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RELATION OF OXIDATION TO PROTEOLYSIS IN MALIGNANT TUMORS

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The primary object of this investigation is the study *in vitro* of the proteolytic mechanism of cancer tissue under conditions approaching as closely as possible those obtaining in living animals. It is obvious that results obtained under such conditions are of considerable significance for the understanding of the characteristic biochemical and biological behavior of malignant growth.

Our work with tumors has led to certain observations which seem to throw an entirely new light on tissue proteolysis and has forced us to initiate research of a more general nature, the results of which are also included in this paper.

Besides temperature and enzyme concentration, the most important and generally recognized factor governing the action of proteolytic enzymes is the hydrogen ion concentration of any enzyme system under investigation. Without proper pH control, results have very little meaning. As far as tissue proteolysis is concerned, it would seem, therefore, that results of greatest significance could be obtained by carrying out the proteolysis within the range of the pH characteristic of the tissue in the living animal. There are, however, no published methods which will permit us to estimate with any degree of accuracy the pH of living tissues *in situ*, and pH measurements on excised tissues are obviously subject to grave error. For the work on the malignant tumors used in this research we did rely on pH estimations made recently in this laboratory by Dr. H. Kahler and one of the writers (V.). The results were obtained in the living animal by means of the glass electrode. This method will be described in the near future.

A second and hitherto unrecognized factor in tissue proteolysis, as will be shown by the following experimental evidence, is the oxygen tension under which the proteolysis is carried out. Here also, as in the case of pH, information pertaining to the true oxygen tension in living tissues *in situ* is very inadequate, due to lack of suitable methods. It can safely be stated, however, that the tissue oxygen tension is far below that of atmospheric air. This is shown by the work of

Campbell (1924), who, by injecting nitrogen into the subcutaneous tissue or the peritoneal cavity of living animals, found an oxygen tension, after equilibrium was reached, of 20 to 30 millimeters under the skin and 30 to 40 millimeters in the abdominal cavity. These are figures which approximate the oxygen tension of venous blood. We believe, however, that the oxygen tension in certain tissue areas which are somewhat removed from the blood capillaries may be considerably lower. In this case due consideration must be given to the fact that the oxygen carried by the blood to the tissues must diffuse through the capillary wall and several cell layers. These cells undoubtedly utilize part of the diffusing oxygen, as would be expected from the high reducing power of tissues (Voegtlin, Johnson, and Dyer, 1924). It would seem, therefore, of considerable interest to study the influence of variations in oxygen tension on tissue proteolysis and to work particularly with oxygen tensions within the physiological range. As far as we are aware the experiments to be reported are the first along this line.

I. AUTOLYSIS OF MALIGNANT TUMORS

Two standard transplantable rat tumors were employed. The Jensen rat sarcoma was originally received through the kindness of Dr. Carl F. Cori, of the New York State Institute for the Study of Malignant Disease, and was propagated in a strain of albino rats received from the same source. In these rats tumor transplantation is successful in a high percentage of the animals, and the tumors grow to considerable size. Histological examination by Passed Asst. Surg. R. D. Lillie, of the division of pathology and bacteriology of the National Institute of Health, shows that this tumor is composed almost completely of malignant cells. Lillie states:

> A richly cellular tumor composed of fusiform and spindle cells presenting moderately hyperchromatic and leptochromatic nuclei, which often exhibit mitoses. The stroma consists of fine and coarse intercellular fibrils. Multiple areas of necrosis, without inflammatory reaction or demonstrable bacteria, are present. The adjacent skeletal muscle is freely invaded and the inclosed muscle fibers are compressed and distorted.

The Walker rat carcinoma 256 was obtained through the courtesy of Dr. George Walker. This tumor originated March 26, 1928, in the breast of a female albino rat. It was received in October, 1930, after having gone through 51 transplantations. We have propagated this tumor by subcutaneous inoculations in the inbred rat strain of the Wistar Institute, in which strain it uniformly gives almost 100 per cent of takes and the tumors very rarely regress. If the tumor-bearing animals are kept until they die, metastases are found in a considerable number of the animals. The histological report on this tumor by Passed Asst. Surg. Lillie follows:

A richly cellular, lobulated tumor, composed of large polygonal epithelial cells having no definite alveolar arrangement and trabeculated by fine and coarse septa of fibrous tissue. The epithelial cells have a comparatively large rim of finely granular acidophilic cytoplasm, large markedly hyperchromatic nuclei, distinct deeply staining nucleoli and frequently exhibit mitoses in various stages. There are multiple areas exhibiting various degrees of necrosis. Bacteria are not demonstrable. One section shows the tumor invading the skeletal muscles with replacement and atrophy of the muscle fibers.

These two transplantable tumors, especially the sarcoma, offer a good opportunity for the study of the proteolysis of cancer tissue, for the reason that they contain only a negligible amount of normal cells and stroma. We are indebted to Associate Pharmacologist J. W. Thompson, of this laboratory, for the supply of tumor animals.

Sufficient fresh tumor tissue was obtained for each experiment by decapitating a few tumor rats and dissecting out the tumors, discarding stroma and macroscopically necrotic appearing tumor tissue. A weighed amount of this tumor material was ground to a pulpy mass in a mortar with pure quartz sand. To this pulp was added about an equal volume of glass-distilled water, and grinding was completed. The material was then filtered through cotton cloth in order to remove any coarse particles and sand. Half a cubic centimeter of this *freshly prepared* tumor extract was placed in each of a series of carefully cleaned pyrex Erlenmeyer flasks of 25-c. c. capacity. There was added then to each flask 2 c. c. of buffer solution prepared from pure chemicals according to McIlvaine (1921). The pH of the digestion mixture was adjusted colorimetrically before and checked after each experiment. As will be noted later, the action of special chemicals ($CuSO_4$ and H_2O_2) was also studied on the autolysis. Sufficient toluene was added to each flask to prevent bacterial growth, and the flasks were stoppered with cotton plugs. Half of the flasks were placed in an incubator at 37° C. in contact with atmospheric air; the other flasks were placed in a large vacuum desiccator which was evacuated by means of a high vacuum pump (Cenco type). Evacuation was carried out for 15 to 30 minutes at room temperature (about 25° C.), and the pressure was measured by a mercury manometer at the beginning and end of the digestion period. The pressures indicated on the graphs refer to those at the end of digestion. The desiccator was then placed in an incubator at 37° C. for 18 to 20 hours.

The degree of proteolysis was estimated by Sörensen's formol-titration method, phenol-phthalein being used as indicator. Duplicate samples were titrated and the values were averaged. The amino nitrogen of the undigested control samples was estimated by the same method and the final values were expressed as increase in amino nitrogen above that of the undigested controls.

The results of these experiments are illustrated by the activity–pH curves in Charts 1 and 2. The optimum of proteolysis under atmos-

pheric as well as reduced oxygen tension lies between pH 4 and pH 6. There will be noted a strikingly greater degree of proteolysis in the samples exposed to a reduced oxygen pressure. As the pH is increased above 6, the degree of proteolysis rapidly decreases and reaches a very low level between pH 7 and pH 8. It furthermore is significant that the two curves representing high and low oxygen tensions approach each other with increasing pH. From these curves we may conclude that proteolysis of the proteins of these two malignant tumors is near the minimum in the pH range characteristic of these tumors *in vivo*,

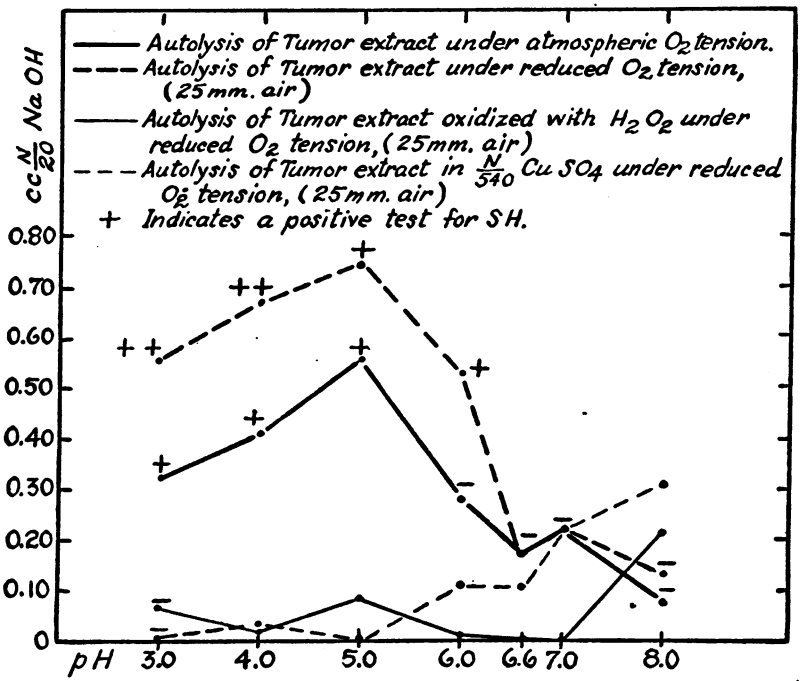

CHART 1.—The autolysis of Walker carcinoma. The digestion mixtures contained 0.5 c. c. of a water extract of tumor and 2 c. c. of buffer. The tumor extract was oxidized by adding 4 c. c. of perhydrol to 30 c. c. of tumor extract. The addition of 0.2 c. c. of N/40 $CuSO_4$ to each flask caused a marked inhibition of proteolysis. The curves represent the net increases in amino N, as determined by the formol titration with N/20 NaOH, after 18 hours at 37° C. at different hydrogen ion concentrations

i. e., pH 6.6 to 6.8, and in the approximate oxygen tension range of mammalian tissues *in situ*.

Is this low degree of proteolysis in the physiological pH and oxygen tension range due to the absence of a proteolytic enzyme acting under these conditions or to the absence of a suitable substrate? In order to test the latter possibility, blood fibrin was added to the Jensen tumor extract; for it was observed that the Walker carcinoma in most experiments showed slightly higher values under the above conditions than the Jensen tumor, and microscopical study showed that the

former tumor contains more fibrous tissue than the latter. The isoelectric point of blood fibrin is at about pH 7. The fibrin was purchased from Merck & Co. It was thoroughly powdered in a ball mill, suspended in distilled water plus some toluene, and ground again in the ball mill until an even suspension was obtained. The proteolysis of the Jensen sarcoma in the presence of added fibrin is illustrated by Chart 3. The graph shows that this tumor contains a proteolytic enzyme which can digest fibrin at about pH 7. There is another pH optimum at about pH 5 under reduced oxygen tension. It is also

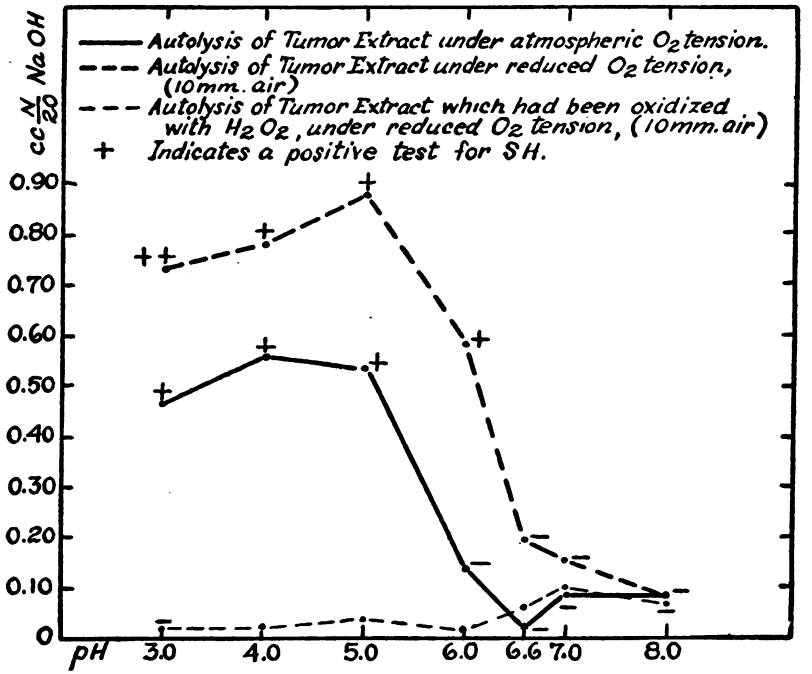

CHART 2.—The autolysis of Jensen sarcoma. The digestion mixtures contained 0.5 c. c. of water extract of tumor and 2 c. c. of buffer. The tumor extract was oxidized by adding 4 c. c. of perhydrol to 30 c. c. of tumor extract

significant that the latter optimum is at a much higher level than that at pH 7.

In view of the recently established interesting function of reduced glutathione as an activator of proteolytic enzymes of the cathepsin type (Grassmann, Dyckerhoff, and v. Schoenebeck, 1929; Waldschmidt-Leitz, Purr, and Balls, 1930) it appeared possible that the sulphydryl compounds occurring in these tumors may play a governing rôle in these autolysis experiments. Unpublished data by Dr. J. M. Johnson and one of us (V.) show that these tumors contain considerable quantities of reduced and practically no oxidized glutathione. They also contain in considerable amounts SH groups at-

tached to protein, as judged from the strongly positive nitroprusside test of fresh tumor material from which the glutathione has been removed by repeated washing with distilled water.

In a recent paper (Voegtlin, Johnson, and Rosenthal, 1931) it was shown that the oxidation of reduced glutathione is powerfully catalyzed by minute quantities of copper, which occurs in practically all tissues in greater or lesser amounts. This catalysis proceeds very

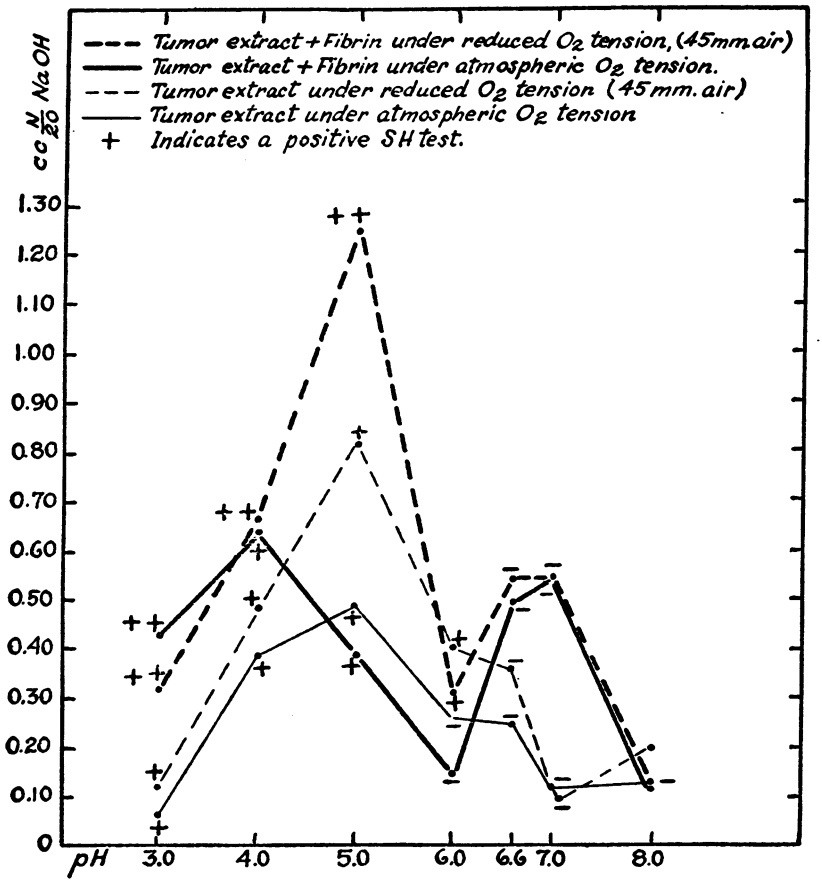

CHART 3.—The proteolysis of fibrin by Jensen sarcoma. The digestion mixtures contained 0.5 c. c. of a water extract of tumor and 2 c. c. of buffer. The addition of 0.5 c. c. of a 10 per cent suspension of blood fibrin caused a marked increase of proteolysis at pH 6.6–7.0 and at pH 5.0

rapidly within the physiological pH range in the presence of oxygen, but in strongly acid solutions the copper-glutathione complex is quite stable. Furthermore, it is known that the reduced glutathione in tissue extracts, on standing in contact with oxygen, is gradually oxidized (Hopkins and Elliott, 1931). These considerations made it desirable to test the tumor digests before and after incubation by means of the nitroprusside test for the presence or persistence of sub-

stances containing SH groups. Before incubation the fresh material always showed a fairly strong test, irrespective of the pH of the buffer used. After digestion the test was strongly positive in the aerobic set at pH 3, and the intensity of the test decreased with increasing pH and became negative at pH 6 and above. The same relation between pH and nitroprusside test was found in the samples digested under greatly reduced oxygen tension, except that the test was stronger in the acid range and positive tests were obtained at a higher pH than with the aerobic samples. The intensity of these tests is indicated in Charts 1 and 2 by + and − signs. There appears to be, therefore, a relation between the presence and persistence of sulphydryl compounds, the oxygen tension and pH under which the proteolysis proceeds, and the degree of proteolysis. Conditions which favor the persistence of SH groups—i. e., a relatively high hydrogen ion concentration and low oxygen tension—are favorable for proteolysis. Further evidence supporting this conclusion is the fact that, when the SH groups of the tumor extract are oxidized by running a current of air through it until the nitroprusside test becomes negative, the tumor material exhibits practically no proteolysis over the pH range from 3 to 8 under atmospheric or reduced oxygen pressure. Similarly, if the SH groups of the extract are oxidized by H_2O_2 before the samples are set up, no appreciable proteolysis occurs. (See Charts 1 and 2.)

