions of oxygen and CO_2 tension.

After planting a culture in this manner, the mica cover slip, with its adherent culture, was inverted over the well of a hollow-ground slide and was sealed to it with vaseline. An outer seal of paraffin was also put on.[4]

In the preparation of cultures from the stock strain of fibroblasts, several technical difficulties presented themselves. In order to avoid these, the following technique was employed: The cultures from which it was desired to obtain explants were planted as usual in hanging drops of embryo juice and plasma. However, instead of

[2] The composition of the Tyrode solution used was as follows: NaCl, 8 g.; KCl, 0.2 g.; $CaCl_2$, 0.2 g.; $NaHCO_3$, 1 g.; NaH_2PO_4, 0.05 g.; glucose, 1 g.; water, 1,000 c. c.

[3] This measurement was made by means of the fine adjustment of a microscope, the fine adjustment head being calibrated to read single micra. This measurement assumed the refractive index of the plasma clot to be 1.4.

[4] The slides used to cover these cultures had a polished concavity of about 25 mm. diameter. The volume of this concavity was 0.5 c. c.

the hanging drop of media being attached directly to the under surface of the mica cover, it was attached to a small disk of mica about 16 mm. in diameter. This was, in turn, attached to the mica cover slip by means of a small drop of embryo juice or Tyrode solution; capillarity held the mica disk in position. At the time of cutting of the graded sizes of explants, 48 hours after planting these parent cultures, the cover of each parent culture was raised, and the inside disk of mica, with its adherent clot, was removed and floated for five minutes or so, face down, in freshly adjusted Tyrode solution. Upon removal from this solution the culture was drained of Tyrode solution, by touching it to a pad of sterile gauze, and was then placed in position under a binocular dissecting microscope. By means of a sharp iridectomy knife, a series of radial and peripheral cuts was made in the culture. These produced a series of explants of graded sizes all from the same culture. These cuts were made so that the largest size fragment consisted of ½ the whole culture; the second size represented about ¼ to ⅛, the third 1/12 to 1/24, the fourth about 1/36 to 1/64. The size of the fourth was such as to allow the migration of about 1 to 40 cells in 48 hours. A still smaller size of explant was planted in some cases. From this smallest size, size 6, no migration was ever seen to take place.

As will be noted, cultures of fresh heart were planted in sets of 5 cultures each, each culture of which represented a different size of explant. Stock fibroblasts, however, were planted in sets of only 4 cultures each. Upon examination of the data it was found that cultures from explants of sizes 1 and 2 of both types of cells were comparable, within the limits of accuracy of the technique, while cultures from explants of sizes 3 and 4 of the stock fibroblasts seemed comparable to cultures from explants of sizes 4 and 5 of the fresh heart. In order to place slides from the two types of tissues on a comparable basis, cultures from explants of sizes 3 and 4 of the stock strain of fibroblasts have been reclassified as sizes 4 and 5, respectively, making them comparable to sizes 4 and 5 of the fresh heart explants.

The plasma used in planting all of these cultures was taken from hens 5 to 18 months old. No substantial differences in the cell growth were noted as a result of the age of the hen. All lots of plasma were kept sealed under vaseline at 4° C. Most of the lots of plasma were only 2 or 3 days old when used; none was more than 9 days old.

The embryo juice was prepared from 9-day chicks, freshly removed from the eggs. The eyes and membranes of these chicks were removed and the remaining tissues were washed with Tyrode solution, then minced and centrifugalized. The supernatant, slightly viscous fluid so obtained was then decanted, frozen three consecutive times,

and stored under a vaseline seal at 4° C. until needed. All embryo juice used was less than 48 hours old.

All cultures were incubated at 38.5° C.

Immediately after preparation, the outlines of the cultures were traced by means of a projectoscope. Similar tracings were made thereafter at intervals of a day or so. The area of each tracing was measured by means of a planimeter, as in Fischer's well known method, and from these data the change in the area of each culture was determined and the areas of the cultures plotted. The curves so obtained were studied separately. From the individual curves have been synthesized the composite curves presented in Charts 1 and 2. These composite curves represent the modes of the curves of the separate cultures studied.

Further, at various intervals of time one or more sets of cultures from different sized explants were sacrificed. These cultures were closely examined unstained at 38.5° to see the general condition of the cells, and then supravitally stained with 1/20,000 neutral red, in unbuffered Locke solution,[5] after which more detailed studies were made on the condition of the cell granules, fat droplets, etc. The staining process was carried out at 38.5°, and the dye was never allowed to act longer than a few minutes, in order to insure a minimum of change in cell structures through the action of the dye. Some of the cultures were also stained with Sudan III in order to study the fat droplets more closely; but in general this was not necessary, except for the smallest sizes of droplets, as the unstained highly refractile droplets showed up quite sharply in contrast with the neutral red absorbing granules of the cell.

Photographic records were kept of almost every culture. Two regions were usually photographed in each. Photographs were generally made at a magnification of 365X, using 8 by 11 cm. plates. Plates 1 to 8 show typical pictures selected from these routine photographs.

Using this technique, about 75 cultures, comprising three series, planted from fresh heart, and about 85 cultures, comprising 4 series, planted from stock fibroblasts, have been studied. A number of other series of similar cultures were also examined. The data from these are not included in those presented, as conditions under which these series were cultivated or examined were less accurately standardized, or the cultures were not so carefully studied. Even these cultures, however, showed the same general changes as those shown by the cultures of the 7 series more closely studied.

In analyzing the data obtained from this study, the change in the volume of the lipoid droplets per cell was found to be so striking that it was thought to be of interest to attempt to portray it graphically

[5] The composition of the Locke solution was as follows: NaCl, 9 g.; KCl, 0.42 g.; $CaCl_2$, 0.24 g.

on some quantitative or semiquantitative basis. To do this all photographs of cultures were critically examined, and from each representative photograph a representative cell or group of representative cells was selected. In each cell or group of cells the number of lipoid droplets of each diameter was counted. The diameter of each droplet was measured by means of a scale graduated to millimeters. From these data, assuming each lipoid droplet to be a sphere, the volume of free lipoid material per cell was integrated.

One precaution was found necessary with this method. From the photographs it was obvious that the largest sizes of lipoid droplets were markedly flattened, and could not be considered as perfect spheres. Generally, though, on the plates showing such lipoid droplets there were cells which appeared to contain what seemed to be comparable amounts of lipoid material, but in somewhat smaller drops. In such instances these cells were chosen for measurement. The results of these approximations are presented in charts 3 and 4, the curves being drawn to show the modes of the volume of lipoid material per cell. The curves for the smallest sizes of explants are omitted from these charts, as curves for these sizes were interrupted by the early death of the cells.

EXPERIMENTAL

CHANGES IN THE AREA OF THE CULTURES

When changes in areas of the cultures were traced, it was observed that, following a short latent period after explantation, there was a rapid initial increase in the areas of all cultures planted from explants of sizes 1 to 5, inclusive. (Charts 1 and 2.) Cultures from explants of size 6 showed no migrations at any time. No difference was noted in the time of onset of this migration for the various sizes of explants from 1 to 5. At 20 hours this increase in areas of cultures from all sizes of explants except size 5 was quite marked, and even size 5 showed some slight increase.

From this time on, through about 50 hours after explantation, the areas of all cultures except those from explants of size 5 and size 6 increased rapidly. Those from size 5 explants showed relatively slight increase, and at approximately 50–90 hours after explantation augmentation of the areas of these cultures had ceased. After this time there was often a slight decrease in the areas of these cultures. This decrease apparently resulted from cell contraction and death.

With the cultures from the largest sizes of explants, the increase of areas of the cultures continued rapidly until about 70–120 hours after explantation. At this time the rates of increases of areas became markedly less, and by 160 hours after explantation they had become very slight indeed.

At the time the cultures had reached their maximum areas, cultures from explants of size 1 were, almost without exception, the largest of

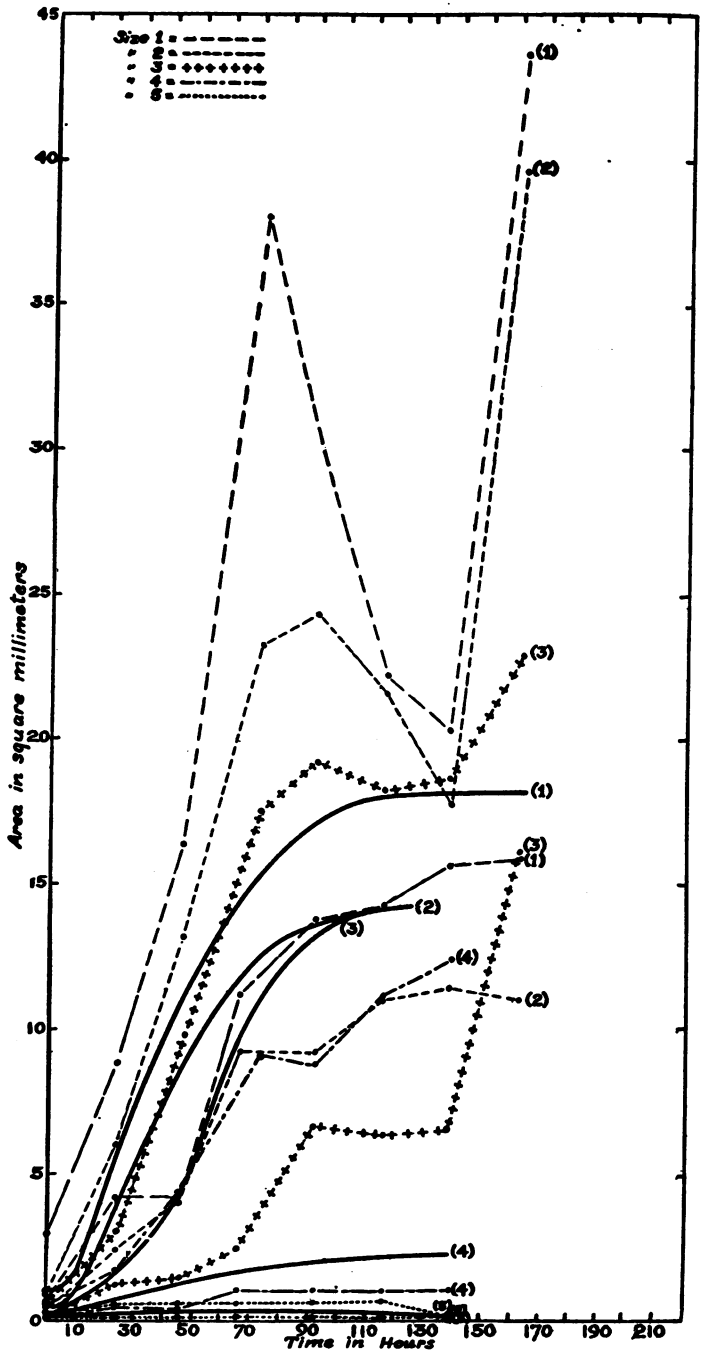


CHART 1.—Areas of cultures from explants of fresh heart, plotted as a function of time. The heavy solid lines, 1 to 5, show the modes of the areas of the cultures, each line representing the mode of the areas of cultures from the same sized explant; the size is indicated by the number at the right hand end of the line. The lighter broken lines represent the limits of the range of areas of cultures seen from each size of explant. These lines are paired, each pair being plotted with the same symbols. Of each pair, the upper line represents the maximum areas of any cultures examined, the lower line the minimum. These lines are numbered to correspond with the heavy lines, the numbers at the right indicating the size of the explant.

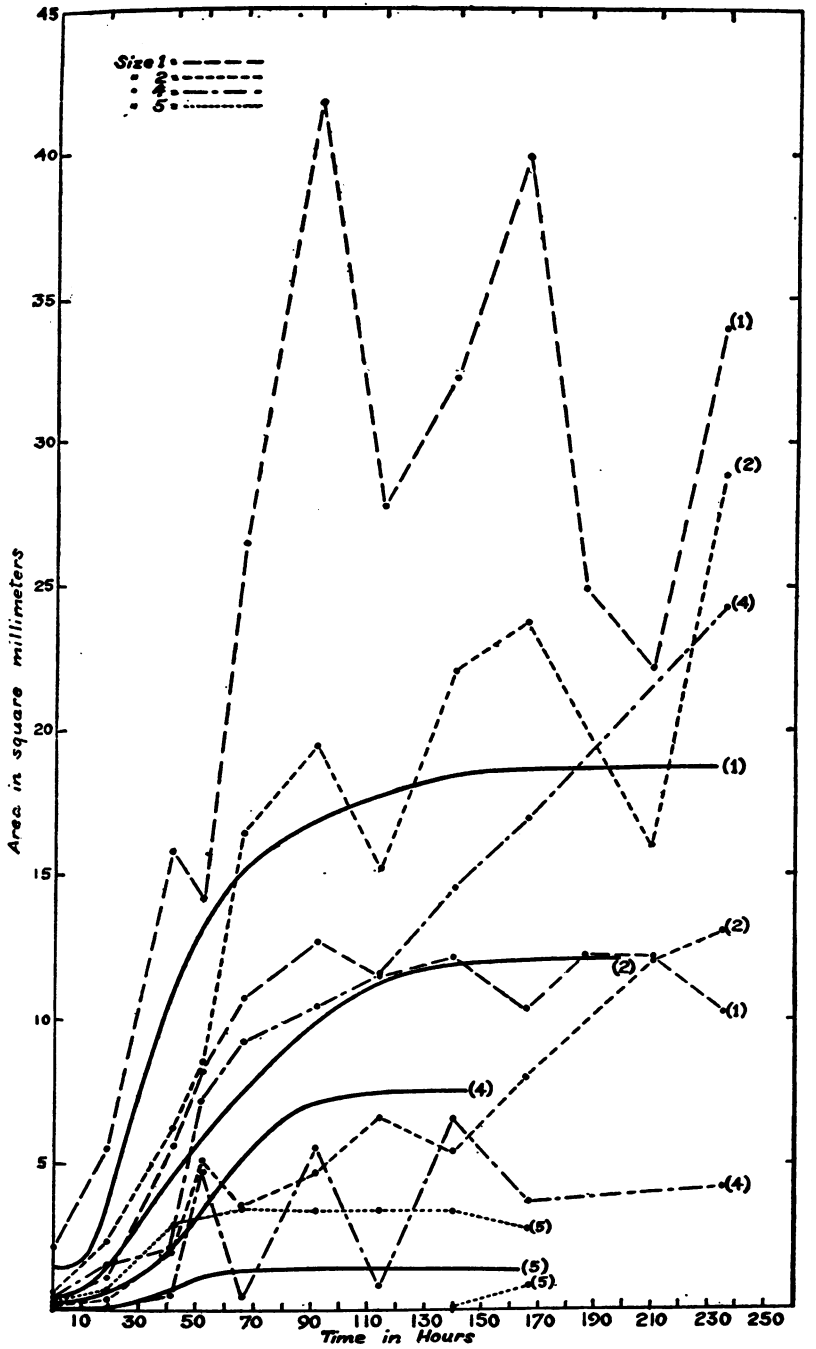


CHART 2.—Areas of cultures from explants of stock fibroblasts, plotted as a function of time. The heavy solid lines 1, 2, 4, and 5 show the modes of the areas of the cultures, each line representing the mode of the areas of cultures from the same sized explant; the size is indicated by the number at the right hand end of the line. The lighter broken lines represent the limits of the range of areas of cultures seen from each size of explant. These lines are paired, each pair being plotted with the same symbols. Of each pair, the upper line represents the maximum areas of any cultures examined, while the lower line represents the minimum. These lines are numbered to correspond with the heavy lines, the numbers at the right indicating the size of the explant.

any; those from size 5 were the smallest, and those from size 4 the next smallest. Sizes 2 and 3, however, showed more variation, and in many cases the final area of the culture from size 3 explants (fresh heart) was equal to or greater than that of cultures from size 2. A similar tendency to show a larger final area was seen in one or two instances in cultures from size 4 explants of stock fibroblasts, but this tendency was less marked and did not appear at all in cultures from explants of size 5.

CELL CHANGES

Time 0 to 24 hours.—During the first 24 hours of incubation, as stated, all sizes of explants showed extensive migration. In the cultures from explants of fresh heart, each of these migrated cells showed about 50 to 100, often slightly angular, neutral red absorbing granules [6] of 0.9 to 1.2 μ diameter. The cultures from stock fibroblasts showed a somewhat greater number of granules, as may be seen by comparing Figures 1 and 10. In many of these cells the granules were too numerous to count and were estimated at about 200 to 300 in number. These granules were probably a little smaller in size than those in the cells from fresh heart explants.

The more peripherally situated cells sometimes showed a slightly greater irregularity in the size of their neutral red absorbing materials. (Fig. 11, Pl. 4.) Some of these cells showed occasional neutral red absorbing vacuoles up to about 2 μ in diameter.

The cells which had migrated out from the three or four largest sizes of explants of fresh heart showed an extremely small volume of lipoid droplets. Sometimes a cell would contain one droplet, sometimes more, but in either case the total volume of lipoid droplets was less than that of two or three droplets of 1 μ diameter. The cells which migrated out from the explants of stock fibroblasts generally showed a somewhat greater amount of lipoid material, but even in these cells there was very little. The occurrence of this lipoid material in cells lying at different distances from the explant was fairly uniform for both of the above types of cultures at this time, although some cultures showed a slight tendency for the more peripherally located cells to show a little more lipoid. (Fig. 11, Pl. 4.)

Cells which had migrated out from explants of size 5 showed, almost without exception, at least a slightly greater volume of lipoid droplets within each cell than did those from the larger size explants. (Fig. 12, Pl. 4.)

Time 24 to 70 hours.—During the period from 24 to 70 hours, the more centrally situated cells which had migrated out from the larger

[6] Throughout this article the term "neutral red absorbing granule" is used to denote those particles of neutral red absorbing material which had a maximum size of about 1.2 μ, and a minimum size of 0.3 or 0.4 μ. These particles were frequently irregularly angular in shape. Particles smaller than these are termed "dust." Particles larger than 1.2 μ were almost without exception spheres or spheres more or less deformed through pressure and are termed "vacuoles."

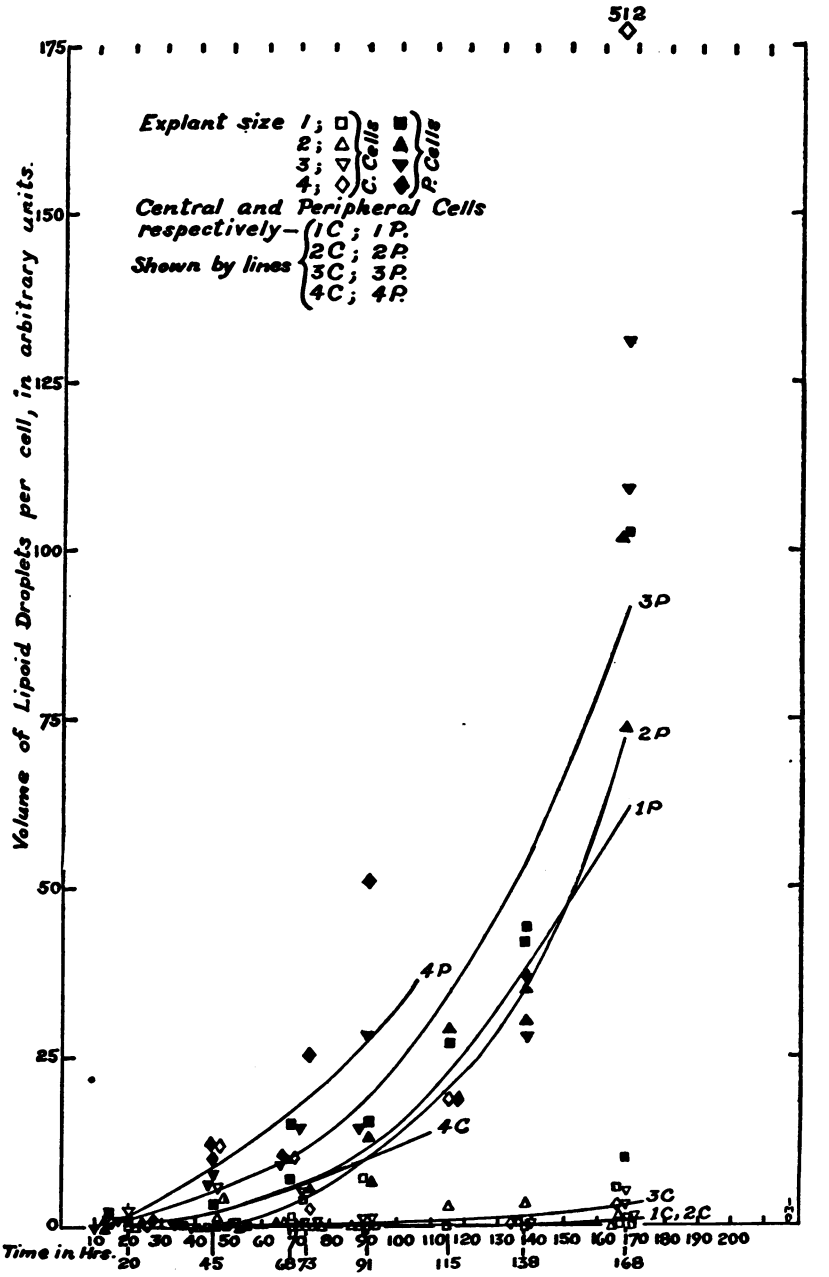


CHART 3.—Total volume of lipoid droplets per cell in cells of cultures from different sizes of explants of fresh heart, plotted as a function of time. For each size of explant the volume of lipoid in the cells from each of two different regions of each culture has been plotted—the most peripheral region (P) (indicated by solid black points) and the region just peripheral to the original area of the explant (C) (points with clear centers). The points for any one size of explant are all the same shape. The graphs indicate the modes of the various sets of points. The number at the right end of each line indicates the size of the explant the points of which fix that line. The volume of lipoid droplets per cell is plotted in arbitrary units, each of which represents about 20 cubic micra. The points were often so densely clustered that it was necessary to spread them slightly horizontally. The lowest row of figures along the horizontal axis indicate the times at which examinations were made.

