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A PROGRAM FOR CIVILIAN MENTAL HEALTH [1]

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Twenty years ago it would have been impossible if not fantastic for a layman like myself to come before an audience such as this and suggest the means for dealing with a grave, an immediate medical emergency affecting every one of America's millions.

But America's millions are interested too. They are interested as citizens and taxpayers. In accidents, death, destruction, broken homes, and disorganized lives, they have seen the results of mental disease.

What must be done, how it shall be done, are your problems. But public policy demands that it *shall* be done.

These things lie very close to the heart of the work of the Federal Security Agency. They are fundamental in education. They are fundamental factors in planning social security for the aged and the needy. They are part of the everyday business of the United States Public Health Service and Saint Elizabeths Hospital.

The poets, the playwrights, the novelists—laymen, if you will—were the first students of man as man. For centuries they applied instinctive insight to the interpretation of man's behavior. In modern years, the poet has had psychiatry's explicit understanding with which to illumine intuition. And so it seems especially fitting that I, as a layman, should express the hope and the challenge of psychiatry in the words of a modern poet, Robert E. Sherwood, in his play "There Shall Be No Night." The central character of that play, a Finnish psychiatrist, says:

> You have heard it said that the days of exploration are over—that there are no more lost continents—no more Eldorados. But I promise you that the greatest of all adventures in exploration is still before us—the exploration of man himself—his mind—his spirit—the thing we call his character—the quality which has raised him above the beasts. "Know thyself," said the oracle. And after thousands of

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years, we still don't know. Can we learn before it is too late—before the process of man's degeneration has been completed and he is again a witless ape, groping his way back into the jungle?

Our democracy has reason to believe that in knowledge is strength. Our very hope for a world worth fighting for, worth living in, lies in our understanding of man's intrinsic worth. And that understanding is measured in ever-increasing degree by the rich promises of continued advances in psychiatry.

The hope gives us courage, but the challenge is sharp, ominous. "Can we learn before it is too late?" More urgently, can we apply what we *do* know before it is too late?

Psychiatry today has a sufficient body of knowledge to detect incipient and frank mental disease, to apply rational treatment not only to acute and chronic disorders but even to their early manifestations. But I believe that today we can envision for psychiatry an even more significant role than the discovery and alleviation of mental disease. Psychiatric knowledge when applied can help human beings to a better understanding of their own problems and the relation of their own behavior to that of other people. We have need to do this, for the war now engulfing the world is far more a war of the spirit than a war of body against body. Can we build in human beings stronger bulwarks of emotional defense against the onslaughts of a world crisis more grave than any recorded in history?

We have already asked so much in the way of adjustment on the part of human beings. We ask parents to adjust their lives for the sake of the children; we ask the youth of the Nation to adjust themselves to our machine civilization. The worker is expected to adjust himself to his place in the industrial scheme, the employer, to the economic needs of our society. Our old people are asked to adjust themselves to advancing age and retirement from their former status of family and social authority. And now millions of young men are expected to adjust themselves to the tensions of military service, an environment totally different from their usual way of life.

Society's "great expectations" for an extremely high spiritual performance by mankind cover virtually the entire population, civilian as well as military. I think we should all consider our chances for realizing our expectations, the means at hand to attain the objective, and the tools we need to do the job.

What then is our emergency problem in relation to mental health?

I feel an intellectual embarrassment akin to that of the man who brought coals to Newcastle when I present this audience with the fact that there are some 750,000 patients with mental and nervous diseases in American institutions whose care costs the United States in the neighborhood of $250,000,000.

I mention it with some hesitancy for this reason. True, we owe

a debt of gratitude to the statisticians and economists for defining the current magnitude of one sector of the mental disease problem. But as a responsible citizen who, with my contemporaries, must help you, the experts, solve this problem, I find myself bogging down in the face of such a discouraging statement, especially when it is coupled with the thought that mental disease is on the increase. The danger is that we exclaim, "Isn't this appalling!", and let it go at that.

It is much easier to push large, impersonal figures into the back of the mind than to face the poignant experience of a man in the prime of life, suddenly stricken with an acute mental illness, removed from his home by the local police in the patrol wagon to a county jail, incarcerated there until a bed becomes available in the large, overcrowded, understaffed State hospital. You know far better than I what his chances are for speedy, satisfying recovery, under such conditions.