The addition of copper sulphate has the same effect.

So far the results do show clearly that in the autolysis of tumors SH groups play a considerable rôle. They indicate that not only reduced glutathione but also SH groups attached to proteins favor proteolysis. In view of the prevalence of these protein sulphydryl groups in practically all tissues, it seemed of great importance to establish their function in proteolysis beyond doubt. The following experimental evidence will serve this purpose.

II. THE ACTION OF PAPAIN

A. Digestion of coagulated egg white.—The important researches of Willstätter and his school have revealed a fairly close parallelism between the action of certain proteases of animal tissues (cathepsin) and their analogue in plants—i. e., papain. In the case of papain it has been known for many years that the presence of HCN or H_2S greatly increases proteolysis. A similar action is exerted by cysteine and reduced glutathione, whereas the corresponding disulphides are inactive (Grassmann, Dyckerhoff, and v. Schoenebeck, 1929).

For the following experiments commercial papain (Merck) was employed. This material was purified in the following way:

Twenty-five grams of the commercial enzyme were treated with 1,700 c. c. of N/30 disodiumcitrate (pH 5) and allowed to digest three days at 37° C. in the presence of 120 mg. SH glutathione, toluene

being added to prevent bacterial growth. The glutathione was added in order to activate the enzyme, so that it would digest as much as possible of the protein of the commercial product. A brownish solution containing only a very small amount of solid particles was thus obtained. After filtration, the filtrate was concentrated in a vacuum desiccator. The enzyme was then precipitated by the addition of 10 volumes of 95 per cent alcohol. The white precipitate was separated by centrifugation and filtration and was thoroughly dried *in vacuo*. This method is a modification of that used by Willstätter and Grassmann (1924).

The substrate selected for the determination of the function of protein sulphydryl groups was egg white from fresh eggs. It has been shown by Heffter (1907), Harris (1923), and Abderhalden and Wertheimer (1923) that the native proteins of egg white do not give a positive nitroprusside test for SH groups. If, however, the egg white is quickly coagulated by heating to about 90° C., then the denatured proteins give a strong nitroprusside test. The intensity of the test depends to some extent on the length of heating. We have tested the protein filtrate obtained by treating fresh or coagulated egg white with 10 per cent trichloracetic acid for the presence of substances containing SH or S–S groups with negative results. This clearly shows that the SH groups of coagulated egg white must be part of the protein molecule and that they are formed as a result of a change in the chemical constitution of these proteins produced by heat. Once formed, these protein sulphydryl groups, which will be designated henceforth as PSH, under suitable conditions are subject to oxidation. We have employed three different methods for this purpose. First, H_2O_2 added to coagulated egg white readily oxidizes the PSH groups. Second, the addition of $CuSO_4$ to coagulated egg white also causes an oxidation of the PSH groups. Third, aeration of the coagulated egg white at 37° C. for several hours leads to the oxidation of the PSH groups. On chemical grounds this last method is probably the mildest and the least objectionable treatment.

On the basis of these considerations it is possible to determine (*a*) the influence of atmospheric or reduced oxygen tensions on the action of papain on freshly coagulated egg white containing PSH groups, and (*b*) the action of papain on coagulated egg white whose PSH groups have been oxidized by air, H_2O_2, or $CuSO_4$.

The coagulated egg white was prepared by diluting fresh egg white with two volumes of 0.8 per cent NaCl solution with vigorous stirring. The solution was then placed in a beaker on a water bath. The material was then stirred vigorously by a mechanical stirring device and was rapidly brought to about 90° C. As soon as samples of the coagulated material yielded a deep purple nitroprusside test, the beaker and its contents were rapidly cooled and the coarser particles

removed by filtration through a coarse cotton cloth. The resulting suspension was either used immediately for a digestion experiment or it was first treated by air in the manner indicated above. Digestion was carried out at 37° C., and the same buffer solutions were used for adjusting the pH as in the tumor experiments.

The results are illustrated by Chart 4. The + or − signs on the curves indicate the presence or absence of PSH groups at the end of the digestion period.

The following conclusions may be drawn from this evidence. Chart 4 shows that there is considerable digestion of freshly coagulated

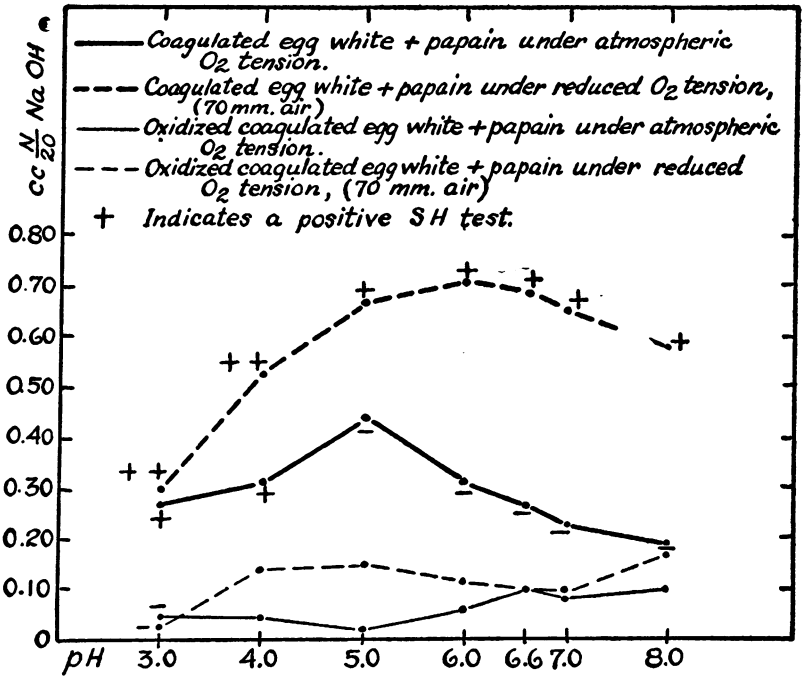

CHART 4.—The proteolysis of coagulated egg white by papain. The digestion mixtures contained 1 c. c. of coagulated egg white+4.8 mg. papain in 0.5 c. c. H_2O+2 c. c. buffer. The coagulated egg white was oxidized by exposure to air at 37° C. for 20 hours or until the nitroprusside test for sulphydryl was negative

egg white by papain, under atmospheric O_2 tension. This confirms the results of other workers. (See literature: Willstätter, Grassmann, and Ambros, 1926.) The new finding is that digestion is strikingly increased if the O_2 tension is lowered. The two lower curves in Chart 4 indicate that only a slight proteolysis occurs if the egg white, after coagulation, is treated with air until the nitroprusside test becomes negative, and this oxidized material is tested with papain under identical conditions. Hence, it is obvious that there exists a definite relation between the degree of proteolysis and the presence of PSH groups. Under reduced O_2 tension these groups are

still present in the freshly coagulated egg white at the end of digestion. As in the tumor experiments, there is again a tendency for diminution of PSH concentration with increasing pH under reduced and even more so under atmospheric O_2 tension. Moreover, experiments, which will not be described here, indicate that if the egg white is coagulated, but not exposed for a sufficiently long time to the high temperature, the nitroprusside test is less pronounced and the degree of proteolysis is correspondingly lower. Treatment of coagulated egg white with H_2O_2, which oxidizes the PSH groups, also almost completely abolishes proteolysis. The same inhibition of proteolysis is also observed when $CuSO_4$ is added to the digestion mixture containing freshly prepared coagulated egg white. We have confirmed the observation of previous workers that uncoagulated egg white is very little digested by papain. It will be remembered that fresh uncoagulated egg white does not contain SH groups.

Without going into a further discussion of these results, it may be said that these experiments furnish clear evidence that the oxygen tension and pH are regulating factors in the digestion of coagulated egg white, which contains PSH groups.

B. Digestion of fibrin and gelatin in the presence of glutathione.—The preceding experiments dealt with the influence of O_2 tension and pH on the proteolysis of a system containing protein SH groups. In the following experiments the influence of O_2 tension and pH was studied on systems containing SH groups in the form of reduced glutathione. As previously stated, it has been found by Waldschmidt-Leitz (1930) and Grassmann (1929) that reduced glutathione promotes the action of papain and cathepsin. Oxidized glutathione, according to Grassmann (1929), is inactive. The activating property of glutathione in proteolysis is therefore due to the SH groups.

The crystalline reduced glutathione was prepared according to Hopkins (1929) by Dr. J. M. Johnson of this laboratory. We are also indebted to him for the iodometric estimations of glutathione referred to later on. The same kind of papain was used as in the preceding experiments. Merck's blood fibrin and commercial gelatin were used as substrates. The technique in other respects was unchanged.

The results are illustrated by Charts 5 and 6. The evidence is clear in showing that, generally, proteolysis in the presence of reduced glutathione is very much greater under reduced than under atmospheric O_2 tension. The figures for the reduced glutathione remaining at the end of the digestion period are given in the upper part of Chart 5. These figures and others from additional experiments indicate that the small amount of added reduced glutathione (1.5 mg.) is completely oxidized at the end of digestion in the higher pH range, whereas with increasing acidity there is still some reduced material left. The digests exposed to a reduced O_2 tension show essentially the same relation-

ship to the pH, except that the SH values are considerably higher in the lower pH range.

DISCUSSION

The hydrolysis of proteins, whether brought about by means of strong acids, alkalies, or enzymes, is considered to consist essentially

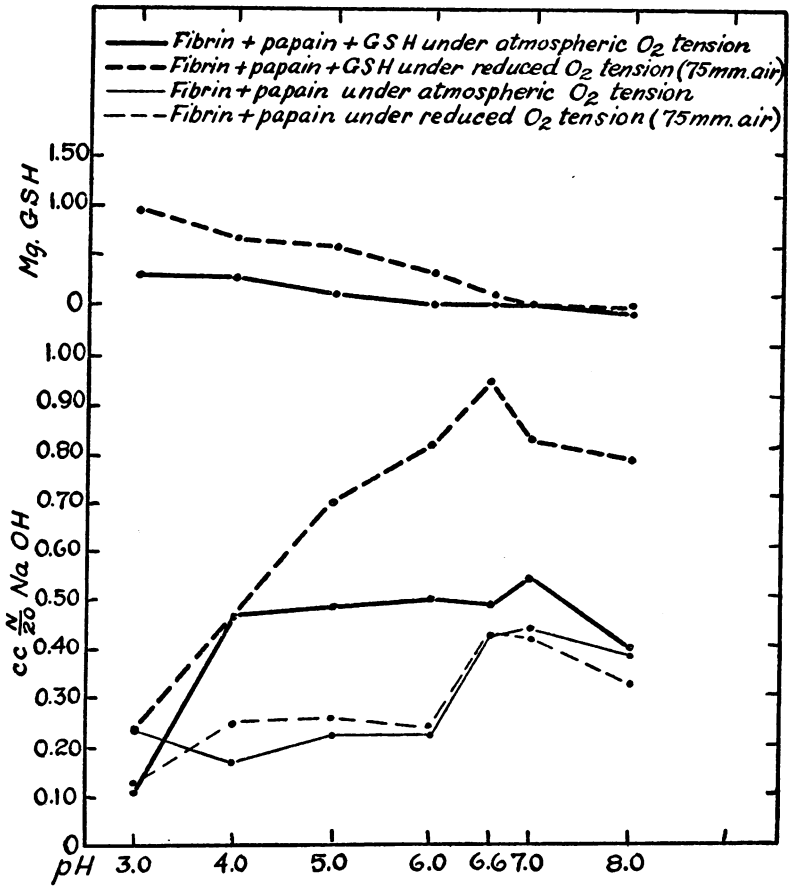

CHART 5.—The proteolysis of fibrin by papain plus glutathione. The digestion mixtures contained 1 c. c. of a 10 per cent suspension of fibrin and 4.8 mg. papain contained in 0.5 c. c. H_2O+2 c. c. buffer. The addition of 1.5 mg. reduced glutathione to each flask caused a marked increase in proteolysis under conditions of reduced O_2 tension. The upper curves demonstrate the greater stability of the glutathione in these digestion mixtures under reduced O_2 tension, 18 hours at 37° C. Correction was made for the original amino N titration of the added glutathione

in the cleavage of peptide linkages with the addition of the components of water, thus,

$$R\cdot CO-NH\cdot R+H_2O=R\cdot COOH+R\cdot NH_2.$$

Strictly speaking, this reaction is a true hydrolysis and is not connected with oxidation-reduction processes. The degradation of the

proteins in tissues is brought about by catalysts, i. e., the proteolytic enzymes. The latter can be separated more or less from the other chemical tissue components and their proteolytic activity on proteins can be studied *in vitro*. Results obtained in this manner are of great scientific interest, but it is obvious that they are only of restricted value for an understanding of proteolysis as it occurs in the living