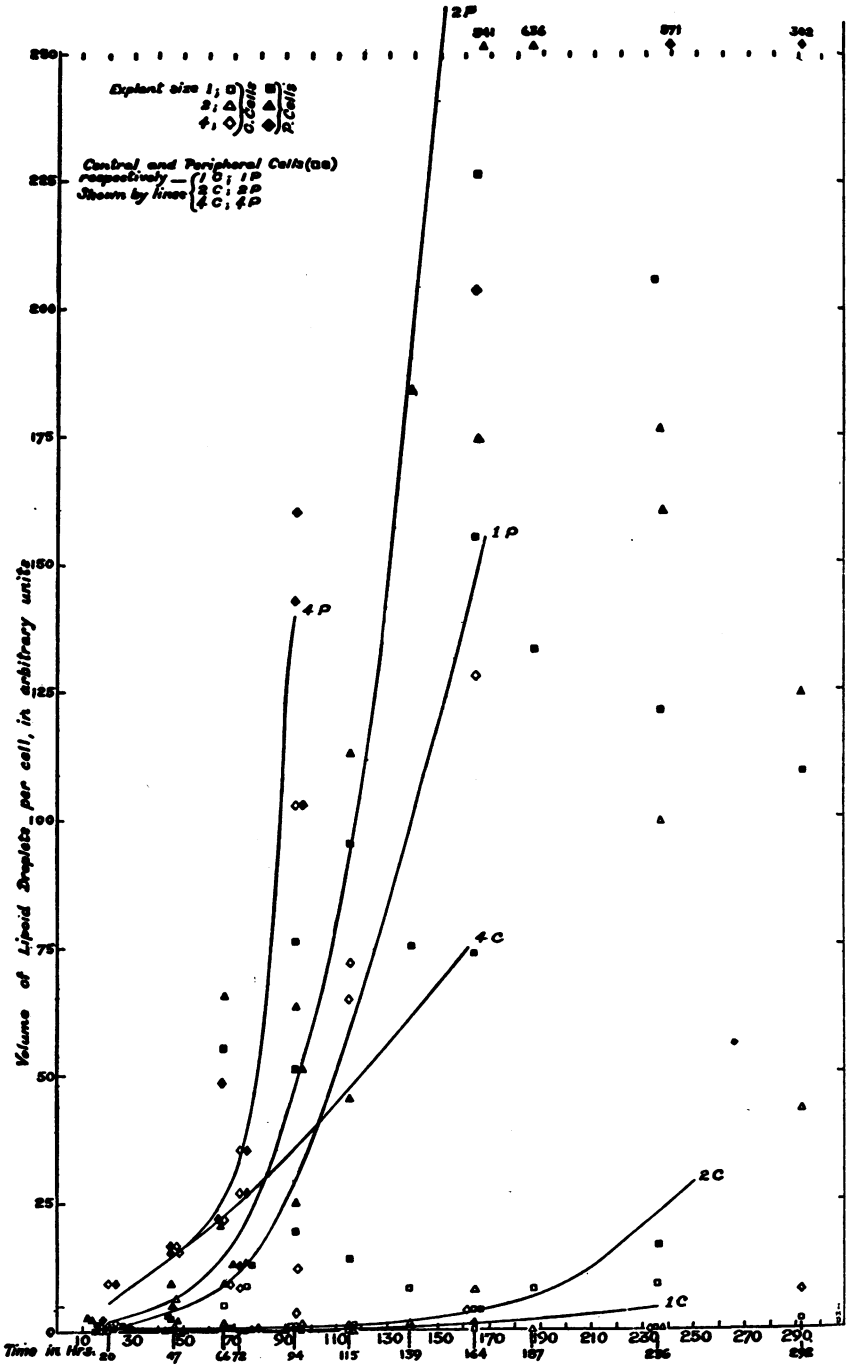


CHART 4 (See explanation on opposite page)

sizes of explants, sizes 1, 2, 3, and some of 4, became more sheetlike. (Figs. 2, 13, Pls. 1 and 5.) This was apparently due to the fact that many of the cells were located on the surfaces of the plasma clot. The more peripherally located cells, however, though generally broad, were less sheetlike and appeared more in spindle or flattened blunt spindle shapes. (Figs. 3, 14, Pls. 1 and 5.) The cells closer to the explant appeared perfectly normal in shape. Of the more peripheral cells, however, even at this time occasional ones were observed which showed marked signs of rounding up. A few of them appeared "moth-eaten," while a few were dead and had more or less disintegrated.

During this period, from 24 to 70 hours, the neutral red absorbing granules of the cells from the explants of fresh heart became much more prominent as a result of an increase in the number of granules per cell. (Compare Figs. 1 and 2, Pl. 1.) The cells from the cultures of stock fibroblasts showed a less marked, if any, increase, apparently due to their originally greater number of granules. (Compare Figs. 10, 13, Pls. 4 and 5.) Cultures of both types, following this increase, showed about 150 to 300 neutral red absorbing granules, of approximately 1μ diameter, per cell.

The variation in the number of neutral red absorbing granules per cell between different cells in the peripheral part of the culture, was becoming marked at this time. (Fig. 14, Pl. 5.) Some of these cells showed as many granules as the more centrally situated cells; some showed very few. Those cells which showed so few generally showed large amounts of free lipoid. Besides this variation in the number of granules they contained, the peripheral cells showed a greater range of size of neutral red absorbing materials than did the more central cells. While the central cells showed granules fairly uniform in size, some of the peripheral cells, generally those which contained fewer neutral red absorbing granules, showed some neutral red absorbing vacuoles of 2 or 3μ in diameter.

There was, during this period, possibly some slight decrease in the volume of lipoid droplets present in the cells situated just peripheral to the region of the original explant in cultures from the larger sizes of explants of stock fibroblasts. For the cultures from the larger sizes of explants of fresh heart, the similarly situated cells showed little change in the volume of lipoid droplets contained in each cell. On the other hand, for the more peripherally situated cells of both types

EXPLANATION OF CHART 4.—Total volume of lipoid droplets per cell in cells of cultures from different sizes of explants of stock fibroblasts, plotted as a function of time. For each size of explant the volume of lipoid in the cells from each of two different regions of each culture have been plotted—the most peripheral region (P) (indicated by solid black points) and the region just peripheral to the original area of the explant (C) (indicated by points with clear centers). The points for any one size of explant are all the same shape. The lines drawn indicate the modes of the various sets of points. The number at the right-hand end of each line indicates the size of the explant the points of which fix that line, while the letters (P) and (C) indicate the lines for the most peripheral cells and the more central cells, respectively. The volume of lipoid droplets per cell is plotted in arbitrary units, each of which represents about 20 cubic micra. These points were often so densely clustered that it was necessary to spread them slightly horizontally. The lowest row of figures along the horizontal axis indicates the times at which examinations were made.

It will be noted that in this figure, curves were plotted only to about 170 hours, while after this time there was some evidence of a drop in the amount of lipoid in some of the cells.

of cultures the total volume of lipoid droplets per cell increased rapidly. (Compare Figs. 2, 3, Pl. 1; 13, 14, Pl. 5.) This increase showed several constant peculiarities as follows: (1) In the cultures from the larger size explants, a relatively broad zone of migrated cells surrounding the area of the original explant showed an exceedingly small volume of lipoid droplets per cell. The most peripheral cells of the culture, however, contained much larger droplets and generally more droplets. (2) In these most peripherally situated cells the volume of lipoid droplets per cell became ever greater as time passed. (3) In these cells at any one time, the volume of lipoid droplets per cell was generally somewhat greater for cells from explants of smaller sizes. (4) At any one time the width of this zone of lipoid-filled peripheral cells, relative to the radius of the culture, became increasingly great as cultures from smaller and smaller explants were studied. With explants of size 5 the volume of lipoid in each cell was maximal; all cells were of this lipoid filled "peripheral" type.

DESCRIPTION OF PLATES[1]

In all of these photographs the pointer, shown in each photograph, is on the side of the field nearest the explant. All cells were stained with supravital neutral red, and were photographed at 38.5° C. All pictures are magnified 365X. The neutral red absorbing materials appear black, the lipoid droplets white. While the nuclei also show up white, they are less refractile than the lipoid droplets and are easily distinguished from them.

Culture series A-9. Cultures from Fresh Heart of 9-day Chick

PLATE 1

Fig. 1.—Culture from explant of size 1; 18 hours after explantation. This shows the first outgrowth of fibroblasts from the explant of fresh heart. There were practically no lipoid droplets present and only a relatively small number of neutral red absorbing granules per cell. There was no discernible difference between the centrally and peripherally situated cells. The black area at the left represents the explant.

Fig. 2.—Culture from explant of size 1; 68 hours after explantation. This shows the cells which were just peripheral to the explant; the explant is shown at the extreme left. Note a slight increase in the number of neutral red granules per cell, and the almost complete absence of lipoid droplets.

Fig. 3.—Culture from explant of size 1; 68 hours after explantation. This is the same culture shown in Figure 2. This figure shows the cells at the periphery of the culture. There were marked variations in the amount of neutral red absorbing materials per cell; some cells showed little, others showed as much as the more centrally situated cells. The cells showed a much greater volume of lipoid droplets than did the more centrally situated cells of the same culture, however.

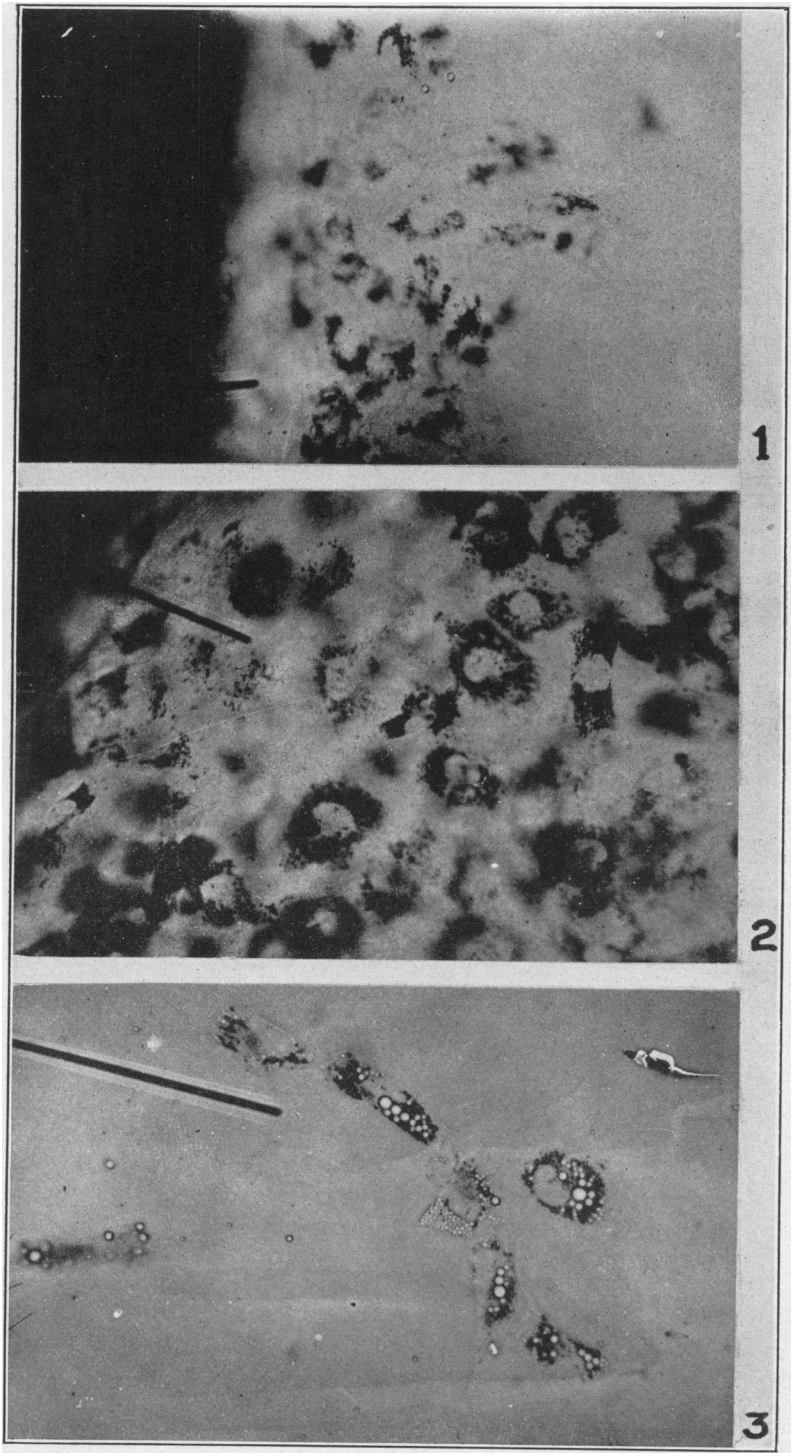
In the culture from the explant of size 5 at this time, the cells were dead and so badly disintegrated that they could not be satisfactorily photographed.

PLATE 2

Fig. 4.—Culture from explant of size 1; 166 hours after explantation. This figure shows the cells just peripheral to the explant. These cells had degenerated and most of them were dead. Most of them were rounded up and appeared somewhat coagulated. The majority of them showed no trace of neutral red absorbing materials and almost no lipoid droplets.

Fig. 5.—Culture from explant of size 1; 166 hours after explantation. This is the same culture as is shown in Figure 4. This figure shows the cells which were