The load of mental disease today is very large; the chronicity of a very large proportion of cases makes the burden excessively heavy in terms of economic loss and cost. But the magnitude of the problem should not, must not, blind us to our own poor performance in lightening the burden. I say "must not" for if the current picture is discouraging, the outlook for the future is even more threatening.

We in this country have not felt the incalculable strains resulting from actual conflict. But we have already begun to experience the strains of "psychological" war and of the disruptions incident to our preparedness efforts. Competent experts are here today to discuss with you the effects of the emergency upon the industrial worker, the soldier, and their families. I need scarcely tell you that the well-being of these groups is the very life-blood of national safety.

An eminent bacteriologist once told me that when an external enemy threatens a colony of bacteria, the great mass of individuals group in such a way as to increase the efficiency of the "fighters," the members of the colony who go out and attempt to deal with the enemy. For group survival, we must accept just this same clear responsibility, and *now*.

Industrial and military efficiency are immediate, urgent requirements for the survival of democracy. And we have come to accept the fact that efficiency functions not in the performance of machines, but in the performance of human beings. Their performance, in turn, depends upon that indivisible whole—emotional and physical status. Thus, if we are to survive, we must first of all follow the example of the lower organisms and group together to increase the efficiency of those who will, either in industry or the armed forces, actively defend our civilization.

Action has already been taken by the several Government agencies and by cooperating organizations such as the American Psychiatric

Association to insure the recruitment and induction into the armed forces of men emotionally as well as physically fitted to withstand the strenuous demands of military service.

The fate of those who are rejected because of incipient mental disease, obvious psychoses, mental defect, or even emotional instability, is very definitely a civilian mental health problem. Are we to write them off as so much waste material? Can we afford to do so when we know that we shall need, somewhere in our defense effort, every man and woman who can contribute anything at all?

A great many such persons can, without any special treatment, make a very valuable contribution in work best suited to their individual abilities. But we do not yet know what the effect of a rejection because of psychic defect has upon the rejected individual. It can be a very damaging experience. Whether it is or not depends almost entirely upon the way the situation is dealt with in the civilian community. Again, another group of rejected individuals can, with some expert assistance, make a more satisfactory adjustment to civilian life than they have hitherto. We need this kind of improvement—salvage, if you please. In short, I am thinking of our present program for sifting out the fit for service in the armed forces as a case-finding mechanism for the improvement of civilian mental health.

I wish that I could say that definite plans have been formulated for the detection of mental disorder in the employment of industrial personnel. Although the requirements for efficient performance in the complexity of industrial production may not be so rigid as in the selection of military personnel, it is safe to say that a large proportion of the personnel problems in industry could be prevented by a wider application of psychiatric concepts to the employment and placement of workers. Many of the large industrial concerns have taken this important step, and have found it valuable not only in promoting efficiency but even in economic savings. The same may be said of psychiatric services maintained in many companies for the detection and amelioration of mental disorders occurring on the job.

Despite these constructive programs, the fact must be emphasized that more than 60 percent of all industrial workers in the United States are employed in small plants, with 500 workers or less, most of which have no industrial hygiene program and no medical service, let alone programs for mental health. An aggressive industrial hygiene program in the defense industries has been put in motion and is proceeding with all the speed that limited resources and lack of trained personnel will permit. That program, as you will hear later on, very definitely includes consideration of the mental health problem. Nevertheless, I am convinced that its solution will require the active participation of all the resources available for civilian defense.

Let me be more specific. How many times could the improvement of a difficult home situation solve the problem of one worker whose emotional difficulties not only hamper his efficiency, but also that of a large number of his associates? Inadequate housing, insufficient income to provide adequate diet for his family, dependent aged relatives, catastrophic illness, even mental disease in the family—these are common situations definitely affecting the emotional well-being of the worker, and I may say, affecting the efficiency of the soldier in the far-off cantonment. Such situations must be met at home, in the civilian community. Thus, we can see that one facet of a program for civilian mental health is the coordination of all services that contribute to the health and welfare of the individual and focusing them upon the promotion of mental well-being.

We have further to consider the more distant future, though none of us can visualize what it holds for us in terms of increase or decrease of mental disorder. We cannot say when this present world conflict will end. We have accepted our responsibility in determining how it will end—that is, we are committed to defend and preserve here and abroad the democratic way of life. The conflict will end, but we do not know what the adjustment period will bring. I think we are all agreed that we must expect more serious social and economic dislocations than we have yet experienced. Serious thought is already being given to how we can provide "shock-absorbers" for social and economic disruption. It is equally important that all our best minds turn attention to the means of offsetting the emotional dislocations we know will result in a post-war period.