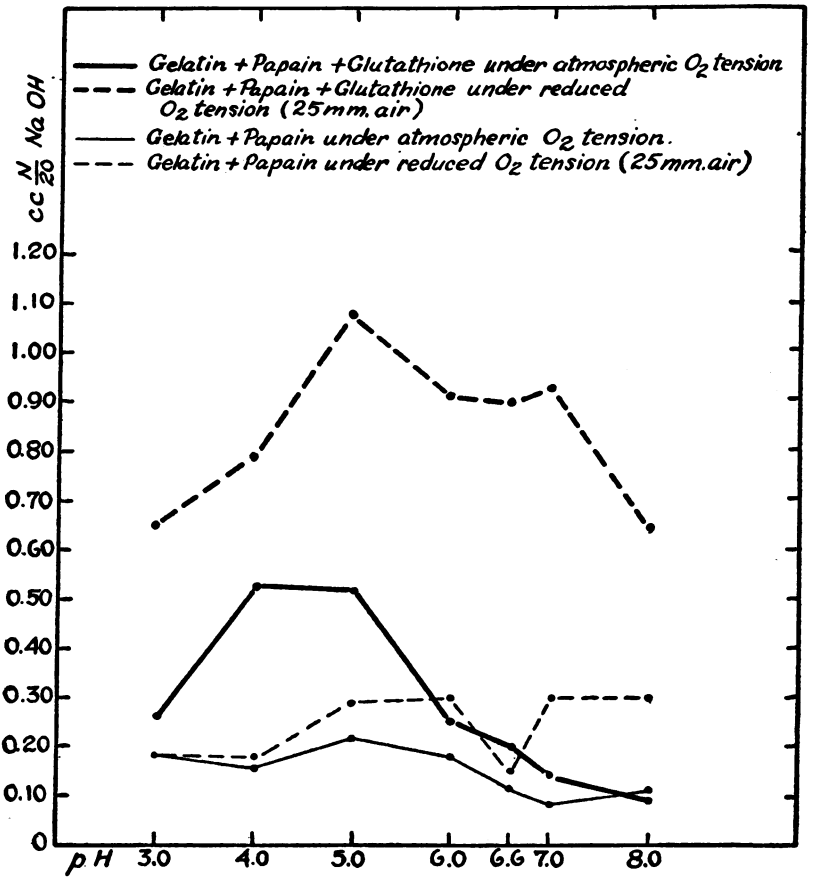

CHART 6.—The proteolysis of gelatin by papain plus glutathione. The digestion mixtures contained 1 c. c. of 12 per cent gelatin and 1.2 mg. papain in 0.5 c. c. H_2O+2 c. c. buffer. A great increase in proteolysis was caused by the addition of 1.5 mg. reduced glutathione particularly under conditions of reduced O_2 tension. Correction was made for the original amino N titration of the added glutathione

animal. This fact was recognized by Bradley and Taylor (1916) in their studies on autolysis with reference to the influence of changes in the acidity of the digests. It was stated in the introduction to this paper that tissue proteolysis should be studied by methods which closely approximate the conditions in the living animal. It will be evident from the experimental results here reported that this viewpoint is fully justified. It has led to the recognition of the O_2 tension

as a controlling factor in the proteolysis of cancer tissue *in vitro*. The experimental evidence clearly shows that in this case tissue proteolysis is promoted when digestion proceeds under greatly reduced O_2 tension—in other words, under conditions comparable to those found in the tissues. This fact alone is sufficient to postulate in tissues a relation between oxidation-reduction and proteolytic processes. Additional evidence presented in this paper further indicates that the sulphydryl system of tissues plays an important part in this relation between oxidation-reduction and proteolysis. Cancer tissues, as well as normal tissues, contain glutathione in the reduced form and proteins containing SH groups. It can be shown that these SH groups are readily oxidized if the tissues are exposed to molecular oyxgen. There is good reason to believe that this oxidation of SH groups is catalyzed by minute traces of heavy metals, such as copper, which occur in all tissues. Our experiments show that oxidation of these SH groups results in a striking decrease in tissue proteolysis. On the other hand, if the conditions for the digestion are such that the SH concentration is only slowly reduced, then proteolysis is promoted. We have seen that a shift toward increasing hydrogen ion concentration and a reduction in O_2 tension tend to retard the oxidation of the SH groups. This relationship has been demonstrated not only in cancer tissue proteolysis, but also in the experiments on the proteolytic action of papain. It would, therefore, appear to have a more general significance.

The experiments described in this paper concern themselves exclusively with the determination of the degree of proteolysis at the end of 18 to 20 hours. Further work, which is in progress, deals with the rate of proteolysis and equilibrium conditions. It is hoped that a clearer understanding of the factors which regulate proteolysis in tissues may lead to a successful demonstration of the synthesis of tissue proteins.

Finally, a few remarks on the bearing of these results on the cancer problem may not be amiss. The work of Warburg and his coworkers (1926) has produced the following important results: First, malignant tumors *in vitro* derive most of their energy from the conversion of glucose into lactic acid. Second, in confirmation of Cori and Cori (1925), it is found that the venous blood coming from malignant tumors contains more lactic acid and less glucose than other venous blood. Third, malignant cells survive *in vitro* for a day or even longer under anaerobic conditions, indicating that cancer tissue is much more resistant to lack of O_2 supply. All of this work has placed great emphasis on the carbohydrate metabolism of tumors as compared with normal tissues. The investigation of the protein metabolism of tumors has received scant attention, perhaps for the reason that most efforts were devoted to a demonstration of a qualitative

difference between the protein metabolism of malignant and that of normal tissues. Such a difference may exist, but so far it has not been demonstrated. However, it is obvious that the progressive cellular growth and accompanying cell death characteristic of malignant tumors must involve the building up and breaking down of proteins. Malignant growth is disordered growth in the sense that the organization of the malignant tissue is not so nicely adjusted for physiological purposes as the organization of normal tissues. In many tumors it is evident that certain portions do not contain an adequate vascular supply. It may be assumed, therefore, that in these locations, due to deficient blood circulation, there would accumulate lactic acid in sufficient concentration so as to cause an appreciable local increase in hydrogen ion concentration. Malignant cells in such regions will die as a result of inadequate food supply and possibly also due to the increased hydrogen ion concentration. There would thus be established conditions (low pH and low O_2 tension) which, according to our *in vitro* experiments, favor proteolysis. The products of proteolysis could then either be absorbed by intact blood vessels on the periphery of the necrotic area or they could be utilized by adjoining living tumor cells for growth and multiplication. It may perhaps not lead us too far from the basis of experimental facts if we also point out that increased hydrogen ion concentration and low oxygen tensions are conditions which favor the persistence of reduced glutathione. The latter substance apparently has a stimulating influence on cell division (Voegtlin and Chalkley, 1930, 1932). Similar considerations might also be applied to the explanation of the destructive action of tumors on the surrounding normal tissue. These problems are under investigation in this laboratory.

There can be little doubt that the mechanism of protein metabolism of normal and malignant tissues is far more complex than has been hitherto assumed.

SUMMARY

1. For the proper understanding of the proteolytic mechanism of the tissues in living animals it is essential to perform experiments *in vitro* under conditions approximating those *in vivo*. An attempt in this direction has been made in the case of malignant tissues by reducing the O_2 tension and adjusting the hydrogen ion concentration accordingly.

2. The *in vitro* autolysis of two malignant tumors shows that both pH and O_2 tension are controlling factors in tissue proteolysis. These factors apparently operate through their influence on the sulphydryl system of the tissues.

3. Evidence is produced, which indicates that not only glutathione, but also proteins containing SH groups, are concerned in tissue proteolysis. Confirmatory evidence is obtained from experiments dealing

with (*a*) the digestive action of papain on coagulated egg white containing protein SH groups, and (*b*) the action of papain on gelatin and fibrin in the presence of reduced glutathione.

4. The results afford substantial proof for the coupling of oxidation-reduction and proteolysis in tissues.

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DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for January, 1932

The accompanying table, taken from the Statistical Bulletin for February, 1932, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for January, 1932, as compared with that for December, 1931, and that for the corresponding month of last year. It also gives a comparison of the rates for the years 1930 and 1931. The rates for this group of persons in recent years are based on numbers varying between 17,000,000 and 19,000,000. Within the last few years the general death rates among these insured persons have averaged about 72 per cent of the death rate for the registration area of the United States.

The Bulletin states:

In no previous January have health conditions among these policyholders been as good as those which prevailed during the first month of 1932. The death rate was 8.7 per 1,000—7.6 per cent lower than the previous low point for

any January on record for this company (9.4 in 1927). In January a year ago, when there was widespread prevalence of influenza, the mortality rate was 9.9 per 1,000. Insured wage earners in all sections of the United States, as well as those in Canada, have shared in the unprecedentedly low January mortality rate.

Each of the important causes of death, except cancer, suicides, and automobile fatalities, recorded a lower death rate in January than in the corresponding month of last year. The remarkably low figure for tuberculosis (67.7 per 100,000), is particularly noteworthy. This figure has never been closely approached during the corresponding month of any previous year. It augurs well for the continuance of the downward course of the tuberculosis mortality rate during the remainder of 1932. The heart-disease rate is lower by 10.8 per cent than in January, 1931, and large reductions are in evidence for the following: Influenza (48.8 per cent), cerebral hemorrhage (12.5 per cent), pneumonia (32.0 per cent), other respiratory conditions (23.2 per cent), diarrheal diseases (23.4 per cent), puerperal conditions (10.8 per cent), and accidents (8.9 per cent). Each of the four principal communicable diseases of childhood also registered a lower mortality rate than for the corresponding month a year ago.

The suicide death rate rose from 7.7 in January, 1931, to 8.7 in 1932.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial insurance department, Metropolitan Life Insurance Co.]

Cause of death	Annual rate per 100,000 lives exposed [1]				
	January, 1932	December, 1931	January, 1931	Year	
				1931	1930
Total, all causes	870.0	821.8	989.5	876.4	873.5
Typhoid fever	1.5	3.0	1.4	2.4	2.4
Measles	2.2	1.5	2.6	3.2	2.9
Scarlet fever	2.3	3.9	3.3	3.2	2.5
Whooping cough	2.7	2.3	4.0	3.6	4.3
Diphtheria	6.1	6.4	6.8	4.5	5.9
Influenza	15.5	11.0	30.3	21.1	14.8
Tuberculosis (all forms)	67.7	64.9	78.0	76.2	80.9
Tuberculosis of respiratory system	60.1	58.7	69.9	67.2	70.4
Cancer	83.4	85.4	81.6	84.0	78.2
Diabetes mellitus	22.1	21.8	23.5	21.1	18.4
Cerebral hemorrhage	65.7	58.7	75.1	60.4	60.4
Organic diseases of heart	156.7	144.2	175.6	147.9	144.9
Pneumonia (all forms)	83.6	68.4	122.9	73.7	75.7
Other respiratory diseases	10.6	9.1	13.8	9.8	10.9
Diarrhea and enteritis	8.5	9.4	11.1	15.7	20.4
Bright's disease (chronic nephritis)	72.6	66.9	74.6	67.0	68.1
Puerperal state	9.9	11.5	11.1	11.7	12.1
Suicides	8.7	11.0	7.7	10.0	9.8
Homicides	6.2	6.8	6.8	7.0	6.7
Other external causes (excluding suicides and homicides)	53.0	53.9	58.2	60.7	62.5
Traumatism by automobiles	23.3	22.4	21.7	22.0	20.9
All other causes	190.7	181.4	200.9	193.2	191.7

[1] All figures in this table include insured infants under 1 year of age. The rates for 1931 and 1932 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

COURT DECISION RELATING TO PUBLIC HEALTH

Death from Rocky Mountain spotted fever caused by tick bites held compensable under workmen's compensation act.—(Idaho Supreme Court; Reinoehl *v.* Hamacher Pole and Lumber Co. et al., 6 P. (2d) 860; decided Dec. 8, 1931.) In a proceeding under the workmen's compensation law, compensation was sought for the death of an em-

ployee from Rocky Mountain spotted fever. It was found that the employee, a swamper for a lumber company, had been bitten by ticks, which bites resulted in Rocky Mountain spotted fever from which death ensued. The law provided for compensation in the case of a "personal injury by accident arising out of and in the course of" employment. The supreme court, in granting compensation, summed up its conclusions in the following language:

The tick bite, or bites, the injury, or injuries, that caused the Rocky Mountain spotted fever resulting in the workman's death in the instant case was, therefore, an "accident," since it was in the ordinary and popular sense of the term and [an] unlooked-for mishap which was neither expected nor designed. The fact that the accidental injury results in a disease does not alter the nature or the consequential results of such injury. Brintons *v.* Turvey, supra. We therefore hold that deceased received "a personal injury by accident arising out of and in the course of his employment."

DEATHS DURING WEEK ENDED FEBRUARY 27, 1932

Summary of information received by telegraph from industrial insurance companies for the week ended February 27, 1932, and corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Feb. 27, 1932	Corresponding week, 1931
Policies in force	73, 951, 428	75, 133, 159
Number of death claims	13, 563	16, 973
Death claims per 1,000 policies in force, annual rate	9. 6	11. 8
Death claims per 1,000 policies, first 8 weeks of year, annual rate	9. 9	11. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended February 27, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates furnished in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Feb. 27, 1932				Corresponding week, 1931		Death rate [2] for the first 8 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1932	1931
Total (83 cities)	8, 962	12. 9	610	[4] 51	14. 0	936	12. 1	14. 3
Akron	27	5. 3	2	25	8. 3	8	7. 7	8. 5
Albany [5]	30	12. 0	2	41	17. 4	2	14. 7	16. 1
Atlanta [6]	85	15. 7	10	97	16. 2	6	14. 9	16. 3
White	44	12. 3	3	44	13. 3	2	11. 7	13. 4
Colored	41	22. 4	7	200	21. 8	4	21. 2	22. 0
Baltimore [5 6]	244	15. 5	22	78	16. 5	26	14. 1	17. 8
White	175	13. 7	12	54	15. 1	21	13. 2	16. 4
Colored	69	24. 0	10	161	22. 7	5	18. 2	23. 8
Birmingham [6]	69	13. 0	4	42	15. 1	9	12. 4	14. 9
White	40	12. 2	3	49	13. 1	4	10. 5	11. 3
Colored	29	14. 4	1	27	18. 3	5	15. 6	20. 7

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended February 27, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931—Continued