[1] The authors are extremely grateful to the Army Medical Museum for printing the negatives of the photographs reproduced in these plates.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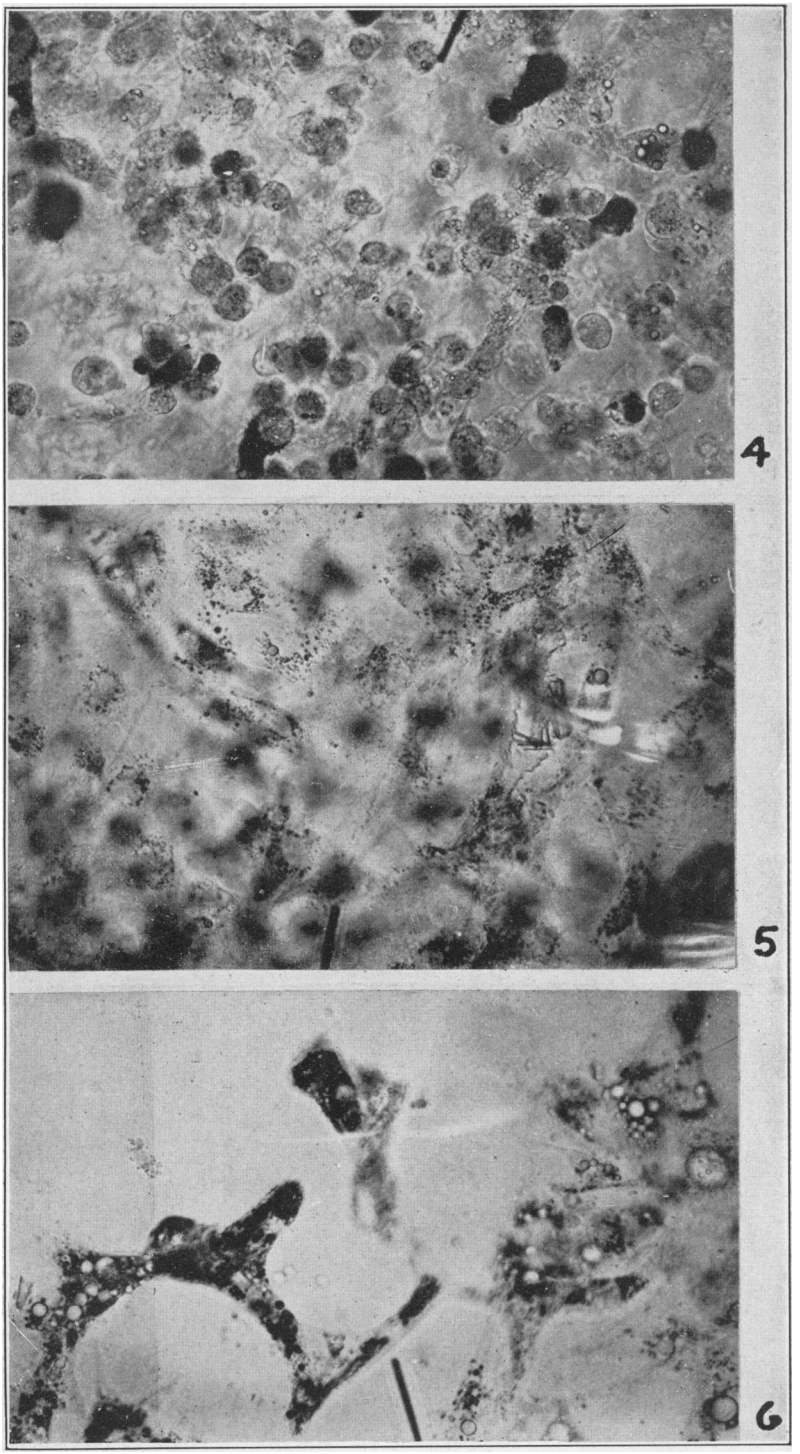
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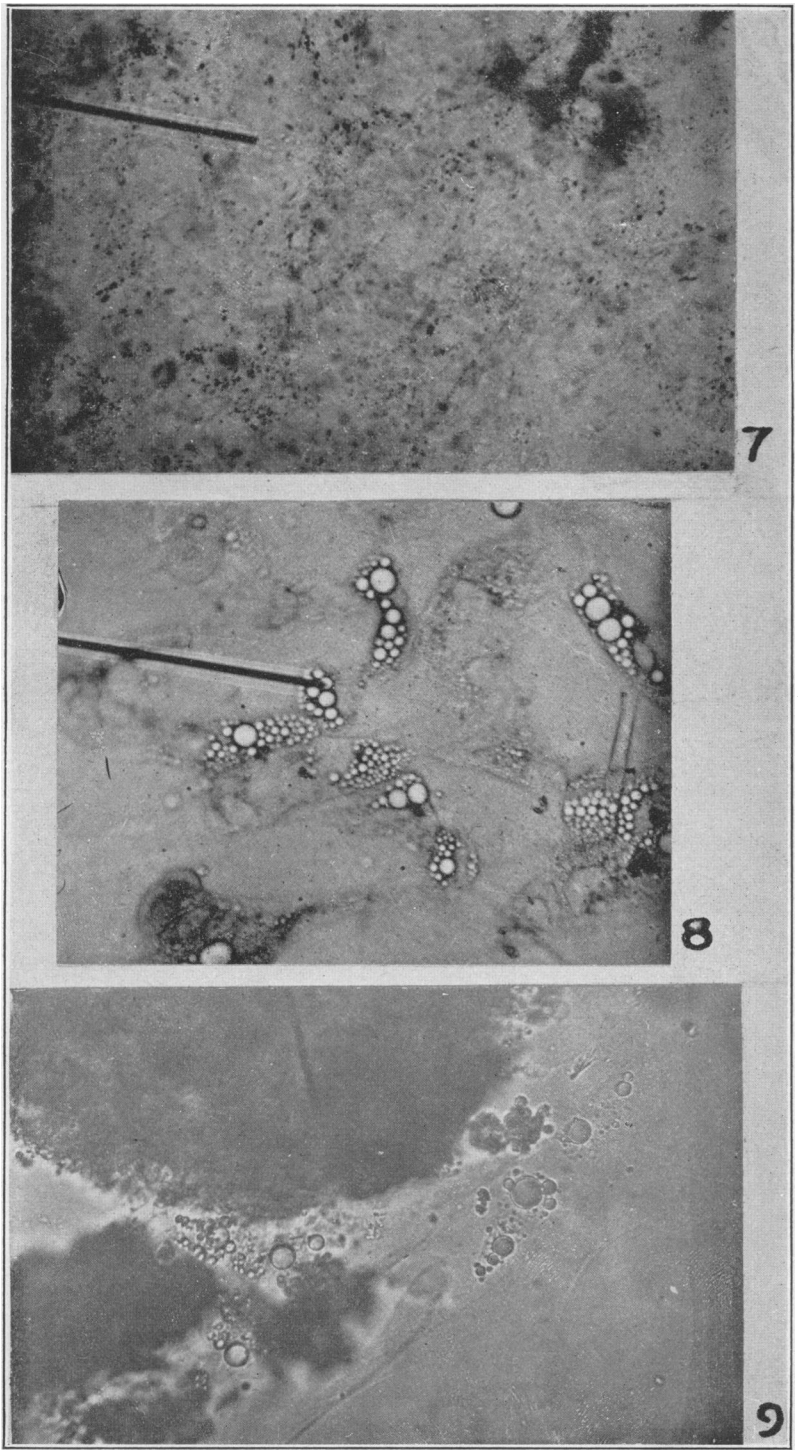
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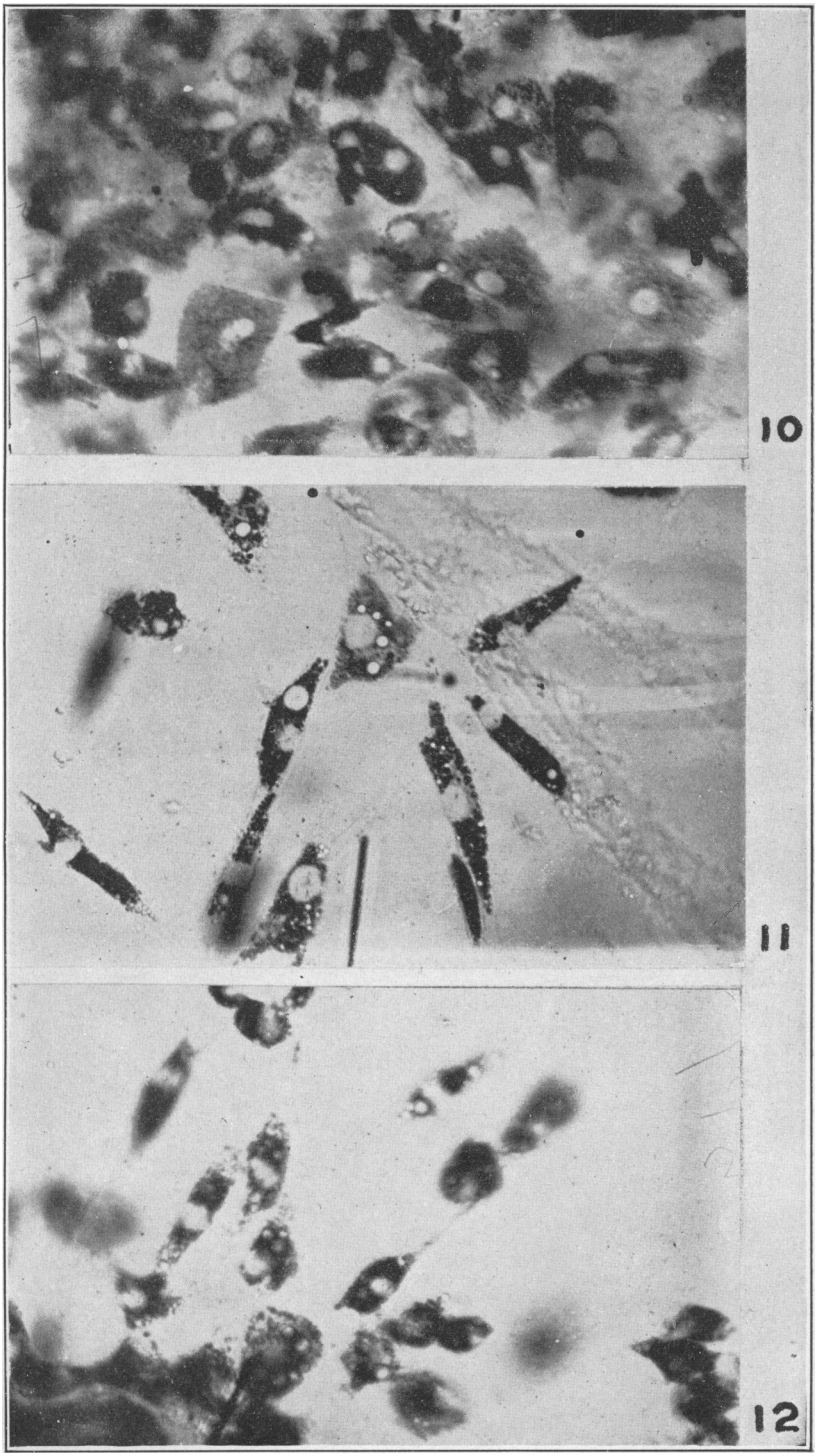
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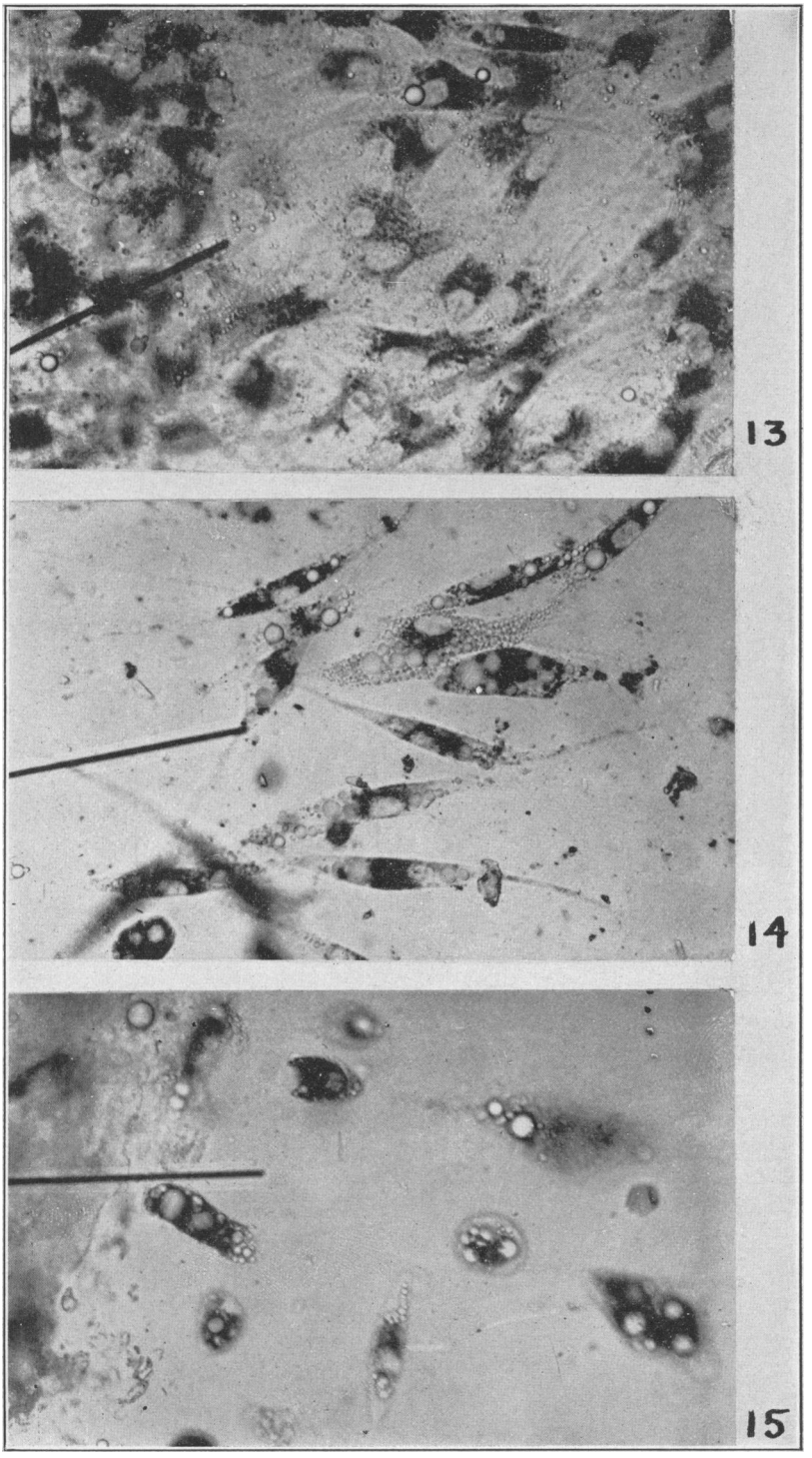
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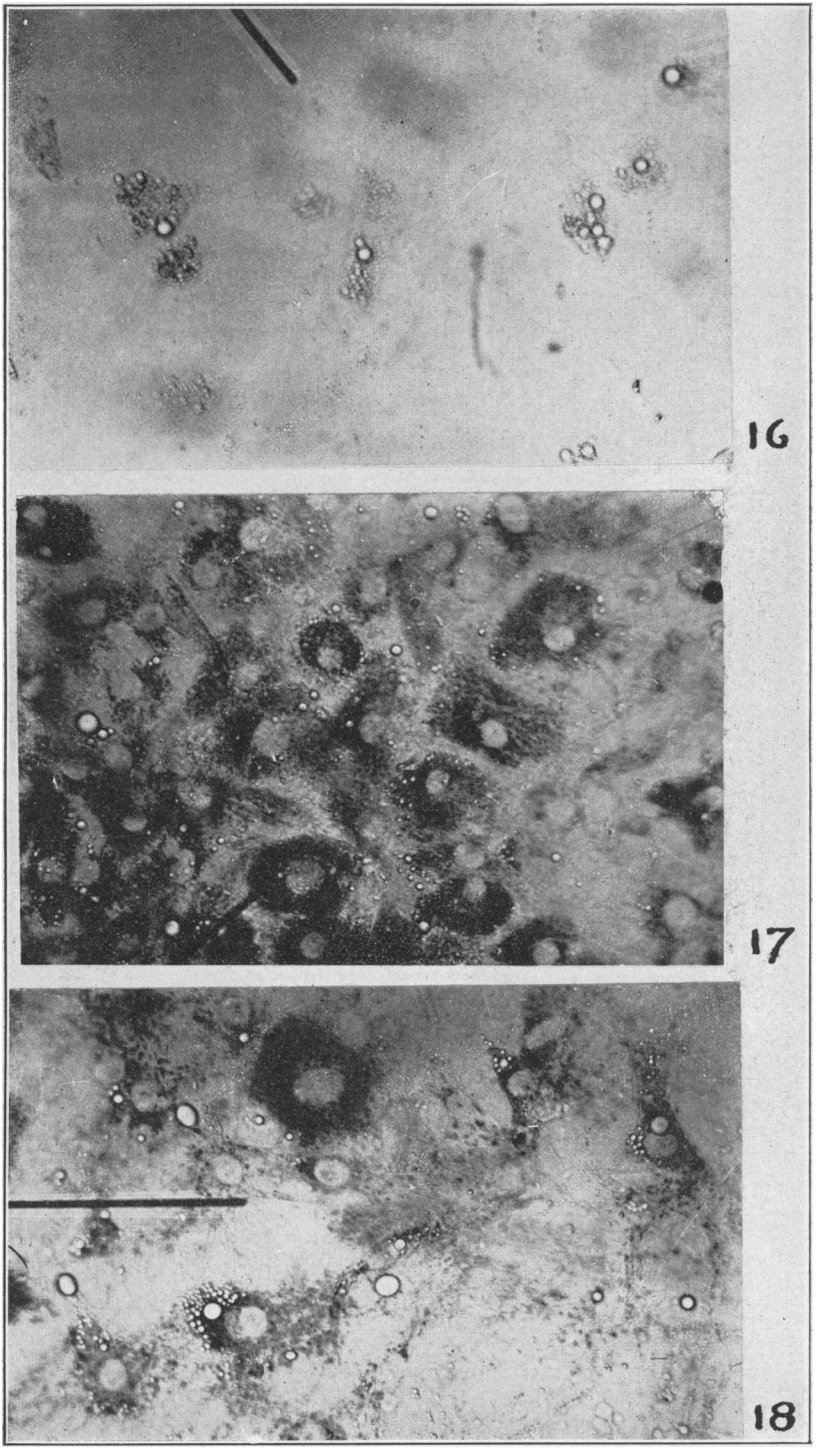
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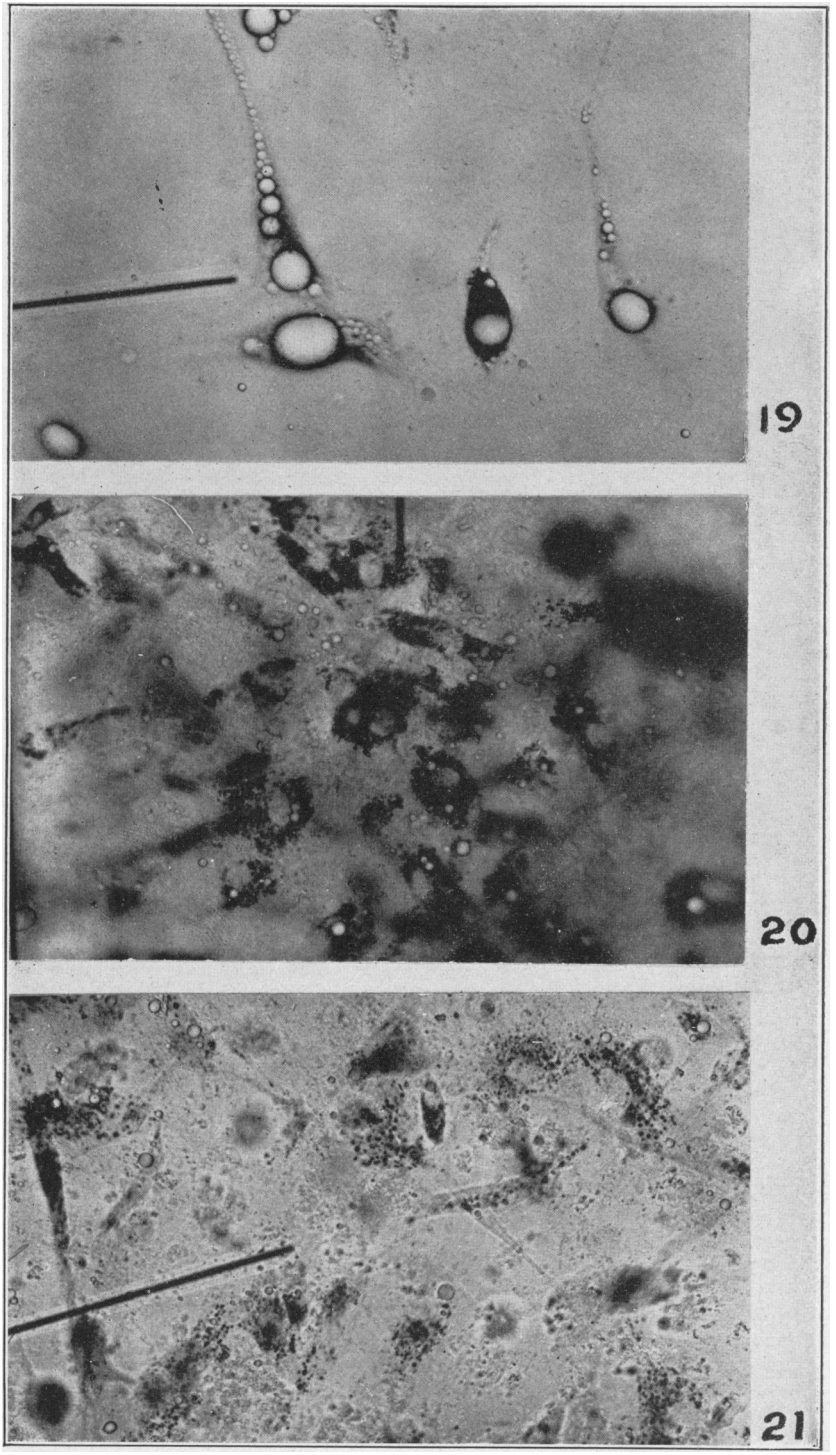
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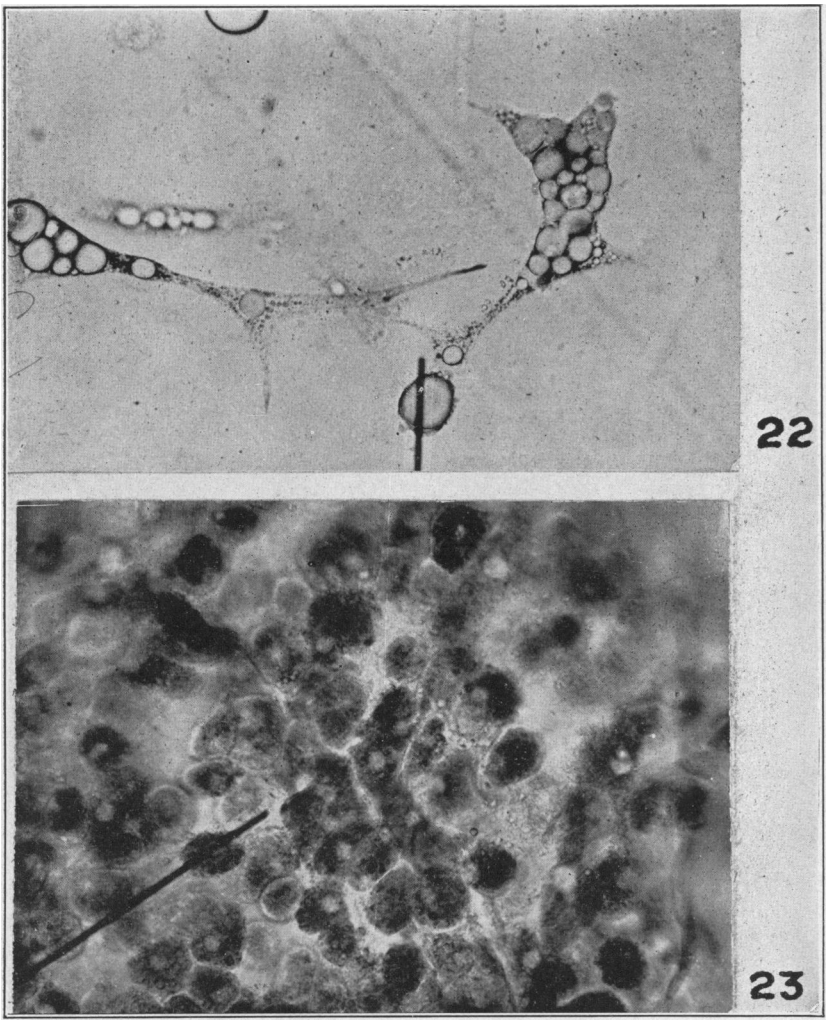
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situated approximately midway between the region of the explant and the periphery of the culture. These cells showed no trace of coagulation and were still expanded and relatively normal. The cells contained much less neutral red absorbing material than was present in the cells at 68 hours (fig. 2), and contained practically no lipoid droplets.

Fig. 6.—Culture from explant of size 1; 166 hours after explantation. This is the same culture as is shown in Figures 4 and 5. This figure shows the cells at the periphery of the culture. There was a marked variation in the size of the neutral red absorbing materials in these cells. Some few neutral red absorbing vacuoles were present. There was a much greater volume of lipoid droplets per cell than in the cells of the more central or middle zones of the culture at this time, but even so there was much less than in cells of this same peripheral region examined at a somewhat earlier stage. It seemed that the cells had possibly disposed of some of their lipoid droplets in some way.