The experience of the last war stands before us, a silent but potent warning. We have no reason to believe that the readjustment of soldiers and sailors to civilian life will be easier than in the past. The United States Veterans' Administration has hospitalized no less than 358,670 cases of mental and nervous disease since 1921. No one will dispute that many of the destructive manifestations in post-war civilian life—crime, alcoholism, divorce, disregard of morals and of adult responsibility—had their roots in psychic disturbance. Our problems may well be more widespread, more malignant than they were during the twenties and thirties.

One of the first matters to be considered in planning for civilian mental health is the successful readjustment of demobilized men to civilian life. Such a program should include not only the discovery and intensive treatment of early cases of mental disease, but also guidance for men who, although not ill, are experiencing emotional difficulties in returning to family life. This task is not a light nor an easy one. The longer demobilization has to be delayed, the longer a very important group of young Americans will be exposed to the difficult environment of military service, and the more complex will be

their and the community's problems during the period of readjustment.

Our present burden of discovered and undiscovered mental illness is great, the nature and magnitude of our future task, obscure. The disastrous results of further neglect on the part of society are unimaginable. Perhaps in no other area of human endeavor does the warning "It is later than you think" apply so aptly as in our efforts for mental health.

What do we have at hand to meet the emergency? Psychiatric knowledge already far outstrips its application. Much more can be learned, and will be learned as greater attention is paid to research in nervous and mental diseases. Psychiatry in the United States is far more advanced than in any other country. We have reason to be proud of the position of world importance occupied by our research and our clinical achievements.

Yet there are in the United States today only 3,000 trained psychiatrists. Psychiatric nurses number perhaps 6,000. And for psychiatric social work and occupational therapy, two of America's unique contributions to clinical psychiatry, we have some 1,500 trained workers.

What is more disturbing, medical education has not equipped general practitioners to recognize mental disease in its early stages, nor to apply psychiatry in the treatment of a very large number of their patients whose bodily ailments are clearly psychic in origin. Yet, it is impossible to see how we can make further progress in mental hygiene without the informed interest of the general practitioner. It is he who first sees the great majority of incipient cases; it is he to whom the neurotics turn with their subjective symptoms, very real to them, for which he can find no demonstrable physical cause.

But graduate and undergraduate psychiatric training in our medical schools should be more than encouraged; it should be pushed with every resource at our command. It would be useless even to toy with the idea of attacking our civilian mental health problem if the immediate future offers no hope of a continuing, ever-increasing supply of physicians aware of the implications and opportunities in psychiatry.

Not only the major share of case-finding but even a part of treatment can be done by the well-trained general practitioner. The psychiatrist should be regarded as the consultant and the specialist in the treatment of mental disease. We do not propose to increase the scope of the psychotherapist's functions, but the supply of trained psychiatrists must be increased.

We do not have a sufficient number to do the job which confronts us at the moment. Indeed, the problems of maintaining professional staffs for the care of the mentally ill become increasingly acute with

every passing day. The draining off from mental institutions of young physicians to supply the needs of the Army and the Navy is already imposing grave hardships, not only in State, city, and county hospitals, but even in the psychiatric service of the Veterans' Administration.

Even in normal times, public mental institutions have been seriously understaffed. The most recent estimates indicate that in State mental hospitals alone the present medical staff is only 42 percent of its required strength, and the nursing staff only three-fourths of minimum standard. We need at least 1,000 more physicians and 10,000 additional nurses and attendants, this without planning for future increases in mental patients and future depletions of staff through the draft.

This brings us face to face with the present status of public care of the mentally ill. As in the study of any other social program, the national picture of mental hospitals reveals marked variations in facilities and services. As in other social programs, the variations in public care of the mentally ill cleave fairly closely to the line of State financial competence. The poor States have poor facilities and services. The wealthier States have better facilities and services.

But within these clear-marked lines, there are variations for which economic and regional considerations can offer no excuse. Some States, some regions, invest sufficient funds to maintain adequate or nearly adequate facilities. Other States simply do not accept their clear responsibility.