City	Week ended Feb. 27, 1932				Corresponding week, 1931		Death rate for the first 8 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1932	1931
Boston	243	16.1	15	45	15.9	21	15.1	17.6
Bridgeport	37	13.1	0	0	14.2	3	11.8	14.4
Buffalo	136	12.1	10	48	18.6	26	13.0	15.5
Cambridge	29	13.2	3	62	12.8	5	13.6	14.0
Camden	31	13.6	2	35	18.0	8	14.4	19.0
Canton	25	12.1	3	75	15.6	1	9.7	11.5
Chicago [5]	802	11.9	43	42	11.9	97	11.1	12.6
Cincinnati	124	14.0	3	19	21.9	16	15.9	18.7
Cleveland	207	11.8	19	62	13.3	16	11.0	12.2
Columbus	74	12.9	6	60	15.3	8	14.7	14.6
Dallas [6]	75	13.9	7	----	13.7	8	11.5	12.8
White	60	13.4	7	----	11.8	6	10.9	11.6
Colored	15	16.1	0	----	23.1	2	14.2	18.4
Dayton	44	9.7	5	72	14.6	8	11.4	12.4
Denver	89	15.8	8	78	15.2	11	17.0	16.0
Des Moines	33	11.8	1	17	11.9	1	12.4	12.3
Detroit	283	8.6	23	41	11.4	70	8.4	9.8
Duluth	20	10.3	1	29	14.9	3	10.2	12.4
El Paso	24	11.7	1	----	14.9	3	15.3	19.4
Erie	22	9.7	2	42	12.4	1	10.7	12.0
Fall River [3] [7]	30	13.6	0	0	13.6	4	12.8	13.6
Flint	34	10.4	4	59	10.2	3	8.7	7.5
Fort Worth [6]	31	9.5	3	----	9.0	0	10.7	11.3
White	28	10.2	3	----	8.9	0	10.0	10.6
Colored	3	5.9	0	----	9.6	0	14.2	14.6
Grand Rapids	32	9.6	0	0	9.4	5	8.5	9.5
Houston [6]	67	10.8	6	----	12.4	9	10.9	12.2
White	46	10.1	3	----	12.6	6	10.2	11.2
Colored	21	12.8	3	----	11.9	3	12.6	14.7
Indianapolis [6]	124	17.3	12	97	16.9	10	13.6	15.6
White	103	16.4	10	92	17.2	10	13.0	15.1
Colored	21	23.8	2	137	15.0	0	18.4	18.9
Jersey City	57	9.3	5	41	12.4	7	10.8	14.6
Kansas City, Kans. [6]	27	11.4	5	111	21.6	5	12.9	17.6
White	20	10.4	2	54	20.5	5	12.3	16.3
Colored	7	15.4	3	384	26.6	0	15.7	23.3
Kansas City, Mo	112	14.1	5	57	17.3	13	12.8	15.5
Knoxville [6]	30	14.0	2	51	16.2	6	11.7	14.9
White	21	11.7	1	28	13.1	4	10.9	13.6
Colored	9	25.7	1	270	32.2	2	15.7	21.2
Long Beach	39	12.7	0	0	9.6	2	11.5	10.4
Los Angeles	333	12.6	19	56	13.1	34	12.6	12.3
Louisville [6]	79	13.4	8	73	16.4	6	14.4	17.4
White	54	10.8	6	63	15.6	6	12.7	15.6
Colored	25	27.3	2	149	20.8	0	23.8	27.2
Lowell [7]	28	14.6	3	78	14.0	4	15.3	14.7
Lynn	28	14.2	1	28	10.2	2	11.8	13.0
Memphis [6]	74	14.7	7	76	19.7	9	17.0	17.0
White	24	7.7	1	17	16.0	4	12.6	14.5
Colored	50	26.0	6	181	25.8	5	24.2	21.2
Miami [6]	26	11.9	0	0	17.6	3	12.9	14.1
White	21	12.4	0	0	14.9	0	12.5	13.5
Colored	5	10.3	0	0	26.8	3	14.5	16.2
Milwaukee	115	10.0	10	48	10.3	12	9.4	11.0
Minneapolis	129	14.0	11	72	12.5	7	11.0	12.5
Nashville [6]	53	17.7	5	75	25.8	8	14.0	18.2
White	34	15.6	3	59	23.1	5	13.4	15.9
Colored	19	23.2	2	125	32.9	3	15.7	24.4
New Bedford [7]	36	16.7	5	144	16.2	2	13.2	14.1
New Haven	50	16.1	1	20	14.7	2	13.1	13.5
New Orleans [6]	141	15.5	17	97	19.6	12	15.4	20.6
White	84	13.0	10	87	15.4	6	12.8	17.0
Colored	57	21.7	7	114	30.2	6	21.6	29.5
New York	1,694	12.3	115	51	12.3	166	11.0	14.2
Bronx Borough	236	8.9	14	40	9.4	22	8.3	10.3
Brooklyn Borough	563	11.0	50	55	10.8	72	10.0	13.3
Manhattan Borough	631	18.6	37	53	19.8	49	16.9	21.5
Queens Borough	207	8.9	12	50	7.4	18	7.2	9.8
Richmond Borough	57	17.8	2	39	12.4	5	14.1	14.5
Newark, N. J	93	10.8	6	33	11.8	6	11.0	14.4

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended February 27, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931.—Continued

City	Week ended Feb. 27, 1932				Corresponding week, 1931		Death rate for the first 8 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1932	1931
Oakland	68	11.9	2	25	10.5	2	11.8	11.7
Oklahoma City	35	8.9	1	14	11.1	3	9.9	11.6
Omaha	57	13.6	4	45	18.5	8	15.5	15.0
Paterson	24	9.0	1	18	22.2	3	12.4	16.4
Peoria	29	13.6	3	83	12.5	1	12.6	14.9
Philadelphia	499	13.2	26	40	14.7	51	12.7	16.9
Pittsburgh	249	19.1	22	101	18.6	18	14.6	18.3
Portland, Oreg	69	11.6	4	51	12.7	3	12.5	12.9
Providence	78	15.9	6	58	17.2	8	14.8	16.4
Richmond [6]	52	14.7	1	15	17.3	4	15.3	18.6
White	35	13.8	1	22	15.1	2	12.9	15.6
Colored	17	16.8	0	0	22.7	2	21.2	26.1
Rochester	91	14.2	7	67	17.3	7	11.9	14.3
St. Louis	231	14.5	6	21	20.4	17	14.1	19.2
St. Paul	59	11.0	2	21	9.4	6	10.6	10.7
Salt Lake City [4]	43	15.5	4	63	12.8	3	12.6	12.1
San Antonio	69	14.6	6	-------	14.6	14	14.7	15.4
San Diego	55	17.6	4	87	14.0	1	17.2	16.3
San Francisco	170	13.4	9	62	13.7	7	14.5	14.5
Schenectady	21	11.4	1	29	13.6	5	11.5	12.2
Seattle	102	14.2	3	30	13.0	8	12.3	12.5
Somerville	20	9.8	0	0	14.9	4	9.9	12.7
South Bend	14	6.6	1	29	12.1	1	8.6	8.7
Spokane	29	13.0	2	53	13.5	1	12.4	12.9
Springfield, Mass	31	10.5	2	34	16.8	3	12.0	14.2
Syracuse	40	9.7	3	39	13.0	3	11.7	13.6
Tacoma	30	14.5	3	83	13.5	3	12.5	14.3
Tampa [6]	25	12.1	2	57	14.9	3	11.5	16.0
White	22	13.5	2	70	12.6	2	10.9	14.3
Colored	3	6.9	0	0	23.5	1	13.8	22.3
Toledo	92	16.0	7	76	15.3	10	12.6	13.4
Trenton	37	15.6	1	20	18.1	4	15.0	19.1
Utica	43	21.9	4	114	14.8	0	16.4	16.4
Washington, D. C. [6]	173	18.3	17	95	19.6	19	16.2	19.3
White	114	16.7	8	66	16.7	4	14.5	16.7
Colored	59	22.6	9	160	27.4	15	20.4	26.1
Waterbury	21	10.8	1	33	8.3	3	9.6	11.2
Wilmington, Del. [7]	67	32.9	0	0	13.7	1	16.4	16.8
Worcester	57	15.0	6	84	13.7	3	12.7	15.7
Yonkers	27	9.9	3	77	9.8	4	7.7	11.4
Youngstown	40	11.9	4	65	8.7	6	10.6	11.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1932 and 1931 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 estimated live births. Cities left blank are not in the registration area for births.
[4] Data for 78 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; Tampa, 21; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

DEATHS DURING WEEK ENDED MARCH 5, 1932

Summary of information received by telegraph from industrial insurance companies for the week ended March 5, 1932, and corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Mar. 5, 1932	Corresponding week, 1931
Policies in force	73, 926, 205	75, 123, 813
Number of death claims	15, 815	16, 589
Death claims per 1,000 policies in force, annual rate	11. 2	11. 5
Death claims per 1,000 policies, first 9 weeks of year, annual rate	10. 0	11. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended March 5, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (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]

City	Week ended Mar. 5, 1932				Corresponding week, 1931		Death rate [2] for the first 9 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1932	1931
Total (83 cities)	9,339	13.4	705	[4] 59	13.8	864	12.3	14.3
Akron	48	9.4	8	100	7.7	8	7.8	8.4
Albany [5]	30	12.0	2	41	14.5	6	14.4	15.9
Atlanta [6]	53	9.8	4	39	17.3	9	14.4	16.4
White	28	7.8	2	29	15.3	5	11.3	13.6
Colored	25	13.7	2	57	21.3	4	20.4	21.9
Baltimore [5] [6]	254	16.2	17	60	17.2	22	14.3	17.7
White	186	14.5	11	50	16.2	15	13.3	16.4
Colored	68	23.7	6	96	22.0	7	18.8	23.6
Birmingham [6]	69	13.0	7	73	14.9	7	12.5	14.9
White	35	10.7	2	33	10.9	3	10.5	11.3
Colored	34	16.9	5	135	21.3	4	15.8	20.8
Boston	222	14.7	20	60	15.2	23	15.1	17.3
Bridgeport	31	11.0	2	36	9.9	3	11.7	13.9
Buffalo	150	13.3	18	86	15.3	22	13.1	15.5
Cambridge	27	12.3	5	104	16.0	3	13.5	14.2
Camden	40	17.5	7	123	14.5	1	14.7	18.5
Canton	25	12.1	2	50	7.8	2	9.8	11.1
Chicago [6]	812	12.0	44	43	11.3	72	11.2	12.4
Cincinnati	162	18.3	6	39	17.4	17	16.2	18.6
Cleveland	199	11.3	21	68	14.9	26	11.1	12.5
Columbus	94	16.4	6	60	16.1	4	14.9	14.8
Dallas [6]	78	14.4	6	-------	9.5	8	11.8	12.5
White	51	11.4	4	-------	6.7	4	10.9	11.1
Colored	27	29.0	2	-------	23.1	4	15.9	18.9
Dayton	60	13.2	5	72	14.9	10	11.6	12.7
Denver	103	18.3	5	49	15.6	10	17.1	15.9
Des Moines	24	8.6	2	34	9.7	1	12.0	12.0
Detroit	286	8.7	31	56	10.4	37	8.4	9.9
Duluth	16	8.2	1	29	16.9	4	10.0	12.9
El Paso	24	11.7	2	-------	15.4	4	14.9	19.0
Erie	24	10.5	3	64	9.7	1	10.7	11.7
Fall River [5] [7]	36	16.3	3	80	15.4	1	13.2	13.8
Flint	32	9.8	7	103	10.8	6	8.8	7.9
Fort Worth [6]	36	11.0	6	-------	11.8	1	10.7	11.3
White	34	12.3	6	-------	11.5	1	10.3	10.7
Colored	2	3.9	0	-------	13.4	0	13.1	14.5
Grand Rapids	41	12.3	6	102	10.9	4	8.9	9.7
Houston [6]	80	12.9	6	-------	13.1	13	11.1	12.3
White	53	11.6	4	-------	11.7	7	10.4	11.3
Colored	27	16.5	2	-------	17.0	6	13.1	14.9
Indianapolis [6]	120	16.8	19	154	14.5	4	13.9	15.5
White	105	16.7	15	138	14.1	4	13.3	15.0
Colored	15	17.0	4	274	17.3	0	18.0	18.7
Jersey City	81	13.2	6	50	12.3	13	11.1	14.3
Kansas City, Kans. [6]	39	16.5	4	89	13.6	1	13.3	17.2
White	35	18.3	3	80	10.5	0	12.9	15.6
Colored	4	8.8	1	128	26.6	1	15.0	23.7
Kansas City, Mo	115	14.4	9	102	16.3	12	13.0	15.6
Knoxville [6]	21	9.8	1	25	10.5	4	11.5	14.4
White	16	8.9	1	28	8.6	4	10.7	13.1
Colored	5	14.3	0	0	20.5	0	15.6	21.2
Long Beach	22	7.1	1	26	9.6	2	11.0	10.3
Los Angeles	329	12.4	21	62	10.0	14	12.5	12.0
Louisville [6]	83	14.1	6	55	18.1	5	14.4	17.5
White	67	13.4	5	52	16.2	4	12.8	15.7
Colored	16	17.5	1	75	28.4	1	23.1	27.3
Lowell [7]	28	14.6	4	105	16.6	2	15.2	14.9
Lynn	21	10.7	1	28	11.7	1	11.7	12.9
Memphis [6]	89	17.7	13	142	18.3	9	17.1	17.2
White	44	14.1	4	68	18.3	6	12.8	14.9
Colored	45	23.4	9	271	18.5	3	24.1	20.9
Miami [6]	23	10.6	1	28	13.9	2	12.6	14.1
White	19	11.2	1	39	12.0	1	12.3	13.4
Colored	4	8.3	0	0	20.6	1	13.8	16.7
Milwaukee	129	11.2	8	38	10.8	12	9.6	11.0
Minneapolis	138	15.0	16	104	12.1	14	11.4	12.5

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended March 5, 1932, infant mortality, annual death rate, and compairson with corresponding week of 1931—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Mar. 5, 1932				Corresponding week, 1931		Death rate for the first 9 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1932	1931
Nashville [6]	44	14.7	4	60	22.5	5	14.1	18.7
White	30	13.8	4	78	16.7	1	13.4	16.0
Colored	14	17.1	0	0	37.8	4	15.8	25.9
New Bedford [7]	31	14.4	1	29	10.7	1	13.4	13.7
New Haven	26	8.4	0	0	12.5	1	12.5	13.4
New Orleans [6]	143	15.8	14	80	13.8	7	15.4	19.8
White	85	13.2	5	44	10.5	1	12.9	16.2
Colored	58	22.1	9	147	22.1	6	21.7	28.6
New York	1,925	13.9	114	51	13.0	170	11.3	14.1
Bronx Boro	277	10.5	9	26	9.9	27	8.5	10.3
Brooklyn Boro	711	13.9	36	40	11.6	55	10.4	13.1
Manhattan Boro	690	20.3	58	83	19.9	67	17.3	21.3
Queens Boro	207	8.9	10	42	8.5	14	7.4	9.4
Richmond Boro	40	12.5	1	20	19.1	7	13.9	15.0
Newark, N. J	115	13.4	5	27	13.3	13	11.3	14.3
Oakland	70	12.2	5	63	15.5	7	11.9	12.1
Oklahoma City	45	11.4	6	82	12.2	8	10.1	11.7
Omaha	67	16.0	4	45	14.4	4	15.6	14.9
Paterson	40	15.0	0	0	16.5	3	12.7	16.4
Peoria	27	12.7	2	55	15.4	3	12.6	15.0
Philadelphia	529	14.0	39	60	15.9	72	12.9	16.8
Pittsburgh	229	17.6	17	78	17.1	15	14.9	18.2
Portland, Oreg	83	13.9	3	38	13.6	1	12.7	13.0
Providence	82	16.7	11	107	16.2	8	15.0	16.3
Richmond [6]	63	17.8	3	45	16.1	8	15.5	18.3
White	37	14.6	1	22	11.9	4	13.1	15.2
Colored	26	25.7	2	92	26.6	4	21.7	26.2
Rochester	75	11.7	7	67	13.2	7	11.9	14.2
St. Louis	227	14.3	7	25	18.4	12	14.1	19.1
St. Paul	80	15.0	0	0	13.6	1	11.1	11.1
Salt Lake City [5]	22	7.9	4	63	12.8	2	12.0	12.2
San Antonio	82	17.4	16	------	15.9	8	15.0	15.5
San Diego	55	17.6	1	22	17.0	4	17.2	16.4
San Francisco	169	13.3	6	42	19.0	7	14.4	15.0
Schenectady	16	8.7	2	58	14.6	3	11.2	12.5
Seattle	101	14.0	7	70	15.4	7	12.5	12.8
Somerville	14	6.9	1	40	8.4	2	9.6	12.2
South Bend	13	6.1	1	29	15.0	2	8.4	9.4
Spokane	32	14.3	5	133	12.6	2	12.6	12.9
Springfield, Mass	30	10.2	4	67	16.1	6	11.8	14.4
Syracuse	51	12.3	4	52	12.0	2	11.8	13.4
Tacoma	26	12.5	0	0	20.3	0	12.5	14.9
Tampa [6]	38	18.4	4	114	13.4	4	12.3	15.7
White	33	20.3	3	105	13.2	2	11.9	14.2
Colored	5	11.5	1	158	14.1	2	13.5	21.4
Toledo	83	14.4	7	76	14.7	7	12.8	13.5
Trenton	30	12.6	1	20	25.7	6	14.7	19.8
Utica	22	11.2	2	57	20.9	2	15.8	16.9
Washington, D. C. [6]	184	19.5	17	95	17.1	19	16.5	19.1
White	128	18.7	10	82	14.8	11	15.0	16.6
Colored	56	21.4	7	125	23.2	8	20.5	25.8
Waterbury	23	11.8	4	132	11.4	1	9.9	11.2
Wilmington, Del. [7]	52	25.5	3	68	18.6	2	17.4	17.0
Worcester	52	13.7	8	112	16.1	5	12.8	15.7
Yonkers	16	5.9	1	26	9.4	0	7.5	11.1
Youngstown	33	9.8	3	49	14.5	7	10.5	11.9

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1932 and 1931 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 78 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; Tampa, 21; and Washington, D. C., 27.