PLATE 3

Fig. 7.—Culture from explant of size 2; 166 hours after explantation. This shows an almost solid sheet of cells just peripheral to the region of the explant. The cells were quite different from those shown in the same region of the culture from explant of size 1 at this time. (Fig. 4.) Note the decreased amount of neutral red absorbing materials as compared with the amount in the cells shown in Figure 2, and the almost complete absence of lipoid droplets.

Fig. 8.—Culture from explant of size 2; 166 hours after explantation. This is the same culture as is shown in Figure 7. This figure shows the peripherally situated cells of the culture. There was a marked accumulation of lipoid droplets and in some of the cells there was an almost complete absence of neutral red absorbing granules. The other cells show only very small amounts of neutral red absorbing granules.

Fig. 9.—Culture from explant of size 5; 166 hours after explantation. This culture was from the same set of cultures shown in Figures 4 to 8. All of the cells had long since died and all that remained were small clumps of lipoid droplets and traces of disintegrated cell cytoplasm.

Culture series A-16. Cultures from stock strain of fibroblasts

PLATE 4

Fig. 10.—Culture from explant of size 1; 22 hours after explantation. This shows the cells which were just peripheral to the region of the explant. There were large numbers of very small neutral red granules per cell. There was an almost complete absence of lipoid droplets.

Fig. 11.—Culture from explant of size 1; 22 hours after explantation. This is the same culture as is shown in Figure 10. This figure shows the peripherally situated cells. There were marked irregularities in the size of the neutral red absorbing materials in the cells; there was also an apparent decrease in the number of neutral red granules, with an increase in their average size. There were also present considerable volumes of lipoid droplets within the cells

Fig. 12.—Culture from explant of size 5; 22 hours after explantation. This figure shows the whole width of the zone of migrated cells. All cells were of the "peripheral" type, as shown in Figure 11, except about four cells very close to the explant. These were more "central" in type in that they showed a very small volume of lipoid droplets.

PLATE 5

Fig. 13.—Culture from explant of size 1; 70 hours after explantation. This figure shows the cells which were just peripheral to the explant. There was markedly less neutral red absorbing materials per cell than was shown by the cells at 22 hours after explantation. (Fig. 10.) There was an almost complete absence of lipoid droplets.

Fig. 14.—Culture from explant of size 1; 70 hours after explantation. This is the same culture as is shown in Figure 13. This figure shows the peripherally situated cells. Note the rather large neutral red absorbing materials and the many large lipoid droplets. There were marked variations between adjacent cells in the amount of neutral red absorbing materials per cell.

Fig. 15.—Culture from explant of size 4; 70 hours after explantation. This figure shows the whole width of the zone of migrated cells. There were marked irregularities in the amount of neutral red absorbing materials per cell. Some

of the cells were rounding up. All cells showed a good deal of lipoid material. All cells were of the "peripheral" type.

PLATE 6

Fig. 16.—Culture from explant of size 5; 70 hours after explantation. The cells were dead and some had partially disintegrated. They all showed a complete absence of neutral red granules. Note also that the cells showed a smaller volume of lipoid droplets than was shown by the cells of Figures 14 and 15. The small amount of lipoid in these cells was apparently due to the cessation of lipoid accumulation at the time of cell death, which was obviously very early.

Fig. 17.—Culture from explant of size 1; 139 hours after explantation. This shows the region of the explant. Even at this time there was a very small volume of lipoid droplets in the cells shown both in this picture and the next, compared with the volume of lipoid droplets shown in the peripheral cells of the same culture. (Fig. 19.) There had been very little, if any, decrease in the amount of neutral red absorbing materials per cell.

Fig. 18.—Culture from explant of size 1; 139 hours after explantation. This is the same culture as is shown in Figure 17. This shows the cells just peripheral to the explant. Note the tremendous decrease in the amount of neutral red absorbing materials per cell, with the result that many cells were almost invisible.

PLATE 7

Fig. 19.—Culture from explant of size 1; 139 hours after explantation. This is the same culture as is shown in Figures 17 and 18. It shows the peripherally situated cells. There were marked irregularities in the amount of neutral red absorbing materials per cell. As may be seen, these materials were almost completely absent from some cells. There was also a great volume of lipoid droplets per cell.

Fig. 20.—Culture from explant of size 1; 238 hours after explantation. This shows the region of the explant. Much of the explant was necrotic, but the remaining living cells showed a markedly greater amount of neutral red absorbing materials than did the cells just peripheral to this area. (Fig. 21.) Note the small volume of lipoid droplets which was present.

Fig. 21.—Culture from explant of size 1; 238 hours after explantation. This is the same culture shown in Figure 20. It shows the cells which lay just peripheral to the explant. Note small amount of neutral red absorbing materials present in the cells. Note also the almost complete absence of lipoid droplets.

PLATE 8

Fig. 22.—Culture from explant of size 1; 238 hours after explantation. This is the same culture shown in Figures 20 and 21. It shows the peripherally situated cells. There were very small amounts of neutral red absorbing materials per cell but there was a tremendous volume of lipoid droplets per cell.

Fig. 23.—This shows a culture of fibroblasts, from explant of size 2, at about 20 hours after explantation. The cells were so crowded that many of them were practically spherical. This picture is presented to show the small volume of the normal spherical fibroblast compared with the tremendous volume of lipoid droplets which the cells situated in the peripheral zone of these cultures later accumulate. Compare Figures 22 and 23.

During this period of time cultures from explants of size 5, as well as many of those from size 4, showed a general degeneration indistinguishable from that seen in the peripheral cells noted as dying or dead in the cultures from the larger sizes of explants. The accumulation of lipoid material in these cells from explants of sizes 5 and 4 was markedly more rapid than in the peripheral cells from larger sizes of explants. Besides this, often beginning as early as 24 hours after explantation, the cells showed marked signs of lateral retraction (Fig. 12, Pl. 4) and generally within the next 24 to 48 hours the cells rounded up, becoming almost spherical (Figs. 15, 16, Pls. 5 and 6).

During this time the cytoplasm of the cell, in some instances, assumed a "moth-eaten" appearance, due to the formation of large irregular vacuoles of refractive index very slightly lower than that of the cytoplasm. These vacuoles showed no trace of color with neutral red, although the cell granules stained brilliantly. About the same time that this rounding up occurred, sometimes later, these granules lost their affinity for neutral red and the cell was left achromatic and apparently dead. That this death was not simulated was evidenced by the onset of complete disintegration; and within a day or so frequently nothing of the migrated cells remained except a few clumped lipoid droplets. (Fig. 9, Pl. 3.)

This degenerative process was in some instances completed in less than 56 hours from the time the cultures were planted. It generally required less than 90 hours, but in one or two cultures, in which the explant was probably a little larger than usual, it required as long as 114 hours. Even in these slides, however, this degeneration was in strong contrast to the living and relatively normal appearance of the cells from the three or four larger sizes of explants.

In these cultures from sizes 5 and 4 explants of fresh heart, no signs of survival of any muscle tissue was noted after death of the fibroblasts. The explant, following the death of the migrated fibroblasts, appeared completely necrotic.

Several cultures which were planted from explants too small to show any migration at all (size 6 explants) were examined. These all showed death of the whole explant within about 72 hours.

Time 90 hours.—At the end of about 90 hours a rather abrupt change was noted in the neutral red absorbing granules of cells which had migrated out from the larger sizes of explants. At this time there was a great decrease in the number of visible granules per cell. Instead of showing 150 to 300 granules, as they had at about 50 hours, they now showed, in some instances, as few as 25. Further, the size of these granules was markedly decreased; most of them were smaller than 0.8μ in diameter. Besides these discrete granules, traces of very fine neutral red absorbing "dust" became visible scattered through the cell. (Compare Figs. 10, 13, 18, Pls. 4, 5, and 6.)

This change in the neutral red absorbing materials within the cell generally showed up first with the cultures from the largest size explants, at about 90 hours after explantation. In the cultures from the smaller sizes of explant the time of its appearance was generally somewhat retarded; for example, cultures from explants of size 2 sometimes showed this change at 90 hours, sometimes at about 114 hours, while in cultures from explants of sizes 3 and 4 it was sometimes even longer delayed, and when it did appear was much less marked. Further, this change in the neutral red absorbing material was shown most strikingly by the more centrally situated cells lying outside the region

of the original explant. In the case of cells lying through the region of the original explant itself this change was often markedly retarded and was irregular.

At the time of these changes in the amount of neutral red granules the more centrally situated cells, particularly for the three larger sizes of explants, showed very slight traces of lipoid while the peripheral cells, as noted, showed a great deal.

Time 90 to 130 hours.—During the period from 90 to 130 hours the amount of neutral red absorbing materials, in the cells in the living cultures (from explants of sizes 1, 2, 3, and some of 4), though it showed some minor fluctuations from cell to cell, continued to decrease slightly. In the peripheral cells in particular there were all manner of slight variations in neutral red granule content (Fig. 19, Pl. 6), but in general those cells which showed the most dense crowding of lipoid droplets showed a decrease in the number and size of their neutral red absorbing granules. Very few large vacuoles were seen.

At the periphery of the cultures from explants of sizes 1, 2, and 3 at this time cells were occasionally seen rounding up and some few appeared to be dying.

The volume of lipoid droplets increased in the cells of all living cultures. The amounts in the peripheral cells increased at a very rapid rate, while the increase for the more centrally situated cells was very slight and in the case of cultures from the larger sizes of explants, practically zero. As formerly, there was a somewhat greater volume of lipoid droplets in the cells from the smaller sizes of explants. Further, the smaller the explant the more closely did the volume of lipoid droplets in the cells nearer the explant approach the volume in the most peripheral cells. Accumulation of lipoid by the cells of size 5 explants and most of size 4 explants had ceased, since the cells, as stated, were dead.

The region corresponding to the original explant, at about this time, began to show more or less extended patches of necrosis, and its remaining living cells showed a marked tendency to accumulate lipoid. In this tendency there was less regularity in the volume of lipoid droplets per cell than was shown by the cells lying just peripheral to the explant, but the cells of this explant region probably contained as much lipoid as those just peripheral, and in some cultures possibly a little more. (Compare Figs. 17, 18, Pl. 6.)

Time 160 to 300 hours.—Cell clumps from explants of sizes 1, 2, and 3, and those of size 4 which had not already died, as described, showed some variation in the time at which the final stages of general degeneration set in, but this period may be roughly fixed at from 160 to 300 hours. The order in which the cultures from the various sized explants degenerated varied from series to series, but, in general, of the cultures from explants of fresh heart, the first ones to show gen-

eral cell death were those from size 1 explants. In the fresh heart the muscle showed large areas of necrosis at about 160 hours and at this same time, in cultures from explants of size 1, ceased to show contractions when the culture was washed with neutral red solution. There was still slight twitching of the muscle cells on washing some of the cultures from the smaller sizes of explants (2, 3) at this time.

During this terminal period two distinct types of degeneration were noted. (Compare Figs. 4, 5, and 6, Pl. 2.) The first of these was the type previously noted in which the more peripherally situated cells, having gradually filled up with lipoid, lost their neutral red absorbing granules and died. This type of degeneration was, as stated, particularly prominent in the more peripherally located cells and became general throughout cultures from the smaller sizes of explants.

During this terminal period there were signs of some decrease in the volume of lipoid contained as droplets in cells of cultures from the larger sizes of explants. Only a small number of slides were examined at this time, however, so this observation must be considered as requiring confirmation.

The second type of degeneration appeared for the first time during this period. It seemed to spread out from the explant itself rather than encroach from the periphery. In it the cells showed no signs of abnormal lipoid accumulation, but instead generally rounded up, often showed marked signs of coagulation, and lost their staining reaction with neutral red. This degeneration generally appeared in cultures from the largest size of explants and was particularly striking in the cultures from size 1 explants from fresh heart. In these cultures the peripheral cells showed the "lipoid" type of degeneration, the centrally situated cells showed the "coagulation" type, while in between these two zones there was left a zone of almost normal fibroblasts. These types of degeneration, however, were not always so clearly marked into zones and often the slides showed a diffuse overlapping of the two general types.

DISCUSSION

As may be noted from the technique described, an attempt was made to study the cultures used under conditions as uniform as possible. With the explants from fresh heart, for example, explants of any one set of graded sizes were all taken from the same original small tissue fragment, while all explants for any one series of cultures, made up of a number of such sets, were taken from the same heart. To maintain a similar uniformity with the explants of the stock fibroblasts, attempts were made to cut explants as segments of a circle and so minimize variations in cell density from center to periphery. This was practical with all except the smallest sizes of

explants, and these were cut from a region of the culture which seemed to show an average cell density. The region generally used was that lying about midway between the periphery of the original explant and the periphery of the culture.

As will be noted, too, care was taken to maintain a relatively constant culture medium for all cultures examined. The same amounts of culture medium were used for all cultures, and the clots of medium were made comparable in size and shape in order to insure comparable conditions of diffusion and gaseous exchange with the overlying air space. Care was also taken to transfer the explant to the culture medium with as little adherent medium as possible. Further, attempts were made, with the cultures from the stock fibroblasts at least, to insure that all sizes of explants were washed to the same extent. Other precautions noted in the technique require no special explanation.

It is obvious that even with such a technique there were several possible sources of variation in different cultures. Particularly prominent were variation of cell density and of explant size. That these and possibly other factors did introduce marked variations in the growth is shown, for instance, by the fact that of the cultures from size 3 explants some showed growth similar to those of size 2, a few similar to those of size 4. Even with these variations, however, the results from the various phases of the problem and from the different types of cultures studied have been, in general, in agreement.

Considering the general method employed in plotting the curves presented showing the changes in areas of the cultures under discussion, an attempt was first made to present curves which showed the average rates of growth of the cultures from the separate sizes of explants. The general shapes of the curves were similar to those presented in Figures 1 and 2. However, inasmuch as various cultures were sacrificed at different points along the curves out toward the ends of the curves where the points were fewer, when a culture larger than the average was sacrificed, the average of the next series of observations showed a sharp drop. This drop was obviously not due to any change in the cultures themselves, but was due to the method of plotting these data. An attempt was then made to present the modes of the various sizes, determined by inspection. This method of plotting was found to give much smoother curves with these data, particularly in the terminal portions of the curves, and to produce curves which were representative of the trend for the curves for the separate cultures examined.

Both of the sets of curves presented to show changes in the areas of the cultures show several points, belonging to cultures from the two largest sizes of explants, lying much above the mode lines for these sizes. It may be noted that these points were from explants

which, through variations in technique, were probably somewhat larger or denser than those usually employed. However, although the cultures represented by these points showed unusually large areas, the changes observed in the slope of their curves, the relation of the cultures to each other, and the changes in the cells themselves coincided with those seen for the other cultures grouped as the same sizes.

The similarity between the general shapes of the curves for the changes of area for cultures from explants of fresh heart and of stock fibroblasts is obvious. As will be noted, the maximum rise for the curve representing the area of the largest size explant coincides almost exactly in both types of cultures, as does the rate of rise and the region at which the curve flattens out. The general trend of the curves for the smaller sizes of the two types of cultures is also similar, differences being easily accounted for by variations in the sizes of the explants used, and differences in their cell densities.

This similarity in the curves for the changes of areas of the cultures from explants from fresh hearts and stock fibroblasts, as well as the evident similarity of the cell changes seen in the two types of cultures, appear to indicate that the factors conditioning the life of the cells in the two types of cultures are essentially similar, at least through the first 100 hours or so after explantation. The later necrosis of the muscle cells of the cultures of fresh heart, accompanied by a central "coagulation" type of degeneration of the fibroblasts in the cultures from the largest size of explants, shows that the two types of cultures, in these later stages, are less comparable. In general though, inasmuch as our chief interest is in the period before this necrosis of muscle sets in, we feel warranted in considering the two types of cultures together.

For both types of cultures the absolute increase of area of the cultures with the passage of time varied directly as the size of the explant. Further, for nearly all of the cultures examined, the maximum size attained by the culture, under the conditions of the experiment, also varied directly with the size of the explant. The only exceptions to this were a few cultures from explants of sizes 3 and 4, and these variations probably arose from errors in technique.

If we assume that the total metabolic changes produced in the surrounding medium by any one culture for any given period of time was a product of the number of cells in the culture, and the time, the area included under any one of these curves from time T_0 to T_1 will represent, roughly at least, the total metabolic change produced by the culture from that size of explant from time T_0 to T_1. Choosing T_1 arbitrarily as 140 hours, it appears that within the time from 0 to 140 hours, although cultures from both sizes of explants had approximately reached their respective maximal areas, cultures from size 5

explants of stock fibroblasts had produced a total metabolic change of only 9 per cent of that produced by the cultures from explants of size 1. For the cultures from the explants of fresh heart this difference is even more striking. Inasmuch as the cell density in cultures from explants of size 5 was generally markedly less than that in cultures from explants of size 1, these contrasts are even more striking than are indicated by the above figures.

Even from this consideration of the relative growth curves it appears obvious that, in addition to the limits imposed on all cultures by the necessity of maintaining their existence from a measured and constant quantity of nutrient material, there was some other definite limiting factor exerting an action on the increase in the area of the culture. This factor appeared to be independent of the total food supply. It seems that we may also conclude from these curves that the action of this factor varied inversely as the size of the culture explant and was most profound in its influence on cultures from the smallest size of explant.

Considering the occurrence of cell degeneration and death in these cultures, the early death of the cultures from the smallest sizes of explants confirms the work both of Burrows and of Fischer in showing that such cell clumps do not proliferate normally. Further, it confirms the work of Fischer in showing that this process of death is not merely due to some process of exhaustion of the medium, such as is seen in the case of the larger sized explants, but is apparently due to the very active influence of some factor which, with the larger size explants, was either nonexistent or was of minor influence.

It is also of interest that during the period from 20 to 140 hours after transplantation, as will be discussed later, some marked signs of degenerative changes were noted in the more peripheral cells of the larger size explants, although in relatively few cases were these changes observed to be so extreme as to lead to cell death.

An attempt was made to study the final type of death in the larger sized explants, but inasmuch as few slides were examined and as the processes observed were not clear, little can be said. It is of interest to note though, that in the largest size of explants from the fresh heart two definite lethal processes were observed, the one encroaching from the periphery, and representing what was apparently a continuation of the tendency for peripheral degeneration; the other radiating from the explant and probably representing a necrosis arising from local lack of food materials or from accumulation of toxic products. This last process was also noted by Burrows (2). That it showed up markedly only in the cultures from fresh heart may have several explanations. For example, it may represent a necrosis of fibroblasts resulting from toxic products resulting from the death of the muscle cells present. On the other hand, it may only mean that the cultures

of stock fibroblasts were less dense and so allowed a better distribution of food and diffusion of waste materials through this central region.

Considering the changes in the neutral red granules of the cells from the time of explantation on, during the first 70 hours there was a marked increase in the number of neutral red granules within the cells from the fresh chick heart, and a very slight, if any, increase in those from the stock fibroblasts, which had been grown for many generations in plasma and embryo juice. This increase in the number of granules per cell probably represented an adaptation from the culture media in which the tissue had formerly lived to that to which it was transferred. The sharp decrease in the number and size of the neutral red granules in the largest size cell clump at about 90 hours however and the same decrease, generally in retarded and less striking form, in the explants of sizes 2, 3, and 4, appeared to result from the exhaustion of the food supply of the culture or to accumulation of waste products. This interpretation is indicated by the fact that the decrease appeared first and most markedly in cultures from the largest sizes of explants and appeared later and in less striking form in cultures from explants of sizes 2, 3, and 4. It is also indicated by the fact that this decrease coincided approximately in time with the decrease in the rate of increase of size of the culture, and by the observation of Carrel and Ebeling (3) that a decreased number of such granules is associated with a low rate of culture growth.

Of the later fluctuations in the neutral red absorbing materials, little can be said except that they were almost certainly associated with the degenerative changes which resulted in the general death of the culture.

Except for the peripheral irregularity, which was more pronounced in cultures from the explants of smaller size, and the variation in the time of decrease of the neutral red absorbing materials at about 90 hours, there appeared little difference in the occurrence and distribution of neutral red through cultures from the various sizes of explants.

That the accumulation of lipoid droplets within the cells of these cultures, as described, represented a true increase in the lipoid within the cell, and not just an unmasking of lipoid, already present, by some degenerative cleavage of the cell cytoplasm, is obvious from many of the slides examined. In these slides the total volume of lipoid present within the cell was several times greater than the original total normal cell volume. For example, the normal cells of one typical culture were estimated as having a volume of approximately 150 volume units each, while at a later stage of degeneration cells were seen in the same series of cultures which showed approximately 500 volume units of lipoid droplets contained within each cell. A similar contrast may be observed by comparing the volume of each of the more spherical cells of Figure 23 with the total volume of the lipoid droplets

seen in each cell of Figure 22, Pl. 8. These results agree with those of Lambert (8, 9), of Lewis (10), of Baker and Carrel (1) and of Hewell and Donley (7), who found that fibroblasts were able to take up and to store certain lipoids as droplets within the cell.