Our public hospitals for mental patients are notoriously overcrowded. Recent estimates indicate that mental hospitals for the Nation as a whole are overcrowded 11 percent in excess of their rated capacity. In some States overcrowding is below the national rate; but in New England and the Pacific States, the rate is from 15 to 24 percent. Even to meet present conditions, it is estimated that an additional 130,000 beds for mental patients are needed. Equally sharp variations exist in the provision of ancillary services such as dental care, occupational therapy, and psychiatric social work for the mentally ill.

With these many problems before us, how can we best plan a program for civilian mental health? I think it is obvious that we must first safeguard and improve our existing facilities for care of the mentally ill.

State legal provisions for admission to public mental hospitals should receive early attention. State laws vary from the intelligent method of commitment upon the recommendations of qualified physicians to inhumane trial by jury.

Politics should be taken out of the administration of public mental institutions. It is almost impossible to look for substantial progress

in our care for the mentally ill until some merit system is applied to the personnel employed in State, city, and county mental hospitals. With each political upheaval, the personnel of such institutions in localities where there is no civil service system are subject to dismissal. Obviously, no continuing program can be developed and pursued under such conditions.

Likewise, our public mental institutions should provide better opportunities for able young men and women on their medical and nursing staffs. Not only should job security apply, but salary scales should be established to attract and to hold competent professional personnel in our public hospitals.

I have already indicated the need for increased emphasis on psychiatric education in our medical schools. More thought must be given to recruitment for psychiatric service, especially with the threat of loss of staff to the armed forces staring us in the face.

Psychiatry has not yet tapped all the reservoirs of qualified recruits. For example, there are today 300 women psychiatrists in the United States; the success of women in this field is undisputed. There are a great many young women physicians who, with appropriate post-graduate training in psychiatry, could render highly competent service in mental hospitals. Here is a group exempt for obvious reasons from service in the Army and Navy medical corps, yet of enormous potential value in civilian service. Older men physicians, beyond the draft age, also should be considered for intensive post-graduate training in psychiatry.

The essential requirement for such training is interneship or residency or both in the very best type of mental hospital. Governmental and private institutions which fall in this category could make a significant contribution to the solution of the emergency problem by providing such interneships and residencies.

Even if we could meet, overnight, all the needs for medical personnel, we have only scratched the surface. A highly competent and sufficient staff of psychiatrists will not compensate for underlying defects in the hospital's concept of care of the mentally ill. In fact, "treatment" rests not in the hands of the physician alone but in the work of nurses, attendants, and other employees of the hospital. It rests also in the administrative program, the equipment available, and in the spiritual atmosphere of the institution.

I am wondering if we do not need, in planning for civilian mental health, to plan for the study and reconditioning of our performance in rendering care for the mentally ill. It is well enough, indeed essential, that we enumerate our lacks in facilities and personnel. Should we not also study the quality of our service?

New construction will be needed in some areas in order to bring hospital facilities up to the minimum standard. However, this does

not mean that we shall have to provide 130,000 new beds to meet existing needs.

Many general hospitals are establishing psychiatric units, where acute recoverable cases of mental disease can be given intensive treatment. This development should be encouraged in our community organization for defense. Although many areas will need new construction to provide adequate general hospital facilities, in other areas there are many general hospitals with empty beds. In line with our policy to coordinate and use all available resources, communities should draw upon these sources in meeting their mental health problems. Likewise, plans for new general hospital construction should take account of the needs of the community for treatment of mental patients.

The construction of a few beds in an appropriately equipped unit is a good investment, even though the administrator of a general hospital recognizes the relatively high cost of diverting space to mental disease cases. True, they are "fixed" beds, they can no more be used for an overflow from the accident ward than can beds in the contagious disease unit. But let it be remembered that our greatest hope of stemming the flooding tide of chronic mental disease lies in prompt, intensive treatment of patients with acute, recoverable disorders, in an environment which does not bear the stigma of a mental hospital.

Many patients with mild, chronic disorders can make a successful adjustment to life outside the hospital, after a period of treatment. The "boarding-out" system adopted by a number of public mental hospitals has proved successful not only in releasing much needed beds but also in improving the status of the patients. Further developments in this direction may well be considered in planning for civilian mental health.