[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 March 12, 1932, and March 14, 1931

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 12, 1932, and March 14, 1931

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931
New England States:								
Maine	2	5	17	63	445	49	0	1
New Hampshire	2	1	----	1	13	59	0	0
Vermont	----	2	----	----	32	----	0	0
Massachusetts	29	46	43	18	481	419	0	0
Rhode Island	3	3	----	----	451	12	2	0
Connecticut	1	15	28	24	236	766	0	2
Middle Atlantic States:								
New York	124	126	[1] 324	[1] 42	2,643	1,835	8	21
New Jersey	39	76	266	70	188	633	1	3
Pennsylvania	131	93	----	----	1,925	3,633	5	32
East North Central States:								
Ohio	64	55	492	872	1,879	680	2	11
Indiana	64	28	200	53	45	757	10	15
Illinois	88	63	190	125	252	1,711	10	1
Michigan	33	32	146	223	602	543	2	13
Wisconsin	13	19	874	113	418	449	3	3
West North Central States:								
Minnesota	9	16	----	1	14	82	0	4
Iowa	14	7	----	----	----	16	3	1
Missouri	32	38	10	47	83	331	0	9
North Dakota	1	7	----	----	25	17	4	1
South Dakota	4	8	10	1	15	30	2	1
Nebraska	11	7	4	----	38	2	0	1
Kansas	15	12	9	77	126	40	0	1
South Atlantic States:								
Delaware	1	3	3	6	----	97	0	0
Maryland [2]	26	13	219	140	80	889	2	0
District of Columbia	9	7	14	2	1	153	3	4
Virginia	----	----	----	----	----	----	----	1
West Virginia	18	8	375	162	626	110	2	1
North Carolina	29	24	76	86	439	501	3	6
South Carolina	8	16	993	2,320	95	127	0	4
Georgia	7	6	185	1,072	22	114	0	4
Florida	----	8	2	87	1	134	0	0
East South Central States:								
Kentucky	11	----	384	----	76	403	1	9
Tennessee	19	7	1,493	393	182	169	3	2
Alabama [3]	24	31	87	627	5	349	0	9
Mississippi	10	13	----	----	----	----	0	2
West South Central States:								
Arkansas	4	6	144	242	1	24	1	4
Louisiana	31	27	12	39	18	2	0	4
Oklahoma [4]	20	12	698	183	24	25	0	1
Texas [3]	59	74	410	233	26	276	0	0
Mountain States:								
Montana	2	2	182	----	81	1	1	0
Idaho	----	----	2	----	1	3	0	0
Wyoming	2	----	1	3	2	----	1	0
Colorado	7	9	----	----	145	669	0	0
New Mexico	16	5	3	29	121	53	1	2
Arizona	1	1	117	19	2	120	2	5
Utah [2]	1	1	----	----	----	----	0	3
Pacific States:								
Washington	7	6	----	1	549	51	1	2
Oregon	1	5	233	290	160	80	0	0
California	49	58	170	508	517	1,256	4	7

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 8 cases: 3 cases in Alabama and 5 cases in Texas.
[4] Figures for 1932 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 12, 1932, and March 14, 1931—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931	Week ended Mar. 12, 1932	Week ended Mar. 14, 1931
New England States:								
Maine	0	0	35	47	0	0	0	2
New Hampshire	0	1	32	16	0	0	0	0
Vermont	0	0	22	9	6	0	1	0
Massachusetts	1	2	489	357	0	0	2	3
Rhode Island	0	0	53	67	0	0	0	0
Connecticut	0	0	109	59	4	0	1	1
Middle Atlantic States:								
New York	1	0	1,821	1,237	2	11	7	13
New Jersey	2	2	334	317	0	0	1	0
Pennsylvania	0	0	747	562	0	0	6	9
East North Central States:								
Ohio	0	0	437	627	27	42	2	5
Indiana	1	0	133	289	13	104	4	6
Illinois	0	4	396	352	24	26	3	0
Michigan	1	1	460	402	8	22	7	5
Wisconsin	1	3	102	162	0	4	11	2
West North Central States:								
Minnesota	1	0	110	114	2	7	1	0
Iowa	0	1	63	132	20	73	3	1
Missouri	0	0	55	301	7	45	4	5
North Dakota	0	0	25	39	2	11	0	0
South Dakota	0	0	13	14	0	32	1	2
Nebraska	0	0	38	62	12	33	3	0
Kansas	0	3	55	71	2	116	3	1
South Atlantic States:								
Delaware	0	0	15	25	0	0	1	1
Maryland [2]	0	0	132	85	0	0	4	1
District of Columbia	0	0	24	33	0	0	3	0
Virginia					1			
West Virginia	1	0	29	40	4	10	12	1
North Carolina	0	0	54	51	1	1	7	1
South Carolina	1	0	7	4	0	3	2	6
Georgia	0	0	5	82	0	0	10	7
Florida	0	0	2	7	0	1	5	3
East South Central States:								
Kentucky	0	0	76	94	0	15	9	1
Tennessee	0	0	31	29	7	0	9	0
Alabama [3]	0	0	15	24	8	33	13	3
Mississippi	0	0	6	16	17	15	5	2
West South Central States:								
Arkansas	0	0	2	31	27	18	0	1
Louisiana	0	0	16	25	2	26	13	6
Oklahoma [4]	0	0	30	54	11	89	4	2
Texas [3]	0	0	38	38	46	56	4	1
Mountain States:								
Montana	0	0	17	32	0	2	4	0
Idaho	0	0	2	9	0	0	0	0
Wyoming	0	0	2	28	1	5	0	0
Colorado	0	0	33	54	2	1	0	2
New Mexico	0	0	10	9	0	3	1	0
Arizona	1	0	3	3	1	0	0	0
Utah [2]	0	0	119	19	0	4	0	0
Pacific States:								
Washington	0	0	26	59	10	37	0	0
Oregon	0	0	26	19	11	18	3	0
California	6	2	139	139	13	46	7	4

[1] Week ended Friday.
[2] Typhus fever, 8 cases: 3 cases in Alabama and 5 cases in Texas.
[3] Figures for 1932 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
January, 1932										
Arkansas	----	68	78	12	12	11	1	49	64	22
February, 1932										
Arizona	----	18	260	1	4	----	1	22	1	0
Connecticut	6	26	62	----	971	----	2	413	26	3
District of Columbia	2	61	10	----	11	1	0	95	0	2
Florida	4	60	8	21	22	2	2	25	1	28
Georgia	6	43	524	59	24	21	2	59	0	44
Iowa	2	50	40	----	24	----	3	223	141	4
Nebraska	13	32	419	----	147	----	0	138	38	2
South Carolina	----	123	2,639	501	204	143	1	31	1	23
Tennessee	13	115	964	13	213	18	1	173	67	34
Wyoming	----	----	208	----	5	----	1	27	0	0

January, 1932

Arkansas:	Cases
Chicken pox	76
Hookworm disease	2
Mumps	33
Trachoma	2
Tularaemia	2
Whooping cough	46

February, 1932

	Cases
Chicken pox:	
Arizona	163
Connecticut	523
District of Columbia	150
Florida	12
Georgia	99
Iowa	196
Nebraska	150
South Carolina	175
Tennessee	163
Wyoming	27
Conjunctivitis:	
Connecticut	1
Wyoming	14
Dengue:	
South Carolina	7
Diarrhea:	
South Carolina	235
Dysentery:	
Connecticut (bacillary)	4
Florida	1
Georgia	11
Tennessee	5
German measles:	
Connecticut	26
Iowa	22
Tennessee	9
Hookworm disease:	
South Carolina	52
Lethargic encephalitis:	
Connecticut	4
South Carolina	2
Mumps:	
Arizona	11
Connecticut	333
Florida	15
Georgia	78
Iowa	75
Nebraska	132
South Carolina	277
Tennessee	127
Wyoming	58
Ophthalmia neonatorum:	
Connecticut	1
South Carolina	10
Tennessee	2
Paratyphoid fever:	
Connecticut	5
South Carolina	5
Tennessee	1
Puerperal septicemia:	
Tennessee	1
Rabies in animals:	
Connecticut	14
South Carolina	15
Septic sore throat:	
Connecticut	30
Georgia	22
Iowa	2
Nebraska	1
Tennessee	12
Tetanus:	
Connecticut	1
Tennessee	1
Trachoma:	
Arizona	12
Tennessee	2
Trichinosis:	
Connecticut	2
Iowa	1
Tularaemia:	
Georgia	4
South Carolina	2
Tennessee	4

Typhus fever:	Cases
Florida	1
Georgia	10
South Carolina	2
Tennessee	1
Undulant fever:	
Connecticut	3
Georgia	3
Iowa	4
Tennessee	1
Vincent's angina:	
Iowa	2
South Carolina	1
Tennessee	1

Whooping cough:	Cases
Arizona	46
Connecticut	482
District of Columbia	83
Florida	35
Georgia	85
Iowa	97
Nebraska	94
South Carolina	142
Tennessee	304

ADMISSIONS TO HOSPITALS FOR THE INSANE, MAY, 1930

Reports for the month of May, 1930, showing new admissions to hospitals for the care and treatment of the insane, were received by the Public Health Service from 113 hospitals, located in 38 States, the District of Columbia, and the Territory of Hawaii. The 113 hospitals had 182,001 patients on May 31, 1930, 97,017 males and 84,984 females, the ratio being 114 males per 100 females.

The following table gives the number of new admissions for the month of May, 1930, by psychoses:

Psychoses	Number of first admissions		
	Male	Female	Total
1. Traumatic psychoses	12	2	14
2. Senile psychoses	137	128	265
3. Psychoses with cerebral arteriosclerosis	191	120	311
4. General paralysis	230	58	288
5. Psychoses with cerebral syphilis	28	7	35
6. Psychoses with Huntington's chorea	4	2	6
7. Psychoses with brain tumor	0	0	0
8. Psychoses with other brain or nervous disease	40	23	63
9. Alcoholic psychoses	137	17	154
10. Psychoses due to drugs and other exogenous toxins	8	13	21
11. Psychoses with pellagra	12	38	50
12. Psychoses with other somatic diseases	34	46	80
13. Manic-depressive psychoses	219	256	475
14. Involution melancholia	23	46	69
15. Dementia præcox (schizophrenia)	420	310	730
16. Paranoia and paranoid conditions	31	45	76
17. Epileptic psychoses	46	29	75
18. Psychoneuroses and neuroses	17	46	63
19. Psychoses with psychopathic personality	23	11	34
20. Psychoses with mental deficiency	56	56	112
21. Undiagnosed psychoses	121	111	232
22. Without psychosis	172	63	235
Total	1,961	1,427	3,388

During the month of May, 1930, there were 3,388 new admissions to the hospitals, 57.9 per cent of these new admissions being males and 42.1 per cent females. Four hundred and sixty-seven of the new admissions were reported as being undiagnosed or "without psychosis." There were 2,921 new admissions for whom provisional diagnoses were made. Of these 2,921 patients, cases of dementia praecox constituted 25 per cent; manic-depressive psychoses, 16.3 per

cent; psychoses with cerebral arteriosclerosis, 10.6 per cent; general paralysis, 9.9 per cent; and senile psychoses, 9.1 per cent. These five classes accounted for 2,069 of the new admissions, or 70.8 per cent of those for whom diagnoses were made.

The following table shows the number of patients in the hospitals and on parole on May 31, 1930:

	Male	Female	Total
Patients on books May 31, 1930:			
In hospitals	87,170	77,433	164,603
On parole or otherwise absent, but still on books	9,847	7,551	17,398
Total	97,017	84,984	182,001

Of the 182,001 patients, 9,847 males and 7,551 females were on parole or otherwise absent but still on the books at the end of the month, 10.1 per cent of the males, 8.9 per cent of the females, and 9.6 per cent of the total number of patients.

INFLUENZA, FEBRUARY 21 TO MARCH 12, 1932

In the table following are presented the influenza case rates, by weeks, per 100,000 population, annual basis, in geographic groups of States, as indicated by weekly reports, for the three weeks ended March 12, 1932, and similar rates for the seven weeks from February 22 to April 11, 1931. The rates are calculated, in groups and as a whole, on the reported cases and estimated populations of 35 States, the District of Columbia, and New York City. The States included are the same as shown for a similar table on pages 571 and 572 of the Public Health Reports of March 4, 1932. Complete figures are not available for the States which are omitted from the table.

Influenza case rates per 100,000 population

	Week ended—									
	1932			1931						
	Feb. 27	Mar. 5	Mar. 12	Feb. 28	Mar. 7	Mar. 14	Mar. 21	Mar. 28	Apr. 4	Apr. 11
35 States	484	598	455	574	422	443	252	306	239	187
New England	43	36	68	200	124	82	60	41	24	15
Middle Atlantic	194	334	271	91	46	52	46	22	28	20
East North Central	357	303	386	348	154	282	63	97	64	49
West North Central	143	96	17	244	70	64	53	51	39	20
South Atlantic	539	650	718	2,313	1,742	1,497	819	1,098	888	724
East South Central	559	1,256	1,287	507	495	670	456	677	418	362
West South Central	740	805	548	230	246	296	249	248	232	215
Mountain	4,784	[1] 6,677	762	25	73	128	58	150	451	33
Pacific	421	356	304	484	584	617	485	343	202	132

[1] An estimate of 2,000 cases for 1 county in New Mexico is omitted because if included the rates for New Mexico can not be fairly compared with those for other States.