At the time of explantation, the fibroblasts from the fresh chick heart contained practically no lipoid droplets, while the fibroblasts from the stock strain of cells contained some small volume of such droplets. For the first 70 hours after explantation there appeared to be little increase in the total volume of lipoid droplets in the cells just peripheral to the region of the explant in the cultures from explants of sizes 1, 2, and 3 of fresh heart, while in such cultures from stock fibroblast explants there was some slight decrease in the total volume of lipoid droplets per cell. The result of this change was that at about 70 hours after explantation the cells of this more central region, for both types of cultures, contained only a very small total volume of lipoid droplets. Practically no increase was noted in this volume up to about 100 to 150 hours. From this time on there was a gradual increase in the amount of such lipoid material in each cell. This increase was very slow for cells of the more central region noted, for cultures from the largest size of explant, but appeared sooner and was much more rapid in cultures from explants of smaller and smaller sizes.

With the peripherally situated cells of these same cultures, however, for both types of cultures a strikingly rapid increase in the volume of lipoid droplets per cell was noticeable, even as early as 20 hours after explantation. Further, in these peripherally situated cells, the rate of accumulation of lipoid droplets, as in the more centrally situated cells, became greater in the cultures from smaller and smaller explants.

The results of these changes were that for cultures from a graded series of sizes of explants, at any one time, the cells of the cultures from the smaller sizes of explants contained a greater volume of lipoid droplets than did the comparably situated cells from the larger sizes of explants. This difference was particularly prominent for the most peripherally situated cells and for the more centrally situated cells of cultures from the smallest sizes of explants. Further, in the cells of any one culture at any one time there was a definite gradient of lipoid deposition. This gradient extended from the cells just surrounding the explant, which cells showed little or no lipoid, to those most peripherally situated, which showed much lipoid. And finally, with the smaller explants this gradient became less prominent due to the increased similarity of the central to the peripheral cells, until, with the cultures from explants of size 5, it did not exist. With cultures from this size explant the central and the peripheral cells were identical; both were "peripheral" in type.

As the work of Baker and Carrel (1) has shown, an excessive amount of lipoid material in the culture medium results in a marked retardation in the rate of increase of area of cultures of fibroblasts planted therein. Baker and Carrel further note that the cells of such a culture became "fatty and the tissue died after a short time, the lipoid acting as a toxic substance."

It appeared that the most peripheral cells of the cultures examined from any of the sizes of explants used were under conditions which vary greatly from the optimal. This was indicated by the irregularities seen in the neutral red absorbing materials, the occasional occurrence of cell death, and the constant general and excessive accumulation of lipoid materials by the cells of this peripheral region. What influence it was that resulted in this variation from optimal conditions in this peripheral region, and so produced such excessive lipoid accumulation, our data do not indicate. It is possible that this factor was the presence of an abnormal amount of lipoid in the culture medium. It is also possible that the factor was something else, the influence of which inhibited the oxidative processes of the cells of this region without similarly inhibiting their absorptive processes. As is obvious, this might easily have resulted in accumulation of lipoid droplets within the cell and might possibly have produced the other changes noted as well. Or it is also possible that the factor was some combination of the two above factors. Whatever the responsible factor may have been, the question is raised as to whether or not it was its influence which was chiefly or solely responsible for the observed fact, previously noted, that the maximal size of any culture, under the conditions of the experiment, varied directly as the size of the explant, and secondly, that cultures from the smallest of these explants died abnormally early.

Considering the first of these points, in the most peripheral cells of cultures from the largest size of explant, there was a somewhat slower accumulation of lipoid per cell than for similarly situated cells in cultures from smaller sizes of explants. Further, it will be noted that in cultures from explants of the largest size, the peripheral zone of lipoid accumulating cells occupied the smallest fraction of the diameter of the culture, and, hence, the smallest fraction of the area of the culture. From these data and from the demonstration by Baker and Carrel that lipoids are definitely inhibitory for the increase of area of cultures of fibroblasts, it appears that in the action of the factor which is responsible for the accumulation of lipoid within these cells we have at least one influence which would tend to make the maximal size attained by any culture, under the conditions of the experiment, vary directly as the size of the explant. Whether this factor was the prime one responsible for this variation our data do not at present permit us to say.

Our data are not sufficient to allow us to draw a final conclusion as to whether or not it is this factor which was responsible for lipoid accumulation within the cell, which was also responsible for the early death of cultures planted from explants of sizes 4, 5, and 6. It appears definite that the cultures from the smallest sizes of explants 4, 5, and 6 did not die as the result of the action of a final total volume of lipoid droplets having been collected within the cells. This is indicated by the observation that at the time of death these cells showed only about 50 volume units of lipoid droplets per cell, while cells have been observed in a living condition in the peripheral zone of larger size cultures at a later time which contained nearly 500 volume units of lipoid each. On the other hand, until they rounded up and died, the cells from explants of sizes 4, 5, and 6 showed the most rapid rate of lipoid accumulation of any cells. It is conceivable that this excessive rate of accumulation of lipoid within the cell may have resulted from some process of cell injury so severe as to result in cell death. On the other hand, it is quite possible that the factor responsible for this accumulation of lipoid within the cell might play a negligibly small rôle in the causation of cell death in cultures from these small size explants.

SUMMARY

1. An attempt was made to study the influence of the size of the explant upon cultures of fibroblasts of the chick, planted in a small and thin hanging drop of embryo juice and plasma. This medium was not changed during the life of the culture. The range of sizes of explants used varied from only a few cells up to cell clumps of about 1 mm. cube. Fibroblasts from both fresh chick heart and a stock strain were used.

2. It was found that for the cultures studied, the absolute increase in the area of a culture varied approximately directly as the size of the explant.

3. Further, the final maximal size of a culture also varied approximately directly as the size of the explant, and in cultures from the smallest sizes of explants it was very slight indeed.

4. Curves representing the areas of the cultures from different sizes of explants, as a function of time, showed a similar shape for the three or four largest sizes of explants. Following a short latent period there was a sharp increase in the areas of the cultures, this continuing until about 90 hours after explantation, at which time the rate of increase decreased rapidly and the curve flattened out.

5. It was found that this decrease in rate of change of area occurred almost simultaneously with a sharp decrease in the number of neutral red granules within the cells. It is concluded that these changes were due to exhaustion of the surrounding medium.

6. With these large size cultures general cell death did not set in until after about 160 hours.

7. With cultures from the smallest sizes of explants, however, following a slight initial migration, lasting about 50 hours, general cell death occurred, with the result that practically all of these cell clumps were dead by 90 hours after explantation.

8. It is shown that this cell death in cultures from the smallest sizes of explants was not due to exhaustion of the surrounding medium, but was due to the influence of some other factor.

9. During the life of the various cultures it was found that the cells of all cultures accumulated lipoid droplets within them. For the first hundred hours and longer, after explantation, the cells just surrounding the region of the explant, in the cultures from the largest size of explants, showed exceedingly slight accumulation; the most peripheral cells of the same culture showed a tremendous accumulation of such lipoid droplets.

10. This gradient of lipoid distribution appeared in all of the larger sizes of cultures, but became less prominent in the cultures from the smaller sizes of explants due to the fact that the more central migrated cells in these cultures appeared increasingly like the most peripheral cells. With cultures from the smallest size of explant this gradient did not exist; both centrally and peripherally situated migrated cells appeared of the "peripheral" type.

11. The conclusion is reached that this accumulation of lipoid droplets within the cell was not due to an "unmasking" of lipoids already within the cell, but was due to the absorption of lipoid more rapidly than the cell could dispose of it.

12. The conclusion is also reached that this accumulation of lipoid droplets within the cells lying in the most peripheral zone of the culture probably resulted from the action of a factor which was at least partly responsible for the fact observed that the maximal size of a culture varied approximately directly as the size of its explant.

13. The question is raised as to whether the extremely rapid accumulation of lipoid droplets by cells from the explants of the smallest size might not be intimately associated with the observed fact that these cells died much earlier than did those from explants of larger sizes.

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COURT DECISION RELATING TO PUBLIC HEALTH

Ordinance imposing fee for inspection of certain bakery products held void.—(Arkansas Supreme Court; Phillips *v.* City of Siloam Springs, 30 S. W. (2d) 220; decided July 14, 1930.) An ordinance of the city of Siloam Springs required that persons or corporations not having an established place of business in the city and bringing bakery products regularly into the city for sale should submit the wagon, automobile, or other vehicle and the bakery products transported therein for inspection at least once a week. A charge of $2 was made for each certificate of inspection.

The appellant, who had been convicted in the lower courts of violating this ordinance, was a salesman of a baking company in Fayetteville. The said company manufactured its products under the supervision and rules of the State board of health, the county health officer, and the city board of health. The city of Siloam Springs had not been given the power to require the inspection of bakeries or the regulation of the sale of their products. The supreme court reversed the judgment of the lower court and dismissed the cause, holding that the ordinance in question was void. A part of the court's opinion follows:

* * * The ordinance complained of only attempts to levy a charge for inspection of breads, cakes, and pies transported over the streets of the city for sale in vehicles, wagons, or automobiles, and does not prevent the shipping of such products by train, nor does it require an inspection thereof. The products were carried in a closed truck or automobile from the place of their manufacture under the rules and supervision of the State and city boards of health in the city of the location of the manufacturing plant, wrapped and sealed as required by the regulations of such boards. There could certainly be no further protection to the health of the inhabitants of the city of Siloam Springs, where the bread and cakes were delivered to the purchasers for resale to the public, by another inspection by the city under the provisions of this ordinance, and, if such were the case, there could be no reason for discrimination against the seller of these products so transported, requiring this second inspection thereof, which

is not required of the same kind of products transported and delivered by railroad carriers. Neither is there any good reason for requiring a weekly inspection of the car or vehicle and the products transported which are allowed to be sold and delivered daily. Such provision clearly indicates that it is an arbitrary one and that necessity does not really exist for the inspection prescribed, since it is required of only one delivery out of seven, and brands it rather as an unrecognized method for raising revenue, since the inspection charges would amount to $104 per year at the very least, and appears to be imposed rather as a discrimination against merchants and bakers not living in the city.

Power has been given to the State board of health for making all necessary rules and regulations for the protection of the peoples of the counties and cities, the regulations have been made by such boards, and appellant's employer, having manufactured and sealed its products under the inspection and in accordance with the rules and regulations prescribed by the State and city boards of health in the city of the manufacture of its products, could not be required to pay for the inspection for the sale of its products so manufactured in other towns and cities of the State, in the absence of a showing of the necessity therefor and power in such city to prescribe such regulation and require such inspection. All necessary power having been given to the State board of health for the regulation and operation of bakeries in the manufacture and sealing of their products for sale and delivery, any power upon the part of cities and towns of the State to regulate the sale of such products in their limits upon an inspection made and charged for will not be implied as incident to the power granted, and, since none have been expressly granted, they can not be held to exist. The city was without power to make such ordinance and charge, and it is void and of no effect.

DEATHS DURING WEEK ENDED OCTOBER 11, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended October 11, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 11, 1930	Corresponding week, 1929
Policies in force	75,406,109	74,892,526
Number of death claims	11,836	11,494
Death claims per 1,000 policies in force, annual rate	8.2	8.0

Deaths [1] from all causes in certain large cities of the United States during the week ended October 11, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Oct. 11, 1930				Corresponding week, 1929		Death rate [2] for first 41 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (77 cities)	7,242	11.0	750	[4] 61	11.1	669	12.0	12.8
Akron	42	8.6	5	46	8.5	6	8.0	9.4
Albany [5]	37	15.1	3	62	16.1	5	14.9	16.5
Atlanta	86	16.7	16	164	16.7	9	16.0	16.2
White	44		9	143		7		
Colored	42	(6)	7	201	(6)	2	(6)	(6)
Baltimore [5]	201	13.0	25	87	12.6	18	14.0	14.8
White	155		18	80		11		
Colored	46	(6)	7	112	(6)	7	(6)	(6)
Birmingham	50	10.0	5	48	11.6	12	13.8	16.2
White	24		1	16		3		
Colored	26	(6)	4	98	(6)	9	(6)	(6)
Boston	219	14.6	32	93	14.2	23	14.1	15.2
Bridgeport	30	10.6	2	34	13.8	8	11.0	12.3
Buffalo	144	13.1	21	94	10.7	9	13.1	14.1
Cambridge	30	13.8	4	80	9.2	0	11.9	12.5
Camden	20	8.9	2	35	11.1	2	13.7	14.5
Canton	22	10.8	3	80	3.0	1	10.0	11.3
Chicago [5]	670	10.3	68	60	9.7	45	10.5	11.4
Cincinnati	130	15.0	17	100	14.9	8	15.7	17.2
Cleveland	158	9.1	13	39	11.5	7	11.1	12.6
Columbus	99	17.8	13	128	12.9	6	15.8	15.0
Dallas	35	7.0	4		8.4	2	11.4	11.6
White	22		3			2		
Colored	13	(6)	1		(6)	0	(6)	(6)
Dayton	49	12.7	10	149	10.1	5	10.7	11.6
Denver	94	17.0	10	109	15.2	4	14.9	14.9
Des Moines	24	8.8	1	18	9.6	3	11.7	11.8
Detroit	250	8.2	42	65	9.2	48	9.4	11.3
Duluth	23	11.8	2	54	9.8	1	11.3	11.7
El Paso	21	10.7	5		19.2	7	17.5	20.0
Erie	25	11.2	2	44	10.4	3	11.3	12.5
Fall River [5] [7]	20	9.1	2	46	11.8	2	12.0	13.9
Flint	19	6.3	6	71	13.0	10	9.2	10.9
Fort Worth	24	7.7	2		6.9	2	11.2	12.5
White	16		1			2		
Colored	8	(6)	1		(6)	0	(6)	(6)
Grand Rapids	29	9.0	3	45	10.0	2	10.3	10.2
Houston	58	10.3	7		9.8	4	12.3	12.8
White	37		5			2		
Colored	21	(6)	2		(6)	2	(6)	(6)
Indianapolis	118	16.8	8	60	13.0	10	14.8	14.8
White	98		6	52		8		
Colored	20	(6)	2	117	(6)	2	(6)	(6)
Jersey City	62	10.2	9	78	9.6	3	11.3	12.6
Kansas City, Kans	35	14.9	1	23	9.4	3	11.7	13.3
White	24		1	28		3		
Colored	11	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	99	13.1	9	75	10.5	4	13.5	14.0
Knoxville	21	10.3	2	47	21.1	6	13.6	14.1
White	20		2	52		6		
Colored	1	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	282	11.8	21	63	12.1	19	11.1	11.4
Louisville	79	13.4	8	69	11.0	9	13.6	15.0
White	59		7	69		8		
Colored	20	(6)	1	66	(6)	1	(6)	(6)
Lowell [7]	24	12.5	3	79	10.8	6	13.4	14.2
Lynn	23	11.7	1	28	6.1	0	10.5	11.4
Memphis	55	11.3	7	82	17.9	10	17.1	19.3
White	29		4	72		7		
Colored	26	(6)	3	101	(6)	3	(6)	(6)
Milwaukee	100	9.1	6	26	10.4	19	9.8	11.1
Minneapolis	88	9.9	3	20	8.9	7	10.7	10.9

See footnotes at end of table

Deaths [1] from all causes in certain large cities of the United States during the week ended October 11, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued.

City	Week ended Oct. 11, 1930				Corresponding week, 1929		Death rate [2] for first 41 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Nashville	42	14.9	9	141	14.2	12	17.4	18.9
White	23		7	147		9		
Colored	19	(6)	2	124	(6)	3	(6)	(6)
New Bedford [7]	19	8.8	2	51	8.7	2	10.9	12.4
New Haven	45	14.4	4	62	12.5	4	12.8	13.4
New Orleans	134	15.3	15	83	16.1	12	17.5	17.7
White	80		7	59		7		
Colored	54	(6)	8	130	(6)	5	(6)	(6)
New York	1,252	9.3	106	45	9.9	111	10.8	11.4
Bronx Borough	157	6.4	11	32	7.4	15	7.9	8.3
Brooklyn Borough	406	8.1	38	40	8.8	39	9.7	10.3
Manhattan Borough	523	14.7	40	51	14.6	43	16.1	16.6
Queens Borough	124	5.9	11	44	6.3	11	7.1	7.7
Richmond Borough	12	13.8	6	117	12.8	3	14.5	16.0
Newark, N. J	93	10.9	11	58	9.9	10	12.0	12.9
Oakland	50	9.1	2	25	10.3	2	11.0	11.5
Oklahoma City	34	9.6	6	108	9.8	1	10.9	10.8
Omaha	12	10.2	4	49	12.3	7	13.6	13.7
Paterson	29	10.9	2	35	9.8	1	12.3	13.4
Philadelphia	419	11.1	49	73	11.3	31	12.6	13.2
Pittsburgh	166	12.9	21	74	11.9	20	13.8	14.9
Portland, Oreg	72	12.5	2	25	9.9	3	12.2	12.8
Providence	41	8.5	2	19	13.8	5	13.1	14.6
Richmond	38	10.8	5	73	12.6	5	14.8	16.4
White	23		1	22		1		
Colored	15	(6)	4	171	(6)	4	(6)	(6)
Rochester	90	14.4	12	107	10.2	8	11.7	12.5
St. Louis	210	13.3	21	73	12.2	6	14.2	14.7
St. Paul	19	9.4	4	40	8.7	1	10.1	10.5
Salt Lake City [4]	31	11.5	2	32	9.8	2	12.2	13.0
San Antonio	19	9.9	5		12.6	5	15.1	14.5
San Diego	34	11.9	1	21	12.7	1	14.4	15.2
San Francisco	115	9.5	6	41	12.3	8	13.2	13.2
Schenectady	13	7.1	2	62	12.0	1	11.3	12.4
Seattle	70	10.0	4	40	12.3	3	10.9	11.2
Somerville	21	10.5	2	63	7.1	1	9.8	9.3
Spokane	25	11.3	2	52	9.1	1	12.3	12.9
Springfield, Mass	36	12.5	5	86	9.5	2	12.2	12.9
Syracuse	51	12.8	7	86	10.2	4	11.7	13.2
Tacoma	14	6.8	2	55	9.8	2	12.3	11.8
Toledo	64	11.4	9	83	11.2	11	12.7	13.7
Trenton	19	20.8	8	154	14.9	7	16.8	17.3
Utica	24	12.2	1	28	16.8	2	14.6	15.6
Washington, D. C	129	13.8	7	41	15.4	12	15.1	15.5
White	76		3	26		3		
Colored	53	(6)	4	71	(6)	9	(6)	(6)
Waterbury	11	5.7	1	24	10.4	3	9.6	9.5
Wilmington, Del. [7]	29	14.4	3	72	10.4	7	14.7	13.9
Worcester	42	11.1	3	42	11.0	4	12.7	12.7
Yonkers	15	5.8	0	0	7.9	1	8.0	9.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 72 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

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

Reports for Weeks Ended October 18, 1930, and October 19, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 18, 1930, and October 19, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929
New England States:								
Maine	5	3	2	2	1	17	0	1
New Hampshire	5	1	----	5	----	23	0	0
Vermont	1	----	----	----	4	1	0	0
Massachusetts	69	106	2	4	80	77	1	2
Rhode Island	7	7	----	----	----	----	0	0
Connecticut	16	36	2	4	8	3	0	0
Middle Atlantic States:								
New York	66	158	[1] 6	[1] 22	74	171	11	18
New Jersey	69	100	8	2	32	11	2	3
Pennsylvania	108	155	----	----	76	150	2	5
East North Central States:								
Ohio	63	63	22	12	10	114	8	2
Indiana	52	29	10	----	18	6	7	0
Illinois	110	205	7	15	20	82	4	6
Michigan	68	116	3	2	42	91	8	23
Wisconsin	16	15	5	28	40	194	5	1
West North Central States:								
Minnesota	21	44	1	1	12	21	0	0
Iowa	9	18	----	----	2	6	1	1
Missouri	46	74	----	3	70	11	2	5
North Dakota	7	11	----	----	----	1	0	2
South Dakota	11	2	----	----	----	----	0	0
Nebraska	14	54	6	----	19	27	0	1
Kansas	11	36	13	----	1	64	2	1
South Atlantic States:								
Delaware	2	3	----	----	----	1	0	0
Maryland [2]	29	40	6	10	----	6	0	1
District of Columbia	7	15	----	----	1	1	0	1
Virginia	----	----	----	----	----	----	----	----
West Virginia	15	26	12	11	21	28	1	0
North Carolina	216	299	9	4	5	1	5	1
South Carolina	65	83	320	----	----	----	0	0
Georgia	36	40	46	49	7	2	0	1
Florida	8	22	1	3	2	2	0	0
East South Central States:								
Kentucky	10	20	----	----	----	----	3	0
Tennessee	35	51	16	21	4	13	2	1
Alabama	70	75	6	7	32	12	3	1
Mississippi	56	103	----	----	----	----	4	0