Here and there in the United States, local public health departments are establishing mental hygiene units in their administration. Although in an experimental stage, we shall follow this work with great interest. The unit is headed by a psychiatrist, who works closely with public health personnel and private physicians. He has an excellent opportunity to plant psychiatric concepts in the professional approach to the community's health problems. Medical health officers, school physicians, and public health nurses gain from him valuable aid in dealing with the emotional problems of individuals whose health problems daily concern them. In his consultant capacity, the psychiatrist in a mental hygiene unit can be of great assistance to local practitioners and to other community agencies.

The joint action of the Selective Service System and the Army for the detection of mental disorder in men called for military duty imposes definite responsibilities upon local communities. Plans must

be made and put into effect for the protection of men rejected because of mental disorder or emotional instability. We are in danger of doing irreparable harm through our efforts to secure for the Army the type of man best suited to full military duty. Rejection calls for explanations; explanations lead to speculation, and the first thing you know, name calling buzzes through the community. A successfully adjusted, adequate person is pilloried, perhaps loses his job. Obviously, the civilian authorities must work out some way of handling these incidents with discretion and tact so that no individual suffers social or psychic injury.

This situation certainly points to the urgent necessity for public education—another long-overdue activity for civilian mental health. Psychiatry at best has done a meager and ineffective job in making itself known to the general public. Yet, it is well known that, in the hospital and in the psychiatrist's office, age-old superstitions, fears, and the stigma which even today attaches to the simple act of seeking help, handicap the treatment of patients. Indeed, in some of our public hospitals, valuable members of the staff spend their entire time talking to families and friends, trying to teach the whys and wherefores of mental disease, its cause, its course, and its cure.

It is my feeling that the psychiatric profession and all other organizations that can contribute anything to education of the public in this field must do so now. It is all very well to talk of directing a frontal attack upon mental disease in its early stages and its acute or chronic manifestations. But we cannot do this with any significant effect and reasonable economy unless we bring the public along with us.

I venture to predict a new concept of preventive psychiatry. In so many diseases of great public importance, our only means of prevention is early diagnosis and prompt treatment. This is true of tuberculosis, venereal diseases, and pneumonia; it is true if we wish to control cancer. There are no shots in the arm to prevent these ailments; and there is no shot in the arm for mental disease. Nevertheless, through continued research, through education of the professions and the public, and through well-planned programs, we are moving toward the final conquest of tuberculosis and venereal disease; we are driving down the death rate from pneumonia to a hitherto undreamed of level. The techniques of diagnosis and treatment of mental disease are not so specific, so precise as in other conditions that prey upon our national strength. But the principle is the same. A program for civilian mental health should be founded upon the same concept—early diagnosis and prompt treatment. The fact that both case-finding and treatment will draw upon all our educational, social, economic, and medical facilities only enhances the opportunity for strengthening the morale of the American people in this urgent hour and in the critical years ahead.

STUDIES IN CHILDBIRTH MORTALITY[1]

III. PUERPERAL FATALITY IN RELATION TO MOTHER'S PREVIOUS INFANT LOSSES

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The underlying conditions leading to the death in childbirth of a mother or an infant may be associated either directly with the puerperal state or may have their origin in causes far removed from the immediate pregnancy. For example, the death of a mother or of an infant resulting from malposition of the fetus may be related only to the present pregnancy, while the death in childbirth of a woman suffering from a chronic heart ailment may be the final outcome of a condition of many years' duration. For effective control and prevention of the casualties of childbirth, it is therefore not sufficient to seek improvements in obstetrical techniques and adequate prenatal and postnatal care but it becomes important to consider also the much broader aspects of public health and clinical medicine.

There is no sharp line of demarcation between the causes directly associated with the puerperal state and those of more remote origin. Probably no cause of maternal and infant death is entirely independent of the general well-being of the mother and of her previous medical and reproductive history. A more precise knowledge of this relationship may lead to a better understanding of the causal pattern of maternal and infant mortality and thus furnish the necessary background for more effective control.

The number of previous deliveries (parity) is closely related to the outcome of both mother and infant in a subsequent pregnancy. For women of the same age the rate of loss of both mother and infant increases with parity (the only exception being first births) (*3*, *4*). In the case of infant loss in the form of stillbirths and neonatal deaths, the rate depends not only on the number of previous births to the mother, but also on the survival of the previous births. In other words, it was shown (*1*) that there is a familial tendency to stillbirths and neonatal deaths; the stillbirth and neonatal mortality rates of infants born to mothers who had had previously one or more infant losses are more than twice as high as those of infants born in families in which the previous issue all survived.