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 34,050,000. The estimated population of the 91 cities reporting deaths is more than 32,490,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended March 5, 1932, and March 7, 1931

	1932	1931	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,112	1,096	----
98 cities	407	466	778
Measles:			
45 States	12,508	15,272	----
98 cities	4,545	4,937	----
Meningococcus meningitis:			
46 States	78	172	----
98 cities	85	79	----
Poliomyelitis:			
46 States	15	34	----
Scarlet fever:			
46 States	6,353	6,114	----
98 cities	3,092	2,215	1,612
Smallpox:			
46 States	412	962	----
98 cities	29	81	66
Typhoid fever:			
46 States	165	129	----
98 cities	40	26	31
Deaths reported			
Influenza and pneumonia:			
91 cities	1,403	1,458	----
Smallpox:			
91 cities	0	0	----

City reports for week ended March 5, 1932

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 non-epidemic 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 1923 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	2	1	2	----------	0	252	0	3
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Manchester	0	0	0	----------	1	0	0	1
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	1	0	0	0
Burlington	2	0	0	----------	0	30	1	1
Massachusetts:								
Boston	45	26	13	4	1	37	38	39
Fall River	6	3	1	1	1	57	4	4
Springfield	27	3	0	----------	0	11	25	1
Worcester	8	2	1	----------	1	0	54	11
Rhode Island:								
Pawtucket	0	2	0	----------	0	0	0	0
Providence	8	7	3	----------	2	367	11	7
Connecticut:								
Bridgeport	6	5	0	----------	1	0	0	7
Hartford	12	5	0	1	0	1	11	5
New Haven	18	0	0	2	0	1	11	3
MIDDLE ATLANTIC								
New York:								
Buffalo	42	12	3	----------	2	6	3	25
New York	216	192	100	514	66	95	163	336
Rochester	4	4	1	----------	0	450	15	2
Syracuse	18	2	1	----------	0	388	8	6
New Jersey:								
Camden	13	5	10	----------	0	3	3	10
Newark	43	14	4	71	0	5	107	24
Trenton	8	3	0	20	2	1	7	5
Pennsylvania:								
Philadelphia	137	63	13	11	5	8	99	44
Pittsburgh	39	18	11	6	19	178	57	44
Reading	52	2	0	----------	0	5	5	3
Scranton	7	----------	2	----------	----------	6	0	----------
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	8	7	4	2	5	0	0	24
Cleveland	116	27	9	116	3	785	180	28
Columbus	6	2	6	1	1	0	4	15
Toledo	22	4	1	11	10	28	2	7
Indiana:								
Fort Wayne	1	3	15	----------	1	1	0	0
Indianapolis	58	5	4	----------	7	0	106	19
South Bend	0	1	0	----------	0	0	0	0
Terre Haute	1	0	0	----------	2	0	0	5
Illinois:								
Chicago	94	90	37	28	21	208	8	90
Peoria	6	----------	2	----------	2	0	0	4
Springfield	3	0	1	----------	0	0	6	5
Michigan:								
Detroit	100	44	29	75	19	75	37	44
Flint	14	2	2	104	1	84	82	9
Grand Rapids	2	1	0	12	5	94	21	7

City reports for week ended March 5, 1932—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	3	1	0	1	0	0	0	2
Madison	8	0	2			0	0	
Milwaukee	88	13	2	9	4	286	36	16
Racine	38	1	1		0	9	73	0
Superior	2	0	0		0	1	40	2
WEST NORTH CENTRAL								
Minnesota:								
Duluth	4	0	0		0	0	0	2
Minneapolis	19	13	6		6	0	31	14
St. Paul	2	6	0	3	3	1	12	9
Iowa:								
Davenport	0	1	1			1	1	
Des Moines	0	1	5			0	0	
Sioux City	2	0	0			0	5	
Waterloo	7	0	0			0	0	
Missouri:								
Kansas City	24	5	8		0	2	2	14
St. Joseph	5	2	2		0	0	0	6
St. Louis	39	36	7			1	2	7
North Dakota:								
Fargo	2	0	0		0	23	1	1
South Dakota:								
Aberdeen	1	0	0			72	0	
Nebraska:								
Omaha	3	5	1		0	0	1	22
Kansas:								
Topeka	13	2	0	1	2	1	3	3
Wichita	14	1	2		0	99	1	5
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	2	0		0	0	2	1
Maryland:								
Baltimore	123	21	14	135	4	4	115	26
Cumberland	0	0	0		0	17	0	1
Frederick	0	0	0		0	2	0	1
District of Columbia:								
Washington	55	13	12	7	3	2	0	18
Virginia:								
Lynchburg	2	0	1		0	0	1	1
Norfolk	6	1	1		0	0	0	0
Richmond	3	3	3		2	0	0	3
Roanoke	0	1	1		0	2	0	0
West Virginia:								
Charleston	0	0	1	7	0	125	0	6
Huntington	0		3			0	0	
Wheeling	1	1	0	6	2	0	1	8
North Carolina:								
Raleigh	0	1	0		0	54	0	3
Wilmington	1	0	0		0	1	0	1
Winston-Salem	15	1	0	1	0	6	7	7
South Carolina:								
Charleston	4	0	1	66	2	0	0	5
Columbia	0	0	0		1	0	0	8
Greenville	2	0	0		0	0	0	
Georgia:								
Atlanta	3	3	1	7	0	0	1	5
Brunswick	7	0	0		0	0	0	1
Savannah	2	1	2	35	0	3	0	5
Florida:								
Miami	0	2	1	1	0	1	0	4
Tampa	0	3	4	6	3	0	0	0

City reports for week ended March 5, 1932—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	0	0	0	----	0	0	0	3
Lexington	1	----	0	----	0	2	50	0
Tennessee:								
Memphis	4	3	2	----	2	0	0	7
Nashville	2	1	1	----	0	2	0	8
Alabama:								
Birmingham	3	1	1	4	0	1	2	8
Mobile	0	0	1	1	0	0	0	1
Montgomery	8	1	1	----	----	0	9	----
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0	----	----	0	0	----
Little Rock	9	0	0	----	0	0	3	4
Louisiana:								
New Orleans	2	13	18	1	1	0	0	10
Shreveport	3	0	0	----	0	54	7	5
Texas:								
Dallas	6	6	4	21	9	23	0	13
Forth Worth	12	4	3	----	2	1	0	2
Galveston	0	0	0	----	0	0	0	2
Houston	2	5	8	----	1	1	0	13
San Antonio	1	3	1	----	10	0	0	4
MOUNTAIN								
Montana:								
Billings	1	0	0	----	0	4	0	0
Great Falls	9	0	0	----	1	0	0	1
Helena	0	1	0	----	0	1	0	0
Missoula	0	0	0	80	0	0	0	1
Idaho:								
Boise	0	0	0	----	1	0	0	2
Colorado:								
Denver	10	7	1	----	2	15	27	15
Pueblo	43	0	0	----	0	0	0	3
New Mexico:								
Albuquerque	3	0	0	----	0	52	1	2
Arizona:								
Phoenix	0	0	0	----	0	0	0	1
Utah:								
Salt Lake City	15	1	0	----	0	2	0	1
Nevada:								
Reno	0	0	0	----	0	1	0	0
PACIFIC								
Washington:								
Seattle	22	4	2	----	----	436	7	----
Spokane	5	2	1	----	----	2	0	----
Tacoma	10	0	1	----	0	9	0	1
Oregon:								
Portland	13	6	1	17	1	47	6	14
Salem	2	0	0	12	----	0	1	----
California:								
Los Angeles	276	30	21	96	5	11	13	17
Sacramento	24	1	2	2	0	152	3	14
San Francisco	79	13	3	4	0	80	9	12

City reports for week ended March 5, 1932—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	4	2	0	0	0	0	0	0	0	7	23
New Hampshire:											
Concord	1	2	0	0	0	0	0	0	0	0	11
Manchester	1	12	0	0	0	0	0	0	0	0	22
Nashua	1	3	0	0	0	0	0	0	0	0	----
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	4
Burlington	1	1	0	1	0	1	0	0	0	0	11
Massachusetts:											
Boston	86	167	0	0	0	11	1	2	0	48	222
Fall River	4	11	0	0	0	2	0	0	0	11	36
Springfield	10	0	0	4	0	1	0	0	0	2	33
Worcester	11	31	0	0	0	1	0	0	0	23	52
Rhode Island:											
Pawtucket	2	0	0	0	0	0	0	0	0	0	32
Providence	15	17	0	0	0	2	0	0	0	5	82
Connecticut:											
Bridgeport	12	8	0	0	0	1	0	0	0	0	31
Hartford	8	16	0	0	0	2	0	0	0	30	40
New Haven	6	24	0	0	0	1	0	0	0	8	26
MIDDLE ATLANTIC											
New York:											
Buffalo	29	159	0	0	0	5	0	0	0	19	146
New York	316	1,052	0	0	0	95	7	6	2	172	1,925
Rochester	9	71	0	0	0	1	1	0	0	3	70
Syracuse	14	22	0	0	0	0	0	0	0	109	51
New Jersey:											
Camden	6	43	0	0	0	2	0	0	0	4	40
Newark	41	37	0	0	0	3	0	0	0	34	128
Trenton	3	15	0	0	0	2	1	0	0	5	30
Pennsylvania:											
Philadelphia	95	276	0	0	0	34	1	1	0	295	529
Pittsburgh	31	68	0	0	0	10	0	3	0	58	229
Reading	6	13	0	0	0	0	0	0	0	20	27
Scranton	----	39	----	0	0	0	----	0	0	6	----
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	29	44	1	0	0	12	0	1	0	6	162
Cleveland	60	78	0	0	0	11	0	0	0	179	199
Columbus	11	5	1	10	0	2	0	0	0	38	94
Toledo	13	8	1	0	0	4	0	0	0	84	83
Indiana:											
Fort Wayne	4	6	0	0	0	0	1	1	0	2	19
Indianapolis	16	10	8	1	0	5	0	0	0	57	----
South Bend	4	1	0	0	0	2	0	0	0	0	13
Terre Haute	2	0	1	0	0	1	0	0	0	1	19
Illinois:											
Chicago	151	195	2	1	0	47	1	1	0	152	812
Peoria	----	1	----	0	0	1	----	0	0	1	27
Springfield	3	3	1	0	0	0	1	0	0	7	26
Michigan:											
Detroit	126	205	1	0	0	17	1	3	0	92	286
Flint	16	19	1	0	0	1	0	3	0	12	32
Grand Rapids	13	6	0	0	0	1	0	0	0	1	41
Wisconsin:											
Kenosha	4	6	0	0	0	2	0	0	0	1	9
Madison	5	5	0	0	----	----	0	0	----	3	----
Milwaukee	32	60	1	0	0	6	1	1	0	100	129
Racine	4	3	0	0	0	2	0	0	0	2	15
Superior	2	0	0	0	0	0	0	0	0	0	4

City reports for week ended March 5, 1932—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											
Minnesota:											
Duluth	8	2	0	0	0	0	0	0	0	0	16
Minneapolis	42	63	0	0	0	3	0	0	0	15	138
St. Paul	28	24	1	0	0	5	1	0	0	18	83
Iowa:											
Davenport	0	13	1	0	----	----	0	0	----	0	----
Des Moines	9	10	2	0	----	----	0	0	----	0	24
Sioux City	1	0	0	0	----	----	0	0	----	5	----
Waterloo	1	1	1	2	----	----	0	0	----	6	----
Missouri:											
Kansas City	25	7	1	0	0	4	0	0	0	24	115
St. Joseph	3	3	0	0	0	0	0	0	0	1	18
St. Louis	42	18	3	0	0	14	1	0	0	85	227
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	0	5
South Dakota:											
Aberdeen	0	3	0	1	----	----	0	0	----	0	----
Nebraska:											
Omaha	6	4	4	1	0	1	0	0	0	5	67
Kansas:											
Topeka	3	0	0	0	0	0	0	0	0	25	22
Wichita	4	0	2	0	0	2	0	0	0	0	34
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	13	0	0	0	2	0	0	0	18	33
Maryland:											
Baltimore	39	69	0	0	0	13	0	5	0	145	254
Cumberland	1	1	0	0	0	0	0	0	0	2	5
Frederick	1	2	0	0	0	0	0	0	0	1	3
District of Columbia:											
Washington	27	51	1	0	0	12	1	2	0	26	184
Virginia:											
Lynchburg	1	2	0	0	0	0	0	0	0	2	10
Norfolk	2	7	0	0	0	0	0	0	0	3	----
Richmond	4	7	0	0	0	6	0	0	0	1	56
Roanoke	1	2	0	0	0	1	0	0	0	0	14
West Virginia:											
Charleston	0	0	0	3	0	2	0	0	0	3	30
Huntington	----	0	----	0	----	----	----	0	----	0	----
Wheeling	3	0	0	0	0	0	0	0	0	7	30
North Carolina:											
Raleigh	1	0	1	0	0	0	0	0	0	3	14
Wilmington	0	0	0	0	0	1	0	0	0	6	5
Winston-Salem	2	8	1	0	0	2	0	0	0	34	22
South Carolina:											
Charleston	0	1	0	0	0	0	0	0	0	0	32
Columbia	0	0	0	0	0	2	0	0	0	0	27
Greenville	0	2	0	0	0	0	0	0	0	1	----
Georgia:											
Atlanta	5	3	1	0	0	1	0	0	0	1	53
Brunswick	0	0	0	0	0	0	0	0	0	0	1
Savannah	1	0	1	0	0	2	1	2	0	7	34
Florida:											
Miami	1	1	0	0	0	0	1	0	0	0	23
Tampa	2	0	0	0	0	0	2	1	0	0	31
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	0	0	0	0	2	0	0	0	0	18
Lexington	----	1	----	0	0	0	----	0	0	13	14
Tennessee:											
Memphis	12	7	1	0	0	5	2	2	0	31	89
Nashville	3	0	0	0	0	1	1	0	0	10	44
Alabama:											
Birmingham	4	2	1	0	0	10	0	0	0	5	69
Mobile	0	4	1	3	0	1	0	1	0	0	24
Montgomery	0	2	0	0	----	----	0	0	----	0	----

City reports for week ended March 5, 1932—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	0	0	0	0	----	----	0	0	----	0	----
Little Rock	1	1	0	0	0	7	0	0	0	1	11
Louisiana:											
New Orleans	10	8	1	0	0	13	2	5	1	0	143
Shreveport	1	1	1	0	0	0	1	0	1	8	28
Texas:											
Dallas	6	6	2	1	0	8	0	0	0	9	78
Fort Worth	3	8	3	8	0	1	0	1	0	0	36
Galveston	0	0	0	0	0	4	0	0	0	0	20
Houston	3	4	4	0	0	6	0	0	0	0	80
San Antonio	2	0	1	1	0	10	0	0	0	0	82
MOUNTAIN											
Montana:											
Billings	2	0	0	0	0	0	0	0	0	0	11
Great Falls	3	0	1	0	0	0	0	0	0	0	8
Helena	1	0	0	0	0	0	0	0	0	0	5
Missoula	1	3	0	0	0	0	0	0	0	0	7
Idaho:											
Boise	0	0	0	0	0	2	0	0	0	0	11
Colorado:											
Denver	16	9	0	0	0	7	0	0	0	12	94
Pueblo	1	1	0	0	0	0	0	0	0	3	18
New Mexico:											
Albuquerque	1	1	0	0	0	3	0	0	0	0	8
Arizona:											
Phoenix	1	0	0	0	0	5	0	0	0	0	----
Utah:											
Salt Lake City	6	5	0	0	0	0	0	0	0	0	22
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	11	6	3	1	0	----	1	0	----	5	----
Spokane	6	2	8	0	0	----	0	0	----	2	----
Tacoma	2	3	3	0	0	1	0	0	0	3	26
Oregon:											
Portland	6	5	13	9	0	2	0	0	0	4	83
Salem	1	0	1	0	0	0	----	0	0	3	----
California:											
Los Angeles	43	55	3	0	0	30	2	0	0	21	329
Sacramento	3	2	1	0	0	3	0	0	0	2	46
San Francisco	28	15	1	1	0	14	0	0	0	16	169

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	0	0
New York	6	2	3	1	0	0	1	0	0
Rochester	2	0	0	0	0	0	0	0	0
New Jersey:									
Trenton	1	1	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	3	2	0	0	0	0	0	0	0
Pittsburgh	1	0	0	0	0	0	0	0	0

City reports for week ended March 5, 1932—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 NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Indiana:									
Indianapolis	7	5	0	0		0	0	0	0
Illinois:									
Chicago	3	1	0	0	0	0	0	0	0
Michigan:									
Detroit [1]	0	0	1	1	0	0	0	0	0
Flint	0	0	0	1	0	0	0	0	0
WEST NORTH CENTRAL									
Iowa:									
Sioux City	1	1	0	0	0	0	0	0	0
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	0	0
St. Louis	1	1	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	1	0	0	0	0	0	0	0
District of Columbia:									
Washington	2	1	1	1	0	1	0	1	0
Virginia:									
Norfolk	1	0	0	0	0	0	0	0	0
North Carolina:									
Raleigh	1	0	0	0	0	1	0	0	0
Winston-Salem	1	0	0	0	1	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	0	0	0	0
Georgia:									
Savannah [2]	0	0	0	0	4	0	0	0	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	0	0	1	0	0	0	0	0
Tennessee:									
Memphis	0	1	0	0	0	1	0	0	0
Alabama:									
Birmingham	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	1	0	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	1	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	1	2	0	0	0	0	1	3	1
San Francisco	0	0	1	1	0	0	0	0	0

[1] Rabies in man, 1 death at Detroit, Mich.
[2] Typhus fever, 5 cases at Savannah, Ga.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended March 5, 1932, compared with those for a like period ended March 7, 1931. The population figures used in computing the rates are estimated mid-year populations for 1931 and 1932, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 34,000,000. The 91 cities reporting deaths have more than 32,400,000 estimated population.