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 18, 1930, and October 19, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19 1929
West South Central States:								
Arkansas	7	25	8	21	1	1	0	1
Louisiana	20	38	2	7	3	4	2	3
Oklahoma [2]	57	99	15	38	7	13	1	1
Texas	35	79	8	15	9	1	0	0
Mountain States:								
Montana	2	4	----	----	1	114	0	2
Idaho	1	----	----	----	2	10	0	4
Wyoming	----	----	----	----	----	----	0	0
Colorado	6	11	----	----	31	4	1	3
New Mexico	12	5	----	----	8	1	0	0
Arizona	5	6	2	----	5	----	0	3
Utah [3]	1	1	4	4	----	3	5	1
Pacific States:								
Washington	32	17	----	----	6	11	2	1
Oregon	3	15	13	17	99	14	0	1
California	55	68	20	25	123	52	4	9

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929
New England States:								
Maine	15	1	23	24	0	0	2	2
New Hampshire	1	0	3	15	0	0	0	0
Vermont	0	0	8	2	2	0	1	0
Massachusetts	42	9	82	156	0	0	11	9
Rhode Island	0	0	9	6	0	0	0	0
Connecticut	10	2	15	24	0	0	7	5
Middle Atlantic States:								
New York	50	31	160	129	0	22	45	33
New Jersey	1	2	77	70	0	0	8	8
Pennsylvania	10	11	194	214	0	0	58	44
East North Central States:								
Ohio	96	7	277	153	17	15	63	41
Indiana	16	1	91	82	22	13	12	4
Illinois	19	12	187	336	23	42	40	17
Michigan	15	14	142	183	22	44	22	17
Wisconsin	15	0	89	61	11	1	8	68
West North Central States:								
Minnesota	20	0	38	76	4	7	4	8
Iowa	19	6	27	32	1	8	2	7
Missouri	12	0	57	72	2	6	27	10
North Dakota	1	0	12	21	6	9	6	2
South Dakota	8	0	12	14	10	15	3	8
Nebraska	35	0	29	18	2	7	1	2
Kansas	44	1	42	92	2	20	8	5
South Atlantic States:								
Delaware	0	0	2	4	0	0	20	0
Maryland [2]	4	0	44	51	0	0	38	23
District of Columbia	1	0	8	10	0	0	0	3
Virginia	----	15	----	----	----	----	----	----
West Virginia	6	1	34	82	0	5	32	32
North Carolina	0	2	156	140	1	11	26	16
South Carolina	0	1	42	44	0	0	9	27
Georgia	1	1	24	42	0	0	42	12
Florida	1	0	4	5	0	1	1	3
East South Central States:								
Kentucky	5	0	34	15	0	7	10	19
Tennessee	4	2	25	60	5	2	26	30
Alabama	2	2	58	63	0	0	34	12
Mississippi	0	0	24	26	0	1	37	13

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 18, 1930, and October 19, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929
West South Central States:								
Arkansas	2	0	11	19	1	1	21	20
Louisiana	4	0	13	26	1	0	10	12
Oklahoma [3]	6	0	38	46	18	22	41	34
Texas	4	2	21	28	2	0	23	7
Mountain States:								
Montana	1	0	21	18	2	15	8	25
Idaho	1	0	1	12	0	3	3	0
Wyoming	2	0	3	2	1	0	0	6
Colorado	4	0	31	13	3	9	8	5
New Mexico	0	0	12	7	0	2	21	18
Arizona	0	0	4	1	0	0	1	3
Utah [2]	0	0	12	4	1	0	5	5
Pacific States:								
Washington	3	2	48	40	24	42	6	18
Oregon	2	1	13	15	1	14	6	5
California	87	5	58	141	4	17	14	12

[2] Week ended Friday.
[3] Figures for 1930 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	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1930										
Hawaii Territory	2	14	12	----	5	----	4	4	0	28
September, 1930										
Florida	1	24	1	80	3	3	2	11	0	13
Iowa	3	17	----	4	10	----	84	94	36	19
Maine	----	7	2	----	105	----	64	28	0	23
Maryland	----	45	13	7	12	1	6	60	0	211
Massachusetts	8	166	4	10	142	----	104	244	0	48
Michigan	30	164	4	2	82	----	51	341	22	117
New Jersey	8	206	9	----	73	----	13	150	0	66
New York	39	241	----	8	241	----	249	306	10	244
North Dakota	----	12	----	----	7	----	7	24	3	26
Ohio	21	163	42	1	65	1	305	482	93	297
Oregon	1	9	39	13	85	----	2	38	5	26
Porto Rico	----	41	15	1,563	8	2	----	----	0	31
Vermont	----	2	----	----	6	----	----	6	0	4
Wyoming	3	4	1	----	1	----	26	15	0	3

August, 1930

Hawaii Territory:	Cases
Chicken pox	2
Conjunctivitis, follicular	11
Dysentery (amebic)	1
Dysentery (bacillary)	4
Hookworm disease	17
Leprosy	6
Mumps	5
Tetanus	3
Trachoma	1
Whooping cough	2

September, 1930

Anthrax:	Cases
New York	3
Chicken pox:	
Florida	8
Iowa	23
Maine	12
Maryland	31
Massachusetts	117
Michigan	118
New Jersey	91
New York	242

Chicken pox—Continued.	Cases
North Dakota	7
Ohio	174
Oregon	28
Vermont	54
Wyoming	2
Colibacillosis:	
Porto Rico	2
Diarrhea:	
Maryland	56
Diarrhea and enteritis:	
Ohio	111
Dysentery:	
Iowa	1
Maryland	56
Massachusetts	5
Michigan	1
New Jersey	2
New York	56
Ohio	11
Oregon	6
Porto Rico	2
Filariasis:	
Porto Rico	4
Food poisoning:	
Ohio	5
German measles:	
Iowa	1
Maine	3
Maryland	7
Massachusetts	27
New Jersey	21
New York	49
Ohio	12
Impetigo contagiosa:	
Maryland	9
Oregon	12
Lead poisoning:	
Massachusetts	10
New Jersey	3
Ohio	3
Leprosy:	
Porto Rico	1
Lethargic encephalitis:	
Florida	1
Maryland	1
Massachusetts	3
Michigan	4
New York	26
North Dakota	1
Ohio	6
Oregon	1
Mumps:	
Iowa	18
Maine	66
Maryland	17
Massachusetts	90
Michigan	48
New Jersey	32
New York	254
North Dakota	64
Ohio	60
Oregon	84
Porto Rico	11
Vermont	2
Wyoming	8

Ophthalmia neonatorum:	Cases
Iowa	1
Massachusetts	115
New Jersey	3
New York	4
Ohio	83
Porto Rico	3
Paratyphoid fever:	
Maine	1
New Jersey	1
New York	5
Ohio	8
Porto Rico	8
Puerperal septicemia:	
New York	8
Ohio	5
Porto Rico	6
Rabies in animals:	
New York	7
Scabies:	
Maryland	2
Oregon	4
Septic sore throat:	
Maine	1
Massachusetts	19
Michigan	20
New York	10
Ohio	48
Oregon	3
Tetanus:	
Iowa	1
Maine	2
Maryland	2
Massachusetts	5
New Jersey	4
New York	9
Ohio	5
Porto Rico	2
Tetanus, infantile:	
Porto Rico	35
Trachoma:	
Massachusetts	5
New Jersey	3
North Dakota	1
Ohio	18
Wyoming	1
Trichinosis:	
Massachusetts	3
New Jersey	1
Tularaemia:	
Wyoming	1
Typhus fever:	
Florida	5
Maryland	3
New York	1
Undulant fever:	
Iowa	7
Maryland	5
Michigan	1
New York	33
Ohio	13
Oregon	2
Vermont	2
Vincent's angina:	
Iowa	5
Maine	3

Vincent's angina—Continued.	Cases
Maryland	13
New York [1]	84
North Dakota	21
Oregon	1
Whooping cough:	
Florida	32
Iowa	40
Maine	146
Maryland	113
Massachusetts	517
Michigan	518
New Jersey	297
New York	1,367
North Dakota	41
Ohio	355
Oregon	63
Porto Rico	65
Vermont	35
Wyoming	11

[1] Exclusive of New York City.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of September, 1930, by departments of health of certain States to other State health departments

Disease	Connecticut	Illinois	Kansas	Massachusetts	Minnesota	New York	Oregon	South Dakota	Washington
Diphtheria						3			
Gonorrhea					1				
Poliomyelitis	1	1			3	2		1	
Smallpox		2							
Syphilis			14		3				
Trachoma					1				
Tuberculosis		7			12		3		
Tularaemia									1
Typhoid fever	3	[1] 8		2	2	9			
Undulant fever						1			

[1] Includes 1 case of paratyphoid fever B.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,165,000. The estimated population of the 91 cities reporting deaths is more than 30,570,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 11, 1930, and October 12, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,448	1,927	
98 cities	442	679	877
Measles:			
45 States	617	1,043	
98 cities	135	132	
Meningococcus meningitis:			
46 States	73	94	
98 cities	33	44	
Poliomyelitis:			
46 States	553	148	
Scarlet fever:			
46 States	1,921	2,067	
98 cities	597	694	645
Smallpox:			
46 States	133	289	
98 cities	10	41	10
Typhoid fever:			
46 States	634	658	
98 cities	127	159	120
Deaths reported			
Influenza and pneumonia:			
91 cities	458	510	
Smallpox:			
91 cities	0	0	

City reports for week ended October 11, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0	----------	0	0	0	3
New Hampshire:								
Concord	0	1	0	----------	0	0	0	0
Nashua	0	1	0	----------	----------	0	0	----------
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	6	25	9	----------	0	8	1	14
Fall River	0	4	3	----------	0	0	0	0
Springfield	12	4	0	2	1	0	0	1
Worcester	2	4	7	2	0	0	1	1
Rhode Island:								
Pawtucket	0	1	1	----------	0	0	0	0
Providence	2	6	2	----------	0	0	0	4
Connecticut:								
Bridgeport	0	5	0	2	1	1	0	1
Hartford	1	4	2	----------	0	5	0	2
New Haven	3	1	0	----------	0	0	1	3
MIDDLE ATLANTIC								
New York:								
Buffalo	11	14	8	----------	0	2	2	7
New York	23	119	37	7	8	18	15	98
Rochester	0	4	0	----------	0	0	0	4
Syracuse	14	3	4	----------	2	1	1	2
New Jersey:								
Camden	2	6	5	----------	0	7	6	3
Newark	7	12	12	2	1	3	1	4
Trenton	2	2	0	----------	0	1	0	2
Pennsylvania:								
Philadelphia	17	48	11	1	3	1	5	26
Pittsburgh	6	20	9	----------	0	0	2	16
Reading	4	1	2	----------	0	0	4	2
Scranton	4	4	1	----------	----------	0	0	----------
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	10	6	1	1	2	1	6
Cleveland	11	48	7	5	0	1	14	10
Columbus	6	4	6	3	2	0	2	2
Toledo	11	8	8	1	0	0	1	2
Indiana:								
Fort Wayne	1	3	1	----------	0	0	0	1
Indianapolis	2	15	10	----------	0	0	4	16
South Bend	1	2	2	----------	0	0	0	0
Terre Haute	0	1	0	----------	0	0	0	0
Illinois:								
Chicago	40	84	94	----------	1	2	15	27
Springfield	0	0	1	2	0	0	0	0
Michigan:								
Detroit	33	59	27	3	1	7	4	13
Flint	8	4	1	----------	0	2	1	3
Grand Rapids	1	3	0	----------	0	1	0	4

City reports for week ended October 11, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	28	0	1		0	0	1	0
Madison	4	0	0			1	8	
Milwaukee	26	13	3		0	2	9	6
Racine	4	2	0		0	0	1	0
Superior	1	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	17	0	0		0	0	0	0
Minneapolis	27	30	2		0	1	12	7
St. Paul	5	12	0		0	7	0	5
Iowa:								
Des Moines	0	4	0			0	0	
Sioux City	1	2	2			0	2	
Waterloo	14	1	1			0	0	
Missouri:								
Kansas City	7	8	1		0	0	0	8
St. Joseph	0	2	0		0	0	0	0
St. Louis	1	36	18	1	1	32	2	
North Dakota:								
Fargo	1	0	0		0	0	10	2
Grand Forks	0	0	0			0	1	
South Dakota:								
Aberdeen	0	0	0			0	0	
Sioux Falls	0	0	0			1	0	
Nebraska:								
Lincoln	8	2	0		0	1	4	
Omaha	0	13	6		0	0	0	3
Kansas:								
Topeka	0	2	3	1	1	0	0	0
Wichita	0	3	2		0	0	0	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	1
Maryland:								
Baltimore	10	22	12	3	0	1	2	18
Cumberland	0	1	1		0	0	0	0
Frederick	0	1	0		0	0	0	0
District of Columbia:								
Washington	0	14	18		0	2	0	8
Virginia:								
Lynchburg	1	3	0		0	0	0	0
Norfolk	1	4	5		0	0	1	4
Richmond	0	20	13		0	1	0	2
Roanoke	0	6	1		0	0	0	0
West Virginia:								
Charleston	0	1	1		0	0	6	0
Wheeling	2	1	0		0	0	0	0
North Carolina:								
Raleigh	0	4	4		0	1	0	0
Wilmington	0	2	1		0	0	0	0
Winston-Salem	0	5	3		0	0	1	1
South Carolina:								
Charleston	0	2	0	5	1	0	0	1
Columbia	0	2	0		0	0	0	3
Greenville	0	1	1		0	0	0	0
Georgia:								
Atlanta	0	10	2	4	0	0	0	8
Brunswick	0	0	0		0	0	0	0
Savannah	0	2	2		0	1	0	1
Florida:								
Miami	0	2	3		1	2	0	3
St. Petersburg		0			0			0
Tampa	0	2	0		0	0	0	0

City reports for week ended October 11, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	2	0	----------	0	0	0	3
Tennessee:								
Memphis	2	8	6	----------	0	1	2	4
Nashville	0	3	4	----------	0	1	0	6
Alabama:								
Birmingham	0	6	6	----------	0	1	2	5
Mobile	0	1	0	----------	0	0	0	1
Montgomery	0	3	0	----------	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	2	1	----------	----------	0	0	----------
Little Rock	0	1	0	----------	0	0	0	2
Louisiana:								
New Orleans	0	10	4	1	1	0	0	16
Shreveport	1	1	0	----------	0	0	0	0
Oklahoma:								
Tulsa	1	5	8	----------	----------	1	1	----------
Texas:								
Dallas	0	15	6	----------	0	0	0	1
Fort Worth	1	4	7	----------	0	0	0	1
Galveston	0	0	0	----------	0	0	0	1
Houston	0	7	4	----------	1	0	0	2
San Antonio	0	3	2	----------	1	0	1	9
MOUNTAIN								
Montana:								
Billings	1	0	1	----------	1	0	0	1
Great Falls	1	0	0	----------	0	0	0	1
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	0	0	0
Colorado:								
Denver	13	11	2	----------	0	5	1	4
Pueblo	1	1	0	----------	0	7	1	2
New Mexico:								
Albuquerque	0	1	0	----------	0	0	0	0
Arizona:								
Phoenix	0	0	1	----------	0	0	0	0
Utah:								
Salt Lake City	0	3	2	----------	0	1	1	2
Nevada:								
Reno	0	0	0	----------	0	0	0	1
PACIFIC								
Washington:								
Seattle	20	5	17	----------	----------	1	15	----------
Spokane	8	3	0	----------	----------	0	0	----------
Tacoma	2	3	1	----------	0	0	0	2
Oregon:								
Portland	13	9	2	----------	0	2	1	6
Salem	0	0	0	----------	0	0	0	0
California:								
Los Angeles	11	32	16	17	0	5	7	12
Sacramento	2	2	2	----------	0	0	7	0
San Francisco	17	14	4	1	0	4	6	2

City reports for week ended October 11, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases, reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	3	0	0	0	0	0	1	0	6	20
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	9
Nashua	0	1	0	0	0	0	0	0	0	0	----
Vermont:											
Barre	0	0	0	0	0	3	0	0	0	0	3
Massachusetts:											
Boston	34	18	0	0	0	9	3	0	0	19	219
Fall River	2	2	0	0	0	1	2	0	0	1	20
Springfield	4	3	0	0	0	1	0	1	0	3	31
Worcester	7	13	0	0	0	2	1	0	0	1	42
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	19
Providence	3	4	0	0	0	0	1	0	0	2	41
Connecticut:											
Bridgeport	3	0	0	0	0	0	0	7	0	0	30
Hartford	3	5	0	0	0	0	1	0	0	1	38
New Haven	2	0	0	0	0	3	1	0	0	2	45
MIDDLE ATLANTIC											
New York:											
Buffalo	12	10	0	0	0	10	2	1	0	29	140
New York	54	24	0	0	0	83	27	15	0	95	1,252
Rochester	3	4	0	0	0	2	0	0	0	3	85
Syracuse	4	1	0	0	0	0	1	1	0	10	51
New Jersey:											
Camden	2	1	0	0	0	0	0	1	0	0	20
Newark	6	7	0	0	0	7	1	0	1	15	95
Trenton	0	4	0	0	0	10	1	0	0	4	49
Pennsylvania:											
Philadelphia	38	37	0	0	0	27	9	10	0	10	419
Pittsburgh	26	23	0	0	0	7	1	2	0	0	----
Reading	1	2	0	0	0	0	1	0	0	0	25
Scranton	1	1	0	0	0	0	0	0	0	3	----
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	10	23	0	1	0	3	1	1	0	1	130
Cleveland	20	14	0	0	0	10	2	2	0	12	158
Columbus	7	4	0	1	0	5	1	0	0	0	99
Toledo	8	11	0	0	0	4	0	1	1	0	64
Indiana:											
Fort Wayne	1	0	0	0	0	1	1	4	0	0	27
Indianapolis	9	12	1	0	0	4	2	1	1	7	----
South Bend	1	0	0	0	0	0	0	1	0	0	14
Terre Haute	2	3	0	0	0	0	0	0	0	0	21
Illinois:											
Chicago	58	91	0	0	0	44	6	2	1	53	670
Springfield	1	2	0	0	0	0	1	0	0	0	17
Michigan:											
Detroit	48	27	1	0	0	19	4	1	0	45	250
Flint	9	9	0	1	0	0	0	1	0	2	19
Grand Rapids	6	11	0	0	0	0	0	1	0	2	29
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	0	0	0	7
Madison	1	4	0	0	----	----	0	0	----	4	----
Milwaukee	16	4	0	0	0	5	1	0	0	29	100
Racine	3	14	0	0	0	0	0	0	0	5	15
Superior	2	2	0	0	0	1	0	0	0	2	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	3	0	0	0	3	0	0	0	7	23
Minneapolis	34	3	0	0	0	3	1	0	0	4	88
St. Paul	15	7	0	0	0	1	1	0	0	5	56
Iowa:											
Des Moines	6	0	0	0	----	----	0	0	----	0	24
Sioux City	2	2	0	0	----	----	0	0	----	2	----
Waterloo	2	0	0	0	----	----	0	0	----	2	----