In many instances the underlying conditions which lead to the loss of mother are also related to the death of the offspring. Thus the rate of loss of infants whose mothers died from a puerperal cause during

[1] From the Division of Public Health Methods, National Institute of Health, U. S. Public Health Service, and the Division of Maternity, Infancy, and Child Hygiene, New York State Department of Health.

their birth is very much higher than that of infants whose mothers survived the postnatal period. Similarly, the puerperal fatality of mothers whose infants were either stillborn or died neonatally is considerably greater than that of mothers whose infants survived the first month of life (*2*). For a better understanding of the factors relating to childbirth mortality it is, therefore, desirable to investigate the mortality of the mother in conjunction with that of the offspring. Such studies will bring out not only the similarities but also the differences between the reactions of the mother and of the infant to the factors under investigation.

The object of the present paper is to investigate the mortality of the mother and of her offspring in relation to the survival of the previous issue to the mother. In general terms the problem under investigation may be stated as follows: When mothers of the same age and parity are separated into different categories, one consisting of mothers whose previous children have all survived, and the others comprising mothers who have lost one or more of their previous children, will the mortality experience of mother and infant in a subsequent delivery differ in these categories? As was stated above, the part of this problem which relates to the infant has been considered in a previous study (*1*), so that the main purpose of this investigation is to determine whether a similar relationship exists for puerperal fatality. However, the results concerning the infant are also presented, not only for the purpose of confirming the previous results (since the present study is based on three times as many births as the previous one), but mainly for the purpose of contrasting the mortality of mothers with that of their infants.

MATERIAL AND METHOD

A more detailed description of the material on which this study is based was given in the first paper of this series (*2*) and only a brief account will be given here. The studies are based on records of over a quarter of a million deliveries occurring in New York State (exclusive of New York City) in the 3-year period 1936–38. The data were derived from birth and death certificates received by the New York State Department of Health. The names of all women who died from a puerperal cause were searched in the index of births to determine whether a live birth or stillbirth certificate was registered. Searches were also made in order to match the birth and death certificates of all infants who died under 1 month of age. The information from each of the matched certificates was brought together on a single punch card.

Women whose deaths were associated with abortion, miscarriage, ectopic pregnancy, and those who died undelivered were excluded, since no birth certificate is filed for these conditions. There remain

only the deaths of mothers delivered of an offspring of viable age.[2] The risk of death to the mother which is associated with such delivery was defined as "puerperal fatality." This risk was measured by a "puerperal fatality rate" defined as the number of deaths of mothers who were delivered either of a live birth or of a stillbirth per 10,000 total deliveries (including those of stillbirths).

During the 3-year period 1936–38, 255,727 women were delivered of 258,525 infants.[3] Of these infants, 7,177 were stillborn and 7,550 died neonatally (under 1 month of age). During the same period 1,122 deaths of women were registered in which the primary cause of death was classified as puerperal. A thorough search in the vital statistics files produced birth and stillbirth certificates for 689 deliveries of these 1,122 puerperal deaths. From the statements on the women's death certificates, it was possible to establish with reasonable accuracy that for the remaining 433 women pregnancy terminated either in an abortion or a miscarriage, or that it was ectopic, or that the woman died in the pregnant state undelivered.

Since this study deals with the previous obstetrical history of the mother, all first births have been excluded. The basic material in this investigation includes the 161,177 births of orders 2 and over and the 411 puerperal deaths which occurred in this group.

The survival of previous births to the mother up to the time of the last delivery was determined from the statement on the birth certificate. The question on the certificate which yielded the required data reads as follows: "Number of children of this mother (at time of this birth and including this child) (a) Born alive and now living . . . (b) Born alive but now dead . . . (c) Stillborn . . ."

TEST OF ADEQUACY OF THE MATERIAL

In testing the reliability of the material it is, obviously, not proposed to establish that every single certificate is exact and accurate. In fact every one who has had occasion to work with birth and death certificates knows that occasional certificates may be grossly inaccurate. However, the information derived from the entire group of certificates may, nevertheless, be adequate if it is possible to establish, first, that the total error introduced in the entire aggregate of certificates is not large, and second, that the inaccuracies which have been recorded on individual certificates are not selective for the problem under investigation. Several tests of this nature have been made in the previous paper on familial susceptibility to stillbirths and neonatal deaths (*1*). The tests concern the rates of previous infant losses according to various factors. These rates were found to conform to

[2] The term "an offspring of viable age" is used to denote a fetus which advanced at least to the fifth month of utero-gestation and which was registered either as a live birth or as a still birth.