Summary of weekly reports from cities, January 31 to March 5, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Feb. 6, 1932	Feb. 7, 1931	Feb. 13, 1932	Feb. 14, 1931	Feb. 20, 1932	Feb. 21, 1931	Feb. 27, 1932	Feb. 28, 1931	Mar. 5, 1932	Mar. 7, 1931
98 cities	78	[2] 78	78	67	72	68	64	70	62	73
New England	48	84	65	75	108	70	65	89	48	106
Middle Atlantic	73	53	75	53	65	64	72	56	63	61
East North Central	79	96	74	85	57	66	45	78	66	75
West North Central	81	99	89	55	85	59	66	55	49	71
South Atlantic	84	[2] 75	59	59	88	47	69	77	78	93
East South Central	87	53	87	53	75	59	46	59	35	29
West South Central	152	156	168	118	158	186	119	132	102	118
Mountain	60	78	103	78	52	35	9	87	9	61
Pacific	72	69	63	49	47	59	67	57	57	63

MEASLES CASE RATES

98 cities	445	[2] 473	438	521	533	668	571	703	698	769
New England	2,322	502	2,008	534	1,589	541	1,510	635	1,740	909
Middle Atlantic	226	353	253	398	384	652	466	645	504	874
East North Central	321	151	364	183	577	254	590	300	919	369
West North Central	172	1,489	182	1,314	197	1,087	226	874	241	643
South Atlantic	196	[2] 1,296	245	1,820	359	2,206	282	2,805	424	2,241
East South Central	0	1,034	17	904	12	1,134	0	1,051	17	1,045
West South Central	198	3	320	17	251	24	234	24	257	68
Mountain	284	1,123	198	687	138	1,566	250	1,210	198	1,331
Pacific	1,138	112	931	169	1,125	243	1,296	223	1,313	347

SCARLET FEVER CASE RATES

98 cities	348	[2] 320	385	348	417	346	441	373	475	345
New England	705	534	630	663	738	589	673	606	666	527
Middle Atlantic	445	304	546	322	631	342	694	381	777	359
East North Central	325	331	385	375	356	353	372	364	382	346
West North Central	284	480	235	474	241	497	248	509	231	492
South Atlantic	245	[2] 305	239	320	231	305	284	364	312	354
East South Central	133	423	127	382	75	534	121	558	87	405
West South Central	106	88	49	105	86	139	56	125	66	71
Mountain	250	261	172	400	267	296	172	305	155	305
Pacific	116	145	109	123	128	94	124	145	158	122

See footnotes at end of table.

Summary of weekly reports from cities, January 31 to March 5, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931 [1]—Continued

SMALLPOX CASE RATES

	Week ended—									
	Feb. 6, 1932	Feb. 7, 1931	Feb. 13, 1932	Feb. 14, 1931	Feb. 20, 1932	Feb. 21, 1931	Feb. 27, 1932	Feb. 28, 1931	Mar. 5, 1932	Mar. 7, 1931
98 cities	2	[2] 23	4	18	4	20	4	20	4	13
New England	2	0	2	0	5	0	5	0	10	0
Middle Atlantic	0	2	0	0	0	3	1	0	0	0
East North Central	0	12	1	10	1	13	1	11	7	15
West North Central	9	151	11	84	13	128	19	128	6	57
South Atlantic	2	[2] 0	0	0	0	2	0	0	6	0
East South Central	0	29	6	12	29	18	17	23	17	23
West South Central	13	81	20	132	7	51	7	64	7	47
Mountain	0	44	17	0	0	44	0	9	0	17
Pacific	4	24	17	29	21	22	13	39	4	12

TYPHOID FEVER CASE RATES

98 cities	5	[2] 4	6	3	3	4	5	7	6	4
New England	2	2	2	2	0	0	2	5	5	5
Middle Atlantic	4	1	3	2	4	3	4	6	4	3
East North Central	4	2	2	1	3	0	4	3	6	1
West North Central	2	2	9	2	0	4	2	11	0	11
South Atlantic	4	[2] 18	16	0	10	10	16	22	20	12
East South Central	29	6	58	29	0	0	12	6	17	18
West South Central	23	24	3	14	3	7	7	14	16	0
Mountain	0	0	0	0	0	9	0	0	0	0
Pacific	4	0	10	10	2	12	6	4	0	2

INFLUENZA DEATH RATES

91 cities	33	[2] 61	17	59	20	60	34	50	37	44
New England	10	46	17	46	7	43	14	24	17	19
Middle Atlantic	8	68	13	49	13	42	39	40	42	32
East North Central	12	52	15	56	18	61	37	61	41	48
West North Central	12	35	26	56	49	68	29	74	32	59
South Atlantic	16	[2] 129	18	119	18	123	31	79	33	73
East South Central	38	64	44	64	25	140	44	76	13	140
West South Central	30	73	44	159	50	97	24	45	71	52
Mountain	52	52	60	17	78	61	69	17	34	44
Pacific	12	12	7	14	14	26	14	41	12	34

PNEUMONIA DEATH RATES

91 cities	120	[2] 231	133	218	154	218	157	212	189	194
New England	144	286	117	291	120	276	192	236	192	185
Middle Atlantic	104	293	124	254	162	236	184	217	221	229
East North Central	96	175	108	182	133	187	110	192	158	154
West North Central	160	136	244	124	285	147	244	218	241	218
South Atlantic	165	[2] 325	174	348	163	340	173	313	196	265
East South Central	175	178	182	166	144	267	138	274	169	229
West South Central	172	214	121	176	165	228	108	221	172	149
Mountain	215	209	172	183	198	200	224	191	198	131
Pacific	100	72	137	72	91	70	104	91	102	101

[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 estimated as of July 1, 1932 and 1931, respectively.
[2] Columbia, S. C., not included.

FOREIGN AND INSULAR

SUSPECTED PLAGUE ON VESSEL

On February 15, 1932, the S. S. *Cadacceus* arrived at Avonmouth Docks, Bristol, England, from Rosario, San Lorenzo, and Buenos Aires, Argentina, loaded with grain. On quarantine inspection, a member of the crew was removed to the isolation hospital for observation with a tentative diagnosis of plague. The disease had its inception some three weeks before the patient came under the observation of the authorities, and the distinguishing symptoms had passed. An inspector sent by the British Ministry of Health came to the conclusion that the case was not plague. Only one rat was found on the ship. However, the crew's quarters and effects were disinfected and the entire crew was placed under surveillance, but no additional cases have been reported to date.

CANADA

Provinces—Communicable diseases—Week ended February 27, 1932.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended February 27, 1932, as follows:

Disease	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia	134			1	
New Brunswick [2]					
Quebec			2		14
Ontario	59		1		5
Manitoba		1			1
Saskatchewan					1
Alberta					2
British Columbia				4	
Total	193	1	3	5	23

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

Quebec Province—Communicable diseases—Week ended February 27, 1932.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended February 27, 1932, as follows:

Disease	Cases	Disease	Cases
Chicken pox	84	Puerperal septicemia	3
Diphtheria	35	Scarlet fever	98
Erysipelas	6	Tuberculosis, pulmonary	56
German measles	4	Tuberculosis, other forms	1
Measles	497	Typhoid fever	14
Poliomyelitis	2	Whooping cough	36

ITALY

Communicable diseases—Four weeks ended October 18, 1931.—During the four weeks ended October 18, 1931, cases of certain communicable diseases were reported in Italy as follows:

Disease	Sept. 21–27		Sept. 28–Oct. 4		Oct. 5–11		Oct. 12–18	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	51	43	42	36	30	28	36	31
Cerebrospinal meningitis	9	8	4	4	3	2	10	9
Chicken pox	33	27	52	33	84	47	119	71
Diphtheria and croup	416	239	468	275	486	291	563	320
Dysentery	23	16	26	16	14	12	14	11
Lethargic encephalitis							3	3
Measles	254	90	378	101	430	90	432	130
Poliomyelitis	7	7	15	14	15	12	19	16
Scarlet fever	296	126	423	160	461	177	539	216
Typhoid fever	1,029	505	1,046	509	839	447	882	449

LATVIA

Communicable diseases—December, 1931.—Cases of certain communicable diseases were reported in Latvia during the month of December, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Scarlet fever	55
Diphtheria	98	Tetanus	1
Erysipelas	25	Trachoma	97
Influenza	131	Typhoid fever	43
Measles	13	Typhus fever	12
Mumps	159	Whooping cough	90
Puerperal fever	14		

MEXICO

Tampico—Communicable diseases—February, 1932.—During the month of February, 1932, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	4	2	Measles	9	
Enteritis, various	37	38	Tuberculosis		16
Influenza	27		Whooping cough	24	1
Malaria	266	8			

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		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				Mar. 5, 1932
						19	26	2	9	16	23	30	6	13	20	27	
Ceylon: Colombo	C				3												
	D				3												
China:																	
Canton	C	2			3												
Hankow	C		8	23	14				2	1							
	D		6	1	6				1								
Shanghai	C	125	88	8													
	D	9	13	4													
Swatow	C						1										
India	C	39,223	26,705	15,722	14,314		3,181	4,004									
	D	21,683	13,257	8,801	7,467		1,640	2,004									
Bombay	C	42	4	5	4			1								1	
	D	17	3	1	6			1								1	
Calcutta	C	46	51	74	74	11	19	10	18	25	26	41	41	37	21	19	
	D	15	23	37	42	6	8	5	6	13	14	23	20	18	12	9	
Chittagong	C		1							1			5		1		
	D												1	1	1		
Madras	C	5											1	1	1		
Negapatam	C	1															
Rangoon	C		1	1				1									
	D		1	1				1									
India (French):																	
Chandernagor	C	2	1	1		2			1								
	D	2	1	1		2			1								
Karikal	C	2	1							12	11	12					
	D	2								5	7	5					
Pondicherry	C	4	1							4	11						
	D	2								4	11						
India (Portuguese)	C	34	75	48	3	1											
	D	18	26	11	3	1											

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

CHOLERA—Continued

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

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931: 19	26	January, 1932: 2	9	16	23	30	February, 1932: 6	13	20	27	Mar. 5, 1932
Indo-China (see also table below):																	
Pnompenh	C	2	1	4							1	1					
	D	2	1								1	1					
Saigon and Cholon	C		1		P	1		1			1						1
	D		1														
Iraq:																	
Abulkhasib	C	6															
	D	5															
Amara	C	66	4	5	3	2	P										
	D	59	1	3	4	2											
Amara Province	C	96	95	35	3												
	D	120	83	24	2												
Basra	C	293	157	78													
	D	154	84	36													
Basra Province	C	53	42	10													
	D	30	19	5													
Dinwaniyah	C		1														
Dinwaniyah Province	C		61	23													
	D		44	15													
Iwaniyah	C		23														
	D		15														
Kut Province	C			20													
	D			14													
Muntafiq Province	C	225	209	68	2												
	D	145	160	51	3												
Nasiriyah	C	88	33	24	8												
	D	75	28	18	7												
Suqelshuyukh	C	2															
	D	2															
Japan: Taiwan—Kelung	C			2													
Persia:																	
Abadan	C		1	3	1												
Ahwaz	C		12	103	47												
	D		7	98	39												

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931			January, 1932			February, 1932		
						1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-29
Khorramabad	C				159	2	1							
	D				115	9	1							
Mohammerah	C		1											
Philippine Islands: [1] Capiz Province	C	35	79	12	27	13	4	4	5		13	9	13	10
	D	16	59	9	19	10	3	3	3		10	8	12	8
Siam	C	1												
	D	1												
Ayudhaya Province	C				1				1					
	D				1				1					
Bangkok	C	1			1				1					
	D				1				1					
On vessel:														
S. S. Kasagi Maru, at Moji, from Shanghai	C	1												
S. S. Ankoo, at Nagasaki, from Shanghai	C	2												
	D	1												
Indo-China (French) (see also table above):														
Annam [2]	C											4		
	D											4		
Cambodia [2]	C	12	14	19	4		2	1	1	9	2	3	2	
	D	2	7	18			1	1	1	2	2	2	2	
Cochin-China [2]	C	39	18	14	6	8	3	3	2	1	2	7		P
	D	32	13	18	4	5	2		1	1	2	5		

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] Reports incomplete.

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

PLAGUE

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

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				Mar. 5, 1932
						19	26	2	9	16	23	30	6	13	20	27	
Argentina: Cordoba Province [1]	C						1						1				
Azores:																	
San Miguel Island	C				5												
	D				1												
Terceira Island	C				16												
	D				6												
Belgian Congo	C								1								
British East Africa (see also table below):																	
Tanganyika	C	4	13							10							
	D	4	5							10							
Uganda	C	289	276	218	145	28	13	9	13								
	D	207	270	211	138	24	15	10	13								
Canary Islands: Palma Island—Los Lanos	C									8							
	D									5	3						
Ceylon: Colombo	C	3	4		1				4	1	2		1		1	1	
	D	3	3		1				4	1	2				1	1	
Plague-infected rats					1				1	1							
Chile:																	
Santiago	C			1													
	D			1													
Plague-infected rats				1													
China: [2]																	
Shansi Province [3]	C			P													
Shensi Province	C			P												P	
Dutch East Indies:																	
Java—																	
Surabaya	C									1	1						
	D									1	1						
Tegal	C														1		
Java and Madura	D	233	325	512	702	179	151	136	121								
West Java	C	65	113	139	198	64	54	39	46	34	48						
	D	65	113	139	198	64	54	39	46	34	48						

Ecuador (see table below).																	
Egypt:																	
Alexandria	C	5	1	6	3					1	1					1	1
	D	2		2	3												
Assiout	C				1	1	1					1					
	D				1	1	1					1					
Beheira	C	2									1	10					
Dakahlia	C										1	1					
Girga	C				2	1											
	D				2	1											
Kena	C				4			1	1								
	D				3			1	1								
Minieh	C			4	2	1		3	3			1					
	D			2		1		3	3			1					
Port Said	C			2	4		1										
	D				2		1										
Tanta	C	2			2							1					
	D				2							1					
France: Rouen—Devilleles	C			P													
Hawaii Territory:																	
Hamakua—Honokaa	C													1	1		
	D													1	1		
Plague-infected rats															1		
Maui Island—																	
Hallimaile—Plague-infected rats		1															
Makawao	C																1
	D																1
Plague-infected rats		1												4			
Pala—Plague-infected rats			1														
Paaulo—Plague-infected rats				1													
India	C	1,832	2,550	2,493	4,235	1,131	1,256	1,195									
	D	772	1,147	1,170	1,739	526	575	715									
Bassein	C	4	1	1								1		1	1	1	
	D	4	1	1										1	1	1	
Bombay	C		1	1	1									1			
	D		1		1									1			
Plague-infected rats		57	42	22	56	17	7	9	9	8	18	14	17	21	27	30	
Madras Presidency	C	376	185	91	57	30	76	63		87	99		22	24			
	D	162	105	40	24	3	26	30		58	54		14	15			
Moulmein	C	5															
	D	9	2														
Rangoon	C	3		5	1		1	1		1	2	2		1	4	3	
	D	2		1	1		1	1			1				4	3	
Plague-infected rats		4	4	1	2		1	1								1	
Indo-China (see table below).																	

[1] 10 cases of bubonic plague were reported in Cordoba Province, Argentina, in January, 1932. They were distant from railroad and 500 kilometers from ports.

[2] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On Sept. 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[3] On Oct. 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths in Hsinghsien.