City reports for week ended October 11, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases, reported	Deaths reported		
WEST NORTH CENTRAL—con.											
Missouri:											
Kansas City	11	5	0	1	0	5	2	0	0	0	99
St. Joseph	2	7	0	0	0	0	0	0	0	0	27
St. Louis	23	9	1	1	0	9	4	3	0	3	210
North Dakota:											
Fargo	1	0	0	0	0	1	0	0	0	1	8
Grand Forks	0	0	0	0	---	---	0	0	---	0	---
South Dakota:											
Aberdeen	0	0	0	0	---	---	0	1	---	0	---
Sioux Falls	2	0	0	1	---	---	0	0	---	0	8
Nebraska:											
Lincoln	0	5	0	0	---	---	0	0	---	5	---
Omaha	3	9	0	1	0	1	0	0	0	1	42
Kansas:											
Topeka	4	1	0	0	0	0	0	2	0	1	15
Wichita	3	2	0	0	0	1	0	0	0	3	26
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	3	0	0	0	0	0	0	0	0	29
Maryland:											
Baltimore	10	14	0	0	0	12	7	16	1	21	201
Cumberland	0	4	0	0	0	1	0	1	0	0	18
Frederick	0	0	0	0	0	0	0	0	0	0	---
District of Col.:											
Washington	12	10	0	0	0	21	3	5	0	0	129
Virginia:											
Lynchburg	2	1	0	0	0	0	0	2	0	0	12
Norfolk	1	1	0	0	0	2	0	1	0	0	---
Richmond	9	7	0	0	0	2	1	2	0	0	46
Roanoke	4	1	0	0	0	0	1	1	0	0	11
West Virginia:											
Charleston	3	0	0	0	0	0	0	2	0	0	9
Wheeling	2	0	0	0	0	0	0	0	0	0	29
North Carolina:											
Raleigh	1	0	0	0	0	0	0	0	0	1	12
Wilmington	1	1	0	0	0	0	0	0	0	4	9
Winston-Salem	3	6	1	0	0	1	0	0	0	0	12
South Carolina:											
Charleston	1	2	0	0	0	0	2	1	0	0	14
Columbia	1	3	0	0	0	0	0	0	0	0	11
Greenville	1	1	0	0	0	0	0	0	0	0	---
Georgia:											
Atlanta	7	11	0	0	0	3	1	4	1	1	86
Brunswick	0	0	0	0	0	1	0	0	0	0	9
Savannah	1	0	0	0	0	2	0	0	0	0	28
Florida:											
Miami	1	1	0	0	0	2	0	1	0	3	2
St. Petersburg	0	---	0	---	0	0	0	---	0	---	7
Tampa	1	0	0	0	0	0	1	1	0	0	14
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	3	0	0	0	1	0	1	0	0	20
Tennessee:											
Memphis	4	6	0	0	0	6	3	1	0	3	55
Nashville	2	3	0	0	0	5	3	2	0	1	42
Alabama:											
Birmingham	5	14	1	0	0	3	2	3	1	1	50
Mobile	1	0	0	0	0	0	0	0	0	0	17
Montgomery	1	1	0	0	---	---	0	0	---	1	---

City reports for week ended October 11, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases, reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0	----	----	0	0	----	0	----
Little Rock	3	1	0	0	0	3	0	3	0	0	----
Louisiana:											
New Orleans	3	4	0	0	0	9	3	3	1	2	134
Shreveport	0	1	0	0	0	1	0	0	0	0	23
Oklahoma:											
Tulsa	3	12	0	0	----	----	1	1	----	1	----
Texas:											
Dallas	5	2	0	0	0	1	2	5	0	0	35
Fort Worth	2	3	0	0	0	1	1	3	0	0	24
Galveston	0	0	0	0	0	1	0	0	0	0	15
Houston	1	1	0	0	0	2	0	2	0	0	58
San Antonio	1	0	0	1	0	9	1	1	0	0	49
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	1	0	1	1	12
Great Falls	1	10	0	0	0	0	0	0	0	0	8
Helena	1	0	0	0	0	0	0	0	0	6	5
Missoula	0	1	0	0	0	0	0	0	0	2	1
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	2	3
Colorado:											
Denver	7	13	0	0	0	9	1	1	0	16	91
Pueblo	1	0	0	0	0	1	0	3	0	1	11
New Mexico:											
Albuquerque	1	0	0	0	0	5	3	3	0	2	7
Arizona:											
Phoenix	1	1	0	0	0	0	0	0	1	0	9
Utah:											
Salt Lake City	2	9	0	0	0	1	3	1	0	7	31
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	6	17	1	0	----	----	2	2	----	5	----
Spokane	7	1	1	2	----	----	0	0	----	0	----
Tacoma	2	1	2	0	0	0	0	0	0	1	14
Oregon:											
Portland	5	2	2	0	0	1	1	0	0	0	72
Salem	0	0	0	0	0	0	2	0	0	0	----
California:											
Los Angeles	15	9	1	0	0	26	2	6	0	14	282
Sacramento	2	2	0	0	0	3	1	0	0	6	30
San Francisco	9	7	0	1	0	7	1	0	1	11	148

City reports for week ended October 11, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	9	0
Massachusetts:									
Boston	0	0	0	0	0	0	2	26	2
Worcester	0	0	0	0	1	0	0	0	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	0	0	0	0	0	0	1	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	0	1	0
New York	8	5	2	0	0	0	17	11	0
Rochester	0	0	0	0	0	0	1	7	1
Syracuse	0	0	0	0	0	0	0	6	1
New Jersey:									
Trenton	1	1	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	2	0	0	0	0	0	0	4	0
Pittsburgh	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	1	4	0
Cleveland	2	0	0	0	0	0	1	11	1
Columbus	2	0	0	0	0	0	0	2	1
Toledo	0	0	0	0	0	0	0	2	0
Indiana:									
Indianapolis	0	1	0	0	0	0	1	2	0
Illinois:									
Chicago	0	0	1	1	1	1	3	16	2
Springfield	0	0	0	0	0	0	0	4	0
Michigan:									
Detroit	6	2	2	0	0	0	3	5	1
Grand Rapids	0	0	0	0	0	0	0	1	1
Wisconsin:									
Milwaukee	0	0	0	0	0	0	1	5	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	3	0
Iowa:									
Des Moines	0	0	0	0	0	0	1	3	0
Sioux City	0	0	0	0	0	0	1	4	0
Missouri:									
Kansas City	0	1	0	0	0	0	1	5	0
St. Louis	2	2	0	0	0	0	0	4	0
Nebraska:									
Lincoln	0	0	0	0	0	0	0	3	0
SOUTH ATLANTIC									
Maryland:									
Baltimore [1]	1	0	0	0	0	0	1	2	0
District of Columbia:									
Washington	1	1	0	0	0	0	0	1	0
Virginia:									
Lynchburg	0	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	0	2	0	0	0
Wilmington	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia: [1]									
Atlanta	0	0	0	0	1	1	0	0	0
Brunswick	0	0	0	0	0	1	0	0	0
Florida:									
Miami	0	0	0	0	1	1	0	0	0
St. Petersburg	0	0	0	1	0	0	0	0	0

[1] Typhus fever, 5 cases and 1 death: 1 case at Baltimore, Md., and 4 cases and 1 death at Savannah, Ga.

City reports for week ended October 11, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	0	0	0	0	0	0	1	0
Tennessee:									
Memphis	2	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	1	0	0	0	0	1	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	2	1	0	1	0
Shreveport	0	0	0	0	0	2	0	0	0
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	2	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
Galveston	0	0	1	1	0	0	0	0	0
Houston	0	0	0	0	0	0	0	1	1
MOUNTAIN									
Colorado:									
Denver	1	1	0	0	0	0	0	3	0
Pueblo	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	0	0
Oregon:									
Portland	0	1	0	0	0	0	0	0	0
California:									
Los Angeles	1	0	0	0	0	0	1	4	1
Sacramento	0	0	0	0	0	0	1	1	0
San Francisco	0	0	0	0	0	0	0	25	2

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 11, 1930, compared with those for a like period ended October 12, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, September 7 to October 11, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929
98 cities	45	66	47	75	58	83	[2] 62	97	72	112
New England	55	47	31	49	51	76	49	88	53	94
Middle Atlantic	28	41	38	54	33	60	43	62	42	75
East North Central	64	95	75	96	75	90	80	124	100	139
West North Central	55	58	47	64	57	100	[3] 62	108	66	123
South Atlantic	62	133	42	114	92	112	62	129	106	139
East South Central	27	116	27	137	34	137	115	157	108	232
West South Central	49	61	67	149	146	164	112	198	64	255
Mountain	34	26	26	70	60	26	[4] 9	26	43	0
Pacific	26	22	14	19	31	65	[5] 62	56	94	60

MEASLES CASE RATES

98 cities	16	16	16	15	18	13	[2] 19	16	22	22
New England	38	16	18	31	42	18	33	34	31	16
Middle Atlantic	20	12	17	7	13	10	12	12	16	12
East North Central	9	20	14	17	13	13	5	12	11	29
West North Central	15	6	19	6	28	10	[3] 73	10	76	23
South Atlantic	5	7	20	7	9	13	20	11	11	9
East South Central	7	7	0	7	74	0	0	0	20	14
West South Central	4	11	0	8	11	11	7	0	0	4
Mountain	34	61	43	26	26	44	[4] 73	35	112	61
Pacific	19	39	21	51	19	24	[5] 27	65	24	65

SCARLET FEVER CASE RATES

98 cities	51	54	62	68	72	95	[2] 74	102	97	114
New England	51	52	71	49	80	99	73	135	106	162
Middle Atlantic	27	16	47	25	33	42	49	48	54	48
East North Central	85	90	91	121	118	161	107	149	137	173
West North Central	34	58	44	92	76	108	[3] 73	119	91	140
South Atlantic	51	47	40	66	57	105	70	120	115	139
East South Central	40	96	40	28	128	75	74	82	182	123
West South Central	26	91	56	72	56	72	37	72	37	130
Mountain	77	70	69	113	94	139	[4] 118	131	283	148
Pacific	73	72	78	68	87	84	[5] 89	128	87	87

SMALLPOX CASE RATES

98 cities	3	3	5	5	3	4	[2] 1	7	2	7
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	1
East North Central	2	4	9	10	3	3	1	7	2	3
West North Central	27	8	21	6	13	8	[3] 0	2	6	13
South Atlantic	0	2	0	0	0	0	2	0	0	0
East South Central	0	0	0	0	0	0	0	48	0	0
West South Central	0	0	0	0	4	0	4	0	4	4
Mountain	0	9	0	52	0	96	[4] 0	52	0	96
Pacific	9	12	5	17	19	10	[5] 2	36	7	34

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Kansas City, Mo., not included.
[4] Great Falls, Mont., not included.
[5] Spokane, Wash., not included.

Summary of weekly reports from cities, September 7 to October 11, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 —Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929
98 cities	27	21	22	22	18	20	[2] 20	16	21	26
New England	20	16	11	13	11	7	11	11	20	16
Middle Atlantic	25	18	16	14	14	12	15	14	14	10
East North Central	17	10	11	11	9	9	9	12	9	8
West North Central	21	17	28	6	15	23	[3] 13	15	9	8
South Atlantic	64	34	62	26	51	17	38	30	64	26
East South Central	54	89	54	0	20	82	67	21	47	27
West South Central	56	50	67	84	37	27	56	8	52	27
Mountain	60	70	0	340	43	313	[4] 118	113	43	749
Pacific	5	19	17	7	14	10	[5] 20	10	19	7

INFLUENZA DEATH RATES

91 cities	3	3	3	2	3	5	[6] 3	6	5	8
New England	0	0	2	2	2	2	0	4	4	0
Middle Atlantic	4	2	2	0	2	5	2	7	7	8
East North Central	3	2	3	2	2	4	1	5	3	8
West North Central	0	6	0	6	0	3	[3] 0	6	6	3
South Atlantic	2	2	0	2	4	6	2	7	2	11
East South Central	22	7	29	7	15	0	15	0	0	22
West South Central	0	12	8	0	4	12	11	16	11	16
Mountain	0	9	17	9	0	17	[4] 18	0	9	26
Pacific	0	0	0	9	6	3	3	9	0	6

PNEUMONIA DEATH RATES

91 cities	55	55	58	54	58	67	[6] 60	77	73	80
New England	62	36	51	29	35	72	40	36	64	74
Middle Atlantic	67	66	68	59	76	72	63	93	78	87
East North Central	43	47	43	47	48	54	54	61	55	65
West North Central	44	45	74	39	35	81	[3] 81	108	86	54
South Atlantic	53	52	51	66	51	60	48	81	79	103
East South Central	29	90	81	67	74	119	118	30	140	104
West South Central	61	55	50	51	77	94	77	113	119	113
Mountain	120	70	112	104	51	70	[4] 137	87	94	122
Pacific	31	41	49	57	49	38	49	47	49	57

[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Kansas City, Mo., not included.
[4] Great Falls, Mont., not included.
[5] Spokane, Wash., not included.
[6] Kansas City, Mo., and Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Montreal—Typhoid fever—October 15–22, 1930.—During the period October 15 to 22, 1930, 37 cases of typhoid fever were reported in Montreal, Canada. The Director of Health of Montreal states that an investigation revealed unsatisfactory conditions in three milk depots in the city, which have since been corrected, and that two suspect carriers had been detected. It is believed that the measures taken will control the situation.

Provinces—Communicable diseases—Weeks ended October 4 and October 11, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the weeks ended October 4 and October 11, 1930, as follows:

Week ended October 4

Disease	Cerebro-spinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia				6		3
New Brunswick						11
Quebec			1	3		20
Ontario	4		1	34		13
Manitoba				4		7
Saskatchewan				1	3	5
Alberta				6	13	3
British Columbia	1	8		3		8
Total	5	8	2	57	16	70

Week ended October 11

Prince Edward Island [1]						
Nova Scotia				5		1
New Brunswick						7
Quebec	1		3	1		20
Ontario			2	46	3	61
Manitoba				1		4
Saskatchewan				3		5
Alberta				7	8	3
British Columbia	2	2		3		6
Total	3	2	5	66	11	107

[1] No case of any disease included in the table was reported during the week.

Ontario Province—Communicable diseases (comparative)—Four weeks ended September 27, 1930.—During the four weeks ended September 27, 1930, and in the corresponding period of 1929 certain com-

municable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	1929		1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	6	1	16	1
Chancroid			2	
Chicken pox	196		102	
Diphtheria	338	23	247	5
Dysentery	10	9	8	2
Erysipelas	1			
German measles	2		5	
Gonorrhea	260		283	
Influenza	3	2	18	2
Lethargic encephalitis	2	2		1
Measles	177		51	
Mumps	112		42	
Paratyphoid fever	2		7	
Pneumonia		104		63
Poliomyelitis	227	9	215	11
Scarlet fever	193	1	192	
Septic sore throat	1	2		1
Smallpox	19		[1] 9	
Syphilis	114		203	
Tetanus	1			
Trichinosis	1	1		
Trachoma			1	
Tuberculosis	121	54	146	51
Typhoid fever	98	11	102	2
Undulant fever	1		3	
Whooping cough	461	5	317	

[1] Cases of smallpox were distributed as follows: Ottawa, 3; Kingston, 3; Chapleau, 1; Plympton, 1; and Toronto, 1.

Quebec Province—Communicable diseases—Week ended October 11, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 11, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	12
Chicken pox	26	Poliomyelitis	1
Diphtheria	46	Scarlet fever	60
Erysipelas	1	Smallpox	4
German measles	1	Tuberculosis	24
Influenza	3	Typhoid fever	20
Measles	39	Whooping cough	64

CZECHOSLOVAKIA

Communicable diseases—July, 1930.—During the month of July, 1930, certain communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	54	1	Puerperal fever	45	15
Cerebrospinal meningitis	14	3	Rabies	1	1
Diphtheria	1,221	84	Scarlet fever	1,431	44
Dysentery	100	15	Trachoma	158	
Malaria	42		Typhoid fever	657	44
Paratyphoid fever	54	1	Typhus fever	1	

MEXICO

Vera Cruz—Deaths from certain diseases—Six weeks ended October 4, 1930.—During the six weeks ended October 4, 1930, deaths from certain diseases were reported in Vera Cruz, Mexico, as follows:

Disease	Week ended—					
	Aug. 30, 1930	Sept. 6, 1930	Sept. 13, 1930	Sept. 20, 1930	Sept. 27, 1930	Oct. 4, 1930
Bronchitis			1			1
Cancer				3	1	1
Cerebrospinal meningitis			2	1	3	
Diphtheria	1					
Dysentery	1				1	
Gastrointestinal disorders	7	7	6	7	10	4
Hookworm disease			1			1
Malaria	3	2	3		2	2
Measles				1		
Pneumonia	3	2	4	4	4	1
Syphilis					1	
Tuberculosis	2	4	6	4	3	7
Typhoid fever	2		1	1	1	
Whooping cough	1					

VIRGIN ISLANDS

Communicable diseases—September, 1930.—During the month of September, 1930, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases
Gonorrhea	1
Syphilis	21

St. Croix:	Cases
Gonorrhea	2
Syphilis	1

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

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables 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]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930					September, 1930				October, 1930		
						2	9	16	23	30	6	13	20	27	4	11	18
Afghanistan	C				[1] P				P								
China:																	
Amoy	C											1	1				
	D											1	1				
Canton	C		3	2	2												
	D				1												
Shanghai	C									8	4		22	23	5		
	D										1	1	1	2			
Shensi Province	C												P				
Swatow	C		3	7		1			2	1	1						
Tientsin	C								2	1							
India	C	41,462	56,311	37,102	26,121	7,199	11,597	11,998	12,104								
	D	27,906	44,878	25,711	13,822	3,676	6,033	6,845	6,304								
Bassein	C	7	7								1						
	D	5	5														
Bombay	C					3	2	3	6					1	3		
	D					2	1	1	4					1	2		
Calcutta	C	647	609	327	220	18	10	17	18	8	10		9	4	4		
	D	414	372	179	128	7	7	10	6	3	3		6	3	4		
Negapatam	C			1													
	D			1													
Rangoon	C	1	9	6	1	1				1	1						
	D	1	3	4	1	1				1							
India (French):																	
Chandernagor	C	6	6	3	1						1						
	D	5	6	2													
Karikal	C	1		3													
	D	1		3													
India: Portuguese	C							1			1						

Indo-China (see also table below):																	
Pnompenh	C	2	1	40	32	5	3	3						1			
	D		5	18	22	3	2	1									
Saigon and Cholon	C	76	160	48	10	2	2	1						1			
	D	55	101	23	3		1										
Philippine Islands:[2]																	
Ports—																	
Cebu	C			1	65	5	4			1	1						
	D				36	4	4			1	1						
Iliolo	C				29	9	19	32	4	3	4	1	2	1			
	D				22	10	18	19	9	4	5	2	3	2			2
Manila	C		1				1			16	13	10	4	2	1	2	
	D									5	6	1			1		
Provinces—																	
Antique	C					14	3		3	2	25	12	8	12		28	
	D					7	3		2	1	14	12	7	8		10	
Bohol	C						54	54	30	30	14	4	1				
	D						29	32	18	12	6	2					
Bulacan	C			3	4	1				1	2	1			2		
	D			1						1	1				1		
Capiz	C				3	1	1			1							
	D				2	1	1										
Cebu	C		1	355	713	55	26	4		1	16	8					
	D		1	170	303	32	15	3		1	6	4					
Iloilo	C			2	309	143	209	127	92	71	60	61	46	18	7	13	12
	D			1	193	77	143	91	65	45	45	35	26	15	6	7	12
La Union	C				1												
Leyte	C			47	11												
	D			19	11												
Masbate	C			10	92	15	19										
	D			3	35	5	9										
Misamis, Occidental	C				3												
	D				3												
Negros, Occidental	C		10	140	568	151	79	45	68	40	43	24	15	8	10	5	5
	D		7	88	368	97	64	33	43	32	30	20	9	6	5	6	3
Negros, Oriental	C				23	6	2										
	D				13	1	3										
Nueva Acija	C				1												
	D				1												
Pampanga	C			2	2					1							
Pangasinan	C				3	1											
	D				2	1											
Rizal	C			1	1												
	D			1	1												
Samar	C						5	3	10			3	1	4			3
	D						5	3	8			2		4			3
Surigao	C						15	2	11	1				(3)			
	D						9	2	6	2							
Tarlac	C					1											

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.

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

CHOLERA—Continued

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

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930 2	9	16	23	30	September, 1930 6	13	20	27	October, 1930 4	11	18
Siam	C	29	33	27	20	-------	1	1	1	-------	-------	-------	-------	-------	-------	1	-------
	D	13	21	19	9	-------	1	-------	1	-------	-------	-------	-------	-------	-------	-------	-------
Bangkok	C	15	9	12	8	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	1	-------
	D	4	3	5	3	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	1	-------
Nagara Pathom	C	10	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	2	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Songkla	C	-------	-------	-------	10	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	-------	-------	-------	6	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
On vessel:																	
S. S. Malwa from Shanghai	D	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1	-------	-------	-------	-------
S. S. Sassari at Massoua, from Jeddah	C	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
On small boat at Port Cebu, from Bantayan Island	C	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Place		March, 1930	April, 1930	May, 1930	June, 1930 1–10	11–20	21–30	July, 1930 1–10	11–20	21–31	August, 1930 1–10	11–20	21–31	September, 1930 1–10	11–20	21–30
Indo-China (French) (see also table above):																
Annam [1]	C	52	60	23	2	14	-------	-------	-------	1	-------	3	-------	-------	-------	-------
Cambodia [1]	C	81	24	88	56	88	-------	-------	-------	43	37	22	-------	23	13	2
Cochin-China [1]	C	82	48	671	147	126	-------	-------	-------	46	22	5	-------	9	6	18

[1] Reports incomplete.