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

PLAGUE—Continued

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

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931: 19	26	January, 1932: 2	9	16	23	30	February, 1932: 6	13	20	27	Mar. 5, 1932
Iraq:																	
Baghdad	C	3		2	7	1			1	2	1	1	1	1	1		1
	D	1			2												
Maudhan	C			3	2												
	D			1	1												
Madagascar (see also table below): Tamatave	C	2	1				1										
Morocco	C		18	2	11												
	D		8	6													
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	4	4	5	5	1				1							
	D	3	3	2	2	1				1							
Spain: Hospitalet—Barcelona Province	C	2	2	7													
	D	1	1	1													
Syria: Beirut	C	2	3	1													
Tunisia: Tunis	C	1	1														
Union of South Africa: Orange Free State	C	P	P		P			P		P	P						

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932	February, 1932
British East Africa (see also table above): Kenya	C	235	14	64	44	41	17	
Ecuador:								
Province—								
Chimborazo	C		13	2	8		8	13
Loja	C		4	11	2		11	
Indo-China	C		4	3		9	16	1
	D		4	1		5	9	1

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932	February, 1932
Peru—Continued.								
Departments—Continued.								
Lambayeque	C		1					
	D		1					
Libertad	C				2		1	
Lima	C		1		9		6	
	D		1		4			
Plague-infected rats				1				

Madagascar (see also table above):								
Ambositra Province	C	2	1	8	39	142		
	D	1	1	5	37	121		
Antisirabe Province	C	22	19	17	27	56		
	D	22	19	17	27	51		
Maevatanana Province	C				4			
	D				4			
Miarinarivo Province	C	20	14	18	10	14		
	D	19	12	16	9	14		
Moramanga Province	C	3	12	13	25	30		
	D	3	11	11	25	29		
Tananarive Province	C	45	65	120	186	248		
	D	44	63	117	178	241		
Peru	C	19	2	8	27	21		
	D	14	2	7	11	9	11	
Departments—								
Canete	C						3	
Cajamarca	C				14			
	D				5			
Lima	C						1	
	D						1	
Piura	C				8			1
	D				7			
Senegal:								
Baol [1]	C	101	13	6	2			
	D	58	8	2				
Dakar [1]	C	194	45	4				
	D	106	31	4				
Diourbel [1]	C		13		10			
	D		5		5			
Louga [1]	C	2	10	1	19			
	D	1	4	2	10			
Rufisque [1]	C	2	1	7	12			
	D			1	2			
Thies [1]	C	26	12	7	16	1		
	D	16	8	5	7	1		
Yombel [1]	C							P

[1] Reports incomplete.

SMALLPOX

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

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				Mar. 5, 1932
						19	26	2	9	16	23	30	6	13	20	27	
Aden	C												2				
Algeria:																	
Algiers	C			1		1											
Constantine	C	1															
Southern Territories	C													2			
Brazil:																	
Porto Alegre (alastrim)	C	48	46	57	51		14	8	13	7	4	17	6				
	D	4	2	3	1		1		1								
Rio de Janeiro	C						1										
Santos	C				1					2							
British East Africa: Tanganyika	C	50	1,184	18	2				55	4							
	D	5	97	2					4								
British South Africa:																	
Northern Rhodesia	C		1						7								
Southern Rhodesia	C	3							1								

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

SMALLPOX—Continued

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

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931: 19	26	January, 1932: 2	9	16	23	30	February, 1932: 6	13	20	27	Mar. 5, 1932
Canada:																	
Alberta	C		12	6	3	9		2									
British Columbia [1]	C	2		2					2	1	4	8	5	8	10	4	8
Manitoba	C	1			2						5		5				
Winnipeg	C	1															
Nova Scotia	C				1											1	
Ontario	C	6	17	15	11	10		2	2	3	2		1	4	16		
Kingston	C	1															
North Bay	C									1							
Ottawa	C	1	8	12													
Toronto	C				1												
Quebec	C							2	1		1						8
Saskatchewan	C	33	11	33	34			1	10	21	7		7		23		
Regina	C		2														
Chile:																	
Santiago	C			3													
	D			2													
Tocopilla	C							2									
China:																	
Amoy	C	1	2	8	46	60	66	49	43	37	60	54	32	35	34	30	22
	D	1	1	6	36	22	20	19	18	14	28	20	29	11	14	12	7
Canton	C	1		2	14	6	3	5	4	3	11	5	8	18	6		
Foochow	C	P	P	P	P		P		P		P		P				
Hankow	C		1	18	29	1	6	34	6	11	32	15	1				
	D				6	1	1	7	3	1		2	2				
Hong Kong	C								1	1		4	6	7	19	19	
	D									1		1	4	2	9	9	
Manchuria—Dairen	C				1								1	1			
Nanking	C				2												
	D				1												
Shanghai—																	
Foreigners only	C		98	21	77	16	40	18	41	43	48	40	32	48	30	44	
Including natives	D	2	13	2	31	8	13	6	14	11	21	17	13	24	18	17	
Swatow	C							2									
Tientsin	C				1								1				

Chosen (see table below).																
Colombia:																
Cali	C					1										
Santa Marta	D	1														
Dutch East Indies: Batavia	C					1							1			
	D												1			
Egypt: Cairo	C									1						
Eritrea	C	10														
	D	2														
France (see table below).																
Germany: Aix-la-Chapelle	C										1					
Great Britain:																
England and Wales	C	97	161	220	216	44	32	54	68	68	55	55	49	70	73	73
London	C	32	58	129	118	18	14	28	40	24	36	22	18	44	38	32
London and Great Towns	C	88	128	179	191	31	22	43	56	60	45	37	46	59	57	53
Honduras:[2]																
Ceiba	C		14													
Puerto Castilla	C		1	1		1		1	1			1			1	2
Tegucigalpa	C				8											
Trujillo	C	1	1	1												
India	C	1,705	1,451	1,152	2,298	362	426	619								
	D	433	224	246	1,066	84	96	110								
Bassein	C										1		2			
Bombay	C	5			1	2			1	3	1	3	1	3	2	5
	D	1			1	1			1			2		2	1	1
Calcutta	C	5	1	1	1		1	1	5	7	3	7	10	9	25	35
	D	5	1	1	1		1	1	1	3	1	3	8	6	7	18
Cochin	C		8	5							1			1	1	4
Karachi	C			1	5	2	1			2	2	12	2	9	11	8
	D									2	1	2	1		5	3
Madras	C	1	13	5	7	1	2	3	1	1	3	3	2	4	2	2
	D		2		2		1	1			2	1			3	
Moulmein	C									1			3	2		
Negapatam	C	4	2	1	1											1
	D		1	1	1											
Rangoon	C	2	3	3	9	4	4	18	13	15	35	58	39	141		104
	D	1	2	1	7	1		2	7	7	8	15	10	18	46	29
Tuticorin	C	2	4	5	8	2	2		2		19	9		9	5	75
	D		1	1							2			2	1	
Vizagapatam	C	6	6						2						1	1
	D	6	1													
India (French):																
Karikal	C	7	8	4	7			4				1				
	D	3	4	3	7			2				1				
Pondicherry Province	C	26	23	38	26	10	7	1	4	4	11	4	13	8	4	4
	D	24	21	36	25	10	7	1	4	4	6	4	13	8	4	4

[1] 23 cases of smallpox with 8 deaths were reported at Vancouver, British Columbia, from Jan. 1 to Feb. 18, 1932.
[2] 500 cases of smallpox with 15 deaths were reported in Honduras from July, 1931, to February 16, 1932.

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

SMALLPOX—Continued

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

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				Mar. 5, 1932
						19	26	2	9	16	23	30	6	13	20	27	
Indo-China (see also table below):																	
Pnompenh	C										1			2			
Saigon and Cholon	C	6	6	7	26	13	8	3	8	23	28	43	23	38	46	33	
	D	3	3	5	12	9	6	2	7	18	22	35	17	24	23	28	
Iraq:																	
Baghdad	C	1			11	3	4	4	4	5	2	2	1	2	1	1	
	D				5	1	2	2	3	9	2	2		2	1	1	
Basra	C								1		1	1		1	1		
	D								2								
Mosul Liwa	C		5														
Ivory Coast (see table below).																	
Jamaica	C				1												
Japan:																	
Taiwan	C											20			55		
Yokohama	C				1				1	2							
Mexico (see also table below):																	
Chihuahua	D													1		1	
Jalisco (State)—Guadalajara	D		4	2	1	1				2			1				
Mexico City and surrounding territory	C	5	7	5	10	6			2		3	6	5	7			
	D	2	4	1													
Monterrey	C			2						1					1	2	
San Luis Potosi	D							1	1	2	1	2			1		1
Torreon	C	2	1		7				2	2		3	1				2
	D	1							2	1			1	1			2
Morocco (see table below).																	
Netherlands: Friesland—Opsterland	C			[1] 1													
Nigeria	C		454	69	15												
	D		141	15	1												
Panama: Chiriqui	C				3												
Poland	C	1		2	1	1											
Portugal:																	
Lisbon	C	66	48	78	91	35	14	26	33	38	22	31	7	21	5		
Oporto	C				2	1			1	2			1	4	1	1	

Rumania (see table below).																	
Siam	C	3				8			5		1						
Straits Settlements	C						2					4		1			
Sudan (Anglo-Egyptian)	C	32			2				2			3				3	5
	D	6										1					1
Sweden: Malmo	C											9					
Syria (see table below).																	
Tunisia: Tunis	C								1								
Union of South Africa:																	
Cape Province	C			P	P	P	P	P	P								
Natal	C	P															
Orange Free State	C	P	P														
Transvaal	C			P	P												
On vessel:																	
Brazilian ship Jaboatao at New Orleans from Brazil	C							1									
S. S. Tacoma at Manila from Shanghai	C								1								
S. S. Cressington Court at Yokohama from Shanghai	C									1							
S. S. Bollington Court at Yokohama from Shanghai	C									1							
S. S. Victoria City at Brisbane from Shanghai	C									1							
S. S. Bellasco at Mobile, from Habana, Cuba, and Hull, England	C								1								

Place		August, 1931	September, 1931	October, 1931	November, 1931			December, 1931			January, 1932			February, 1932	
					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	72	39	47	20	2	98	144	41	324	11	107	191	145	206
	D	26	13	16	4		18	17	21	55	11	52	85	47	98
Ivory Coast	C	7			1										
	D	4			1										
Syria: Beirut	C										2	3			

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932
Chosen	C	19	9	7	2	1	1
	D	7	1	1			
France	C		4		6	1	

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932
Mexico (see also table above)	D	731	565				
Morocco	C	23	59	91	152	279	488
Rumania	C	1					

[1] Imported case.

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

TYPHUS FEVER

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

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Week ended— November, 1931		December, 1931				January, 1932					February, 1932			
					21	28	5	12	19	26	2	9	16	23	30	6	13	20	27
Algeria:																			
Algiers	C		1	2					1		3		1						
Constantine Department	C	2	1	38	1		1	1	1		3	1	2		3	2			
Geryville	C												5		2		1		
Oran	C	1		1	1														
Bulgaria	C	1		2		2		2	1	14	1	6	16	12	13	3	1	29	
	D								1	1	1			2	3	1		3	
Chile:																			
Antofagasta	C			1						1					1				
Santiago	C			34	3														
China:																			
Manchuria—Harbin	C	1																	
Shanghai	C		1																
Chosen (see table below).																			
Colombia: Cali	D	1															1		
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	2							3		1	1					1		
Beheira	C			1						7								63	
Cairo	C	1						1											
Gharbieh	C			1						1									
	D			1															
Provinces	C										11		4		13	26	26	11	104
	D										2				2	1	1	2	5
Greece (see table below).																			
Guatemala (see table below).																			
Irish Free State:																			
Donegal County—Stranorlar	C							2											
Limerick County—																			
Croom	C		1																
Glin	C	2	1																
Limerick	C							1											
Rathkeale	C		1																
Waterford County—Lismore	C										1								

Place																			
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico:																			
Guadalajara	D									1									
Mexico City, including municipalities in Federal District	C	10	14	16	7	3	5	7	4	3	3	1	5	10	4	6	7		
	D	4	8	4	1	1	1	1	2	1	1	2	1	4	2	2	1		
San Luis Potosi	D									1									1
Torreon	C		2	3															
	D		2	6															
Morocco	C		4	1			11	6	4	1	1	3		2	1	3	7	19	19
	D							2	1										
Palestine	C	4	6	3		1			2	1		1	1	1		1		1	
Paraguay: Asuncion	D	1																	
Peru.[1]																			
Poland	C	11	14	20	16	36	32	22	68	30	46	49	69	61	74	61	49	41	
	D		1	3	2	2		6	5	5	3	1	4		4	2	2	3	
Portugal: Oporto	C	2		3											1		1		
Rumania	C	13	18	38	13	13	13	29	25	41		42	62	83	68				
	D	1	3	9	1	1	2	2	4	5		1	3	1	8				
Tunisia: Tunis	C	3		3			26			1		1				1	13		11
	D						2										1		2
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P		P	P	P	P	P	P	P	P	P					
Municipality of East London	C	P																	
Natal	C	1	P			P	P	P	P		P								
Orange Free State	C		P	P				P	P	P	P	P	P	P					
Transvaal	C	P	1	P	P	P	P	P	P	P	P	P	P	P					
Venezuela: Caracas (see table below).																			
Yugoslavia (see table below).																			
On vessel: At Antofagasta, from Iquique and points north	C									1									

Place		July, 1931	August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932
Chosen: Seoul	C	1	33	12	24	4		
	D	1	5		1	1		
Czechoslovakia	C				18		10	
	D				1		3	
Greece	C	2	13	9	12	4	6	
	D		2	1			1	
Guatemala	C	34	3					
	D	5						

Place		July, 1931	August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932
Latvia	C						12	
Lithuania	C	8	2		5	9		
	D				1			
Turkey	C	9	5	16	11	14	21	14
	D						2	3
Venezuela: Caracas	D						1	2
Yugoslavia	C	3	1					11

[1] Typhus fever has been reported in Peru from May to November, 1931, 153 new cases being reported during the months of October and November. The disease has not spread to the coastal regions.

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

YELLOW FEVER

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

Place		July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Week ended— November, 1931		December, 1931				January, 1932					February, 1932				Mar. 5, 1932
						21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	
Brazil:																					
Alagoas State	C	3																			
	D	2																			
Maceio	D				1																
Utinga	C				3																
	D				2																
Bahia State	C											2									
Ceara State	C	1																			
	D	1																			
Sobral	C				1																
	D				1																
Pernambuco State	C		2																		
	D		2																		
Pau d'Alho	C				1																
	D				1																
Recife	C			1																	
	D			1																	
Santa Teresa (about 56 miles from Victoria)	D																				
Gold Coast:																					
Cape Coast	C																				P
Dagomba District	C	4						1													
Kete Krachi	C			1																	
Oda	C		1																		
	D		1																		
Salaga	C							1													
	D							1													
Tamale	C			2	1		2	1													
	D			2																	
Wale Wale	C	1																			
	D	1																			
Ivory Coast:																					
Grand Bassam	C	4	1																		
	D	2	1																		

Seguela	C	P																				
Tehini	C				1																	
Nigeria	C	1			2		2													1		
	D	1			1		2															
Senegal:																						
Podor (Hinterland)	C	1																				
	D	1																				
St. Louis	C			1																		
Thies	C			1																		
	D			1																		
Sudan (French): Macina—Kayo Circle	C				2																	
	D				2																	
Togo (French): Atakpame—Anie Circle	C				1				1													
	D				1																	
Upper Volta:																						
Banfora	C			2																		
	D			1																		
Dedougou	C				2																	
Diarabakoko	C			2																		
	D			1																		
Ouagadougou	C		1	2																		