PLAGUE

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

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930 2	9	16	23	30	September, 1930 6	13	20	27	October, 1930 4	11	18
Algeria:																	
Algiers	C				3		1		6	1	2	6	2	1	1	2	
Constantine	C			1	1												
Oran	C				3	1	1	1	1	1	2	3	4				
Philippeville	C										1			1		1	
Azores: Ponta Delgada	C	8															
	D	5															
Belgian Congo	C				2	1		1		2	3						
	D				2	1		1			3						
British East Africa (see also table below):																	
Tanganyika	C	44															
	D	20															
Uganda	C	117	227	406	228	52	67	62	55	44							
	D	105	195	328	213	50	64	62	53	37							
Canary Islands: Las Palmas	D					1											
Ceylon:																	
Colombo	C	1	6	1	3			1	1	2				1	1		
	D	1	5	1	3			1	1	3				1	1		
Plague-infected rats		4		1													
Chile: Antofagasta	C	1															
	D	1															
China: Manchuria—Tungliau and Nungan	C								30			29	P	2			
Dutch East Indies:																	
Batavia and West Java	C	87	82	98	84	19	30	20	14	13	14						
	D	81	82	98	84	19	30	20	14	12	14						
Plague-infected rats		8	5	4			1				1	1					
Java and Madura	D	173	185	202	217	45	51	47	45	55	54	67					
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	2	13	19	23	2	2	4	3	3	3	2	2	2	1	3	3
	D	2	3	9	10	2	1	3		5	1	2		3	1	1	1
Assiout	C	14	20	9	2												
	D	5	5	3	2												
Beni-Suef	C								1								
Dakahlieh	C	5	11	1													
	D		2														
Gharbieh	C	1				3											
	D	1				1											
Girga	C	1			1					1							
Minieh	C		7	10	3												
	D		1	1													
Port Said	C	1	2	2	1	1											

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

PLAGUE—Continued

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

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930 2	9	16	23	30	September, 1930 6	13	20	27	October, 1930 4	11	18
France:																	
Marseille	C									2	2	1					4
St. Ouen	C				1												
	D				1												
Gambia	C								4								
	D								4								
Greece (see also table below):																	
Patras	C			1	1												
Pyrgos	C														2		
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats				1													
India	C	2,215	648	240	377	145	189	293	250								
	D	1,960	635	187	256	98	84	154	141								
Bassein	C									1		1					
	D									1		2					
Bombay	C	4	6	3	1						1			1			
	D	8	5	2	1						1				1		
Plague-infected rats		108	81	26	52	10	8	9	9	12	9	11	15	21	13		
Madras Presidency	C	44	38	39	47	35	21	7	18		47						
	D	19	11	22	31	13	9	1	11		23						
Rangoon	C	5	4	1	2	2	1			2	1	5	2	2			
	D	4	3	1	2	1	1			2	1	4	2	2			
Plague-infected rats		4	5	1	6	4		2	1	2		2	4		1		
India (Portuguese)	D		7					P									
Indo-China (see also table below):																	
Pnompenh	C	3	3	6	2		2		2	2	1			1	1		
	D	4	1	7	2									1	1	1	
Saigon and Cholon	C		1	2				1			1			1			
	D			1													
Iraq: Baghdad	C	6	37	28	18	4	3	2							1		
	D	2	18	15	7		2	1							1		
Japan: Osaka (vicinity of)—Plague-infected rats		3															
Kwang-Chow-Wan	C	37	34	31	4			1									
Madagascar (see also table below): Tamatave	C	1		1	1	2					1	P			1		
Morocco	C	121	71	3	1		8	7									
	D	45	34	4			1	1									

Nigeria: Lagos	C		2	5	1	2	1	3	1	1	1		1					
	D		2	5	1	2	1	3	1	1	1		1					
Plague-infected rats		7	17	11	18			4	4		4							
Senegal (see table below).																		
Siam	C	5	5			2	3		2	3								
	D	6	4			1	3		2	2								
Bangkok	C		5			1	2											
	D		4				2											
Nagara Pathom	C	10																
	D	9																
Nagara Rajsima	C	1				1			1		1							
	D	1				1			1		1							
Syria: Beirut	C			12	9		1		1	3	2							
Tripolitania	C							2										
Tunisia:																		
Sfax district	C	1	21	9	6		1											
Tunis	C	4	1	1	5													
	D			1	1													
Union of Socialist Soviet Republics:																		
Salsk Region	C			2	5	4		3										
	D			1	4	3		2										
Stavropol Region	C			1														
	D			1														
Union of South Africa:																		
Cape Province	C		P	1	1				1				1					
	D				1			1										
Orange Free State	C	1								1								
	D									1								

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	85	16	171	107	97	87
Ecuador: Guayaquil	C	2	0	0	0		
	D	0	0	0	0		
Plague-infected rats		2	0	0	0		
Greece (see also table above)	C		1		1		
Indo-China (see also table above)	C	27	4		11	1	2
Madagascar (see also table above):							
Ambositra Province	C	25	14	1			
	D	20	12	1			
Antisirabe Province	C	38	46	19	3	8	
	D	36	45	19	3	8	
Itasy Province	C	4					
	D	4					
Miarinarivo Province	C	14	1	5	1	1	
	D	14	1	5	1	1	

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
Madagascar (see also table above)—con.							
Moramanga Province	C	5	3	1	3		
	D	5	3		3		
Tananarive Province	C	52	39	15	16	11	
	D	52	38	14	16	11	
Senegal:							
Baol [1]	C	18	24	13	2	62	79
	D	8	12	11	2	48	20
Dakar [1]	C		2	52	53	140	108
	D		2	42	117	122	90
Louga [1]	C		33	54	60	138	75
	D		10	27	21	103	33
Thies [1]	C	3	12	21	52	54	34
	D	2	9	8	35	30	20
Tivaouane [1]	C	11	71	135	43	119	110
	D	8	38	69	28	70	54

[1] Incomplete reports.

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

SMALLPOX

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

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930 5	12	19	26	August, 1930 2	9	16	23	30	September, 1930 6	13	20	27	Oct. 4, 1930
Algeria:																			
Algiers	C	5	1	3			1				1		2						
Constantine	C				1			1											
Oran	C	1																	
Arabia: Aden	C	3	1			1													
Bolivia: La Paz.[1]																			
British East Africa (see also table below):																			
Tanganyika	C	103	57	409	1,610	64	4		100	26	51	44	121	198	288				
	D	7	14	70	301	13	2		27	4		3	30	4	55				
British South Africa:																			
Northern Rhodesia	C	9	1	59															
	D		2	9															
Southern Rhodesia	C		66	155	79	1	12	18					1	1					
	D		1	13															
Canada:																			
Alberta	C	10	4				2	1	2	1							1		13
Edmonton	C	4	3																
British Columbia—Vancouver	C	20	17	4	2	2	2	1	1	1	1	2	2			1	1	1	
Manitoba	C	4	4	10	4									1					
Ontario	C	100	77	82	47	3	5	6	10	8	3	5	4	2	2	6		1	
North Bay	C			1															
Ottawa	C	19	21	25	15	1	1	4	7	5	1	1		2	1	2			
Toronto	C			4	4		1									1			
Quebec	C				4	3					2	2	1						
Montreal	C									7									
Saskatchewan	C	47	41	39	22		2		3				8			1			3
Regina	C			4															
Ceylon: Angoda, Western Province	C		6																
	D		2																
China:																			
Canton	C	6	3																
	D	2	3																
Changking	C		P	P	1	P	P	P	P	P		P	P	P	P	P	P		
Foochow	C		P	P	P		P		P		P		P						
Hong Kong	C	38	18	12	4		2												
	D	25	23	9	3		1												

Manchuria—																			
Harbin	C		1	20	4				3			2							
Kwantung—Dairen	C		2	8	16	8													
	D			4	1														
Nanking	C	P	P	P	P		P	P	P	P	P	P	P	P	P	P			
Shanghai—																			
Foreigners only	C	2	3	2	5	1	1	1	1	3						18			
Including natives	D	10	10	5	3											2			
Swatow	D	6	3	6	4	1				1		2	1	1	1			1	
Tientsin	C	2	2	1															
Chosen (see table below).																			
Colombia:																			
Barranquilla	C	2	1							2									
Buenaventura	C		15	4	6	4	3	2	1		1	1							
Costa Rica:																			
Port Limon	C		6	2	2														
San Jose [1]	C	10	7	2															
Curacao (alastrim)	C	14	2	2	1	2						1							
Dutch East Indies:																			
Borneo	C	185	90	16	12		2												
	D	12	31	1	1														
Java—																			
Batavia and West Java	C	78	64	12	13	3	1	3	1	1	4	5	2	2		2	1		
	D	6	11	7	3	2	1	1	1	1	1	1	2	2		1			
East Java and Madura	C		4					1											
Sanggi Islands	C	5	160	26				11		36				14					
	D	1	24	5				3		2				3					
Sumatra	C	48																	
	D	5																	
Egypt: Port Said	C		1	1			2		1										
France (see table below).																			
Great Britain:																			
England and Wales	C	1,700	1,427	1,417	926	156	138	126	109	70	86	95	93	99	106	75	61	82	74
Ashton under Lyne	C	15	18	17	7		4	2	2					1					
Bradford	C		3	2		1													1
Cardiff	C	2	3			2													
Leeds	C	16	2			1													
London	C	710	602	637	498	84	52	62	48	36	50	41	51	43	44	36	41	30	34
London and Great Towns	C	1,239	1,066	1,078	753	127	96	102	83	61	73	71	80	79	84	51	54	55	56
	D	3	3																
Sheffield	C	8	2																
Stoke-on-Trent	C	122	85	62	32	3	2	1	3	1	1					1	1		
Scotland	C				4		1								5				
	D						1												
Honduras: Naco	C															5			
India	C	39,329	34,843	22,835	12,962	2,258	2,006	1,853	1,513	11,313	1,282	1,236	1,046						
	D	9,109	6,983	5,451	3,531	733	580	577	458	368	327	290	261						
Bombay	C	718	430	218	113	17	15	11	7	6	2	2	2	2	1	1			
	D	431	270	161	79	13	9	9	2	5	2	1	2	2	1	2			

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

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

SMALLPOX—Continued

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

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930 5	12	19	26	August, 1930 2	9	16	23	30	September, 1930 6	13	20	27	Oct. 4, 1930
India—Continued.																			
Calcutta	C	361	495	302	161	27	19	13	14	4	------	12	9	4	5	3	2	3	4
	D	305	403	258	146	17	17	12	10	4	------	8	9	3	4	1	1	3	4
Cochin	C	291	183	37	16	------	------	4	2	2	4	4	4	1	1	------	1	------	------
	D	35	13	8	4	------	------	------	------	------	------	------	------	1	------	------	------	------	------
Karachi	C	33	30	14	7	------	------	------	1	2	------	2	------	------	------	1	3	------	------
	D	47	17	4	3	------	------	------	------	2	------	1	------	------	------	------	2	------	------
Madras	C	173	133	72	35	6	10	17	16	19	------	9	10	9	11	6	8	4	------
	D	36	27	15	10	4	1	3	4	3	------	5	3	1	1	1	3	1	------
Moulmein	C	146	43	89	21	4	10	3	1	------	------	------	2	1	------	------	------	------	------
	D	41	7	21	7	3	4	1	2	------	------	------	1	------	------	1	------	------	------
Negapatam	C	------	------	1	2	------	------	------	------	2	------	2	------	1	2	------	6	4	2
Rangoon	C	10	4	6	9	2	1	1	------	1	1	1	------	------	------	------	------	------	------
	D	5	------	1	2	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Tuticorin	C	------	------	5	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Vizagapatam	C	69	6	5	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	18	2	3	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
India (French):																			
Chandernagor	C	6	10	24	19	3	1	4	------	------	------	------	------	------	------	1	2	------	------
	D	2	2	7	3	1	1	1	------	------	------	------	------	------	1	1	------	------	------
Karikal	C	24	19	12	11	1	------	1	------	------	8	------	1	------	5	------	------	1	------
	D	7	8	3	8	1	------	1	------	------	8	------	1	------	2	------	------	1	------
Pondicherry Province	C	21	24	40	23	4	9	8	5	7	8	------	7	11	7	7	10	11	------
	D	13	20	36	23	3	9	8	5	7	8	------	7	11	7	7	8	11	------
India (Portuguese)	C	38	44	47	28	1	------	------	------	1	6	1	1	1	2	------	------	------	------
	D	2	8	8	10	------	------	------	1	1	------	------	1	------	------	------	------	------	------
Indo-China (see also table below):																			
Pnompenh	C	------	------	3	------	------	------	1	------	------	------	------	------	------	------	------	------	------	------
	D	------	2	------	1	------	------	1	------	------	------	1	------	------	------	------	------	------	------
Saigon and Cholon	C	3	5	3	1	------	------	------	------	------	1	------	1	------	------	------	------	------	------
	D	1	5	2	------	------	------	------	------	1	1	1	------	1	------	------	------	------	------
Iraq:																			
Baghdad	C	------	8	1	1	1	1	1	------	------	------	1	------	------	------	------	------	------	------
	D	------	1	1	------	------	------	1	------	------	------	1	------	------	------	------	------	------	------
Basra	C	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

Mossoul Liwa	C		22	21	4	47	20												68		
	D		3	3	1	19	1												27		
Ivory Coast (see table below).																					
Jamaica (alastrim)	C			2																	
Japan: Tokyo	C		1																		
	D		1																		
Macao	D	3	2	1																	
Mexico (see also table below):																					
Jalisco (State) Guadalajara	D	22	20	7	15	3	1				1										
Juarez	C	2			6						2										
	D				1						1								1		
Mexico City and surrounding territory	C	106	99	80	77	10	12	4	11	2	3	3	2	7	2	1	2				
	D	31	47	32	17	2	3	1	2	1	3	2		1	1	1	2				
Progreso	C			1																	
	D			1	1																
Morocco (see table below).																					
Nigeria: Lagos	C	1	1		1																
Poland	C		7	3	2																
Portugal:																					
Lisbon	C	7	8	8	10		7		6		6	19	25	7	8		13	4	5		
Oporto	C												1								
Rumania	C	2																			
Siam	C		8	2		2		4													
	D		4					3													
Somaliland, British: Boales	C	2																			
	D	6																			1
Spain	C				12		1	1	3	2					4	1					
Straits Settlements	C	5	5	11	9	1	2	7	1	1	1	1	5	1	2	3	1	1	1		
	D	1	2	3	2	1	1	1				1	1		1						
Sudan (Anglo-Egyptian)	C	60	42	19	67	8	1		3				42	102	5	20	1	25	1		
	D	5	4	2	3		1						3	50	2			2			
Sudan (French) (see table below).																					
Switzerland: Berne Canton	C								1	1	1							1			
Syria (see table below).																					
Taiwan: Taihoku (see table below).																					
Tunisia: Tunis	C	3	4	2	2				1								2				
Turkey (see table below).																					
Union of South Africa:																					
Cape Province	C	P	P	P					P												
Orange Free State	C	P						P	P	P											
Transvaal	C	P									P	P	P	P	P						
Upper Volta	C	2	3	1	13																
Zanzibar	C	13																			
On vessel:																					
S. S. Elysia, at Port Sudan, from Bombay	C		1																		
S. S. Naldera, at Port Said	C			1																	
S. S. Manoa, from Honolulu to San Francisco	C					1															

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

SMALLPOX—Continued

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

Place		March, 1930	April, 1930	May, 1930	June, 1930			July, 1930			August, 1930			September, 1930	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	26	261	305	80	133	----	----	----	238	59	34	----	54	52
Ivory Coast	C	7	----	----	----	----	----	----	----	----	----	----	----	----	----
Sudan (French)	C	609	521	274	76	----	----	----	34	----	----	----	39	----	P
	D	49	36	32	18	----	----	----	----	----	----	----	3	----	----
Syria: Beirut	C	17	19	7	6	1	----	----	----	2	1	----	----	----	----
Taiwan: Taihoku	C	58	12	----	----	----	----	----	----	----	----	----	----	----	----

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	175	174	171	142	186	----
Uganda	C	----	----	78	----	----	----
	D	----	----	69	----	----	----
Chosen	C	236	253	107	----	3	----
	D	53	53	35	----	----	----
Seishin	C	----	5	2	1	2	----
	D	----	1	1	----	----	----

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
France	C	8	58	51	----	----	----
Mexico: Durango (see also table above)	D	5	4	4	3	3	3
Morocco	C	17	10	18	5	3	----
Turkey	C	----	3	16	----	----	----

TYPHUS FEVER

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

Place		Apr. 6-May 3, 1930	May 4-31, 1930	June 1-28, 1930	Week ended—													
					July, 1930				August, 1930					September, 1930				October, 1930	
					5	12	19	26	2	9	16	23	30	6	13	20	27	4	11
Algeria:																			
Algiers	C	8	15	3	----	1	2	3	----	----	----	2	----	3	----	----	----	----	----
Constantine Department	C	15	6	12	----	1	1	----	----	----	----	3	----	----	----	----	----	----	2
Oran	C	----	3	4	----	2	1	----	----	1	----	----	1	----	----	----	----	----	----

Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C		1																
Bulgaria	C	15	6	16		4	5	1		1					2	2		2		
	D	1	2	1			1													
China:																				
Manchuria—Harbin (see also table below)	C	52	13	8	2				2				2							
Shanghai	C									1										
Chosen (see table below).																				
Czechoslovakia (see table below).																				
Egypt:																				
Alexandria	C	1		1	1						1			1	1		1			
Beheira Province	C	2	49	45		5	1	9								1				
	D		13	4		1		1												
Cairo	C								2			5			1					
Port Said	C											4		1				1		
Great Britain: Scotland—																				
Dunfermline	C					1														
Glasgow	C		1																	
	D		1																	
Greece (see table below).																				
Ireland:																				
Irish Free State—																				
Galway County—Oughterard	C							2												
Kerry County—Dingle	C	5																		
Leitrim County—Mohill	C			9				1												
Mayo County—																				
Ballina	C		2	1		1														
Castlebar	C											1								
Swinford	C		14																	
Westport	C						2		1											
Roscommon County—																				
Roscommon	C						1													
Strokestown	C						1													
Wicklow County—Shillelagh	C			4	1		1													
Latvia (see table below).																				
Lithuania (see table below).																				
Mexico:																				
Durango	D															1	1			1
Mexico City, including municipalities in Federal District	C	4	6	9	2		2	1	2	2	2	3	2	2	3					
	D	4	3	1					1	1				1	1					
Morocco	C	15	11	15		4	3	4				8		2						
	D	3																		
Palestine	C	1	2	2	3	1	1	1		1	1	1		1	1	1		1		1
Poland	C	243	171	117		24		12	10	15	2	7	2	3	6	12	3	6		
	D	15	5	11		4			1		1	1		1			1			
Portugal:																				
Lisbon	C	4																		
Oporto	C	1									1							1		1
Rumania	C	186	227	58	11	10	3	4	5		2	2	1							
	D	11	35	5	5	2	1		2											

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

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

TYPHUS FEVER—Continued

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

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930				August, 1930					September, 1930				October, 1930	
					5	12	19	26	2	9	16	23	30	6	13	20	27	4	11
Spain: Valencia	C			3		3									1				
	D					1									1				
Tunisia	C		6	18			14	10	2	5		3	1	1		4	1	1	1
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P					
Natal	C	P	P	P	P	P	P	1	P	P	P								
Orange Free State	C		P	P	P	P	P	P	P	P	P	P	P						
Transvaal	C	P					P		P	P	P		P						
Yugoslavia (see table below).																			

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
China: Harbin (see also table above)	C	37	204	240		14	5
Chosen: Seoul	C		3	43	2	3	2
Czechoslovakia	C	42	29	12	1		1
Greece: Athens	C	3	1	3	3	6	6
Latvia	C			3	3	3	
Lithuania	C	62	73	27	16	18	
	D	4	4				
Turkey	C	1	3	16	2		2
Yugoslavia	C	46	22	16	6		
	D	2	4	1			

YELLOW FEVER

Brazil:	Cases
Mage, on the Leopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2

Gold Coast:	Cases
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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