[3] There were 2,754 pairs of twins and 22 sets of triplets.

known facts. The tests will be repeated here for the births of the 3-year period 1936–38 (in the previous paper only the 1936 births were used). In addition, the rates of previous infant loss for 1936–38 are compared to those of 1936 to furnish further evidence of the reliability of the material on which this study is based.

From data in table 1, it is possible to determine the rate of loss (exclusive of abortions and miscarriages) sustained in the previous issue of the mothers whose records are included in this study. The mothers of the 161,177 births had had previously a total of 439,140 births. Of these, 52,801 were either stillborn or died before the last birth, the rate of loss being 120.2 per 1,000 total previous births. This loss was made up, for the most part, of stillbirths and deaths of infants under 1 year of age, and, to a lesser degree, of deaths of children over 1 year of age. The rate of stillbirths and infant mortality combined in the last decade in the area considered was around 90 per 1,000 total births. Hence the rate of 120.2 for the combined loss, including children over 1 year of age, is approximately the value to be expected.

TABLE 1.—*Live births and stillbirths (exclusive of first births) by order of birth according to the number of children lost to the mother prior to the last birth, New York State (exclusive of New York City), 1936–38*

Order of birth	Total births	Number of children lost to the mother prior to the last birth										
		0	1	2	3	4	5	6	7	8	9	10 and over
2	63,878	58,326	5,552									
3	35,735	29,082	5,946	707								
4	21,343	15,642	4,631	950	120							
5	13,157	8,699	3,334	903	184	37						
6	8,756	4,973	2,538	869	297	57	22					
7	6,088	3,067	1,891	755	260	80	25	10				
8	4,208	1,875	1,285	622	252	126	35	12	1			
9	2,702	1,026	841	471	228	83	31	14	5	3		
10 and over	5,310	1,318	1,398	1,118	637	402	187	126	62	35	14	13
Total	161,177	124,008	27,416	6,395	1,978	785	300	162	68	38	14	13

Additional confidence in the material is gained from the fact that the rate of previous loss for the mothers of the 1936 births was higher (124.5) than that for mothers of 1936–38 births (120.2). This higher rate is to be expected because of the downward trend in childhood mortality, particularly in infant mortality. The previous children of the mothers of the 1936 births were exposed, on the whole, to higher mortality rates than the previous children of the mothers of the 1936–38 births.

Table 1 affords another check on the reliability of the material. From the fact that infant mortality has been declining during the last decade, in addition to the obvious fact that the previous children of the mothers of the higher orders of birth were exposed to the risk of

death for a longer period of time than those in the lower orders of birth, it follows that the rate of previous loss should increase continuously with order of birth. It is also to be expected that in each order of birth the rate of loss among the previous children of the mothers of the 1936–38 births should be lower than the rate for the children of the mothers of the 1936 births. The following rates show that such was the case:

Order of birth	Rates of loss of previous children per 1,000 total previous births	
	Children of mothers of 1936–38 births	Children of mothers of 1936 births
2	86.9	89.2
3	103.0	103.8
4	107.6	108.7
5	111.0	114.9
6	125.7	129.2
7	128.3	129.6
8	137.3	148.2
9	143.3	144.3
10 and over	176.3	182.4

One other test of the material concerns the relationship of infant mortality to age of mother. It is known that for every order of birth, the stillbirth as well as the neonatal mortality rates start high when the mother is young, drop to a minimum, and then rise with age of mother (*4*). The rate of loss among the siblings of the second births according to age of mother at the time of the second birth should therefore also follow the same pattern. Here also it is to be expected that the rates among the previous children of the mothers of the 1936–38 births should be lower than those of the children of the mothers of the 1936 births in the various age groups of mother. The following rates show that such was the case:

Age of mother	Rates of loss of previous children per 1,000 total previous births	
	Children of mothers of 1936–38 births	Children of mothers of 1936 births
Under 20	120.8	124.0
20–24	86.6	88.0
25–29	79.2	80.4
30–34	85.1	89.8
35–39	96.7	102.3
40 and over	130.4	119.3

From the above considerations it appears, first, that the rates of loss of the previous issue to the mothers entering in this investigation are of the order of magnitude which is compatible with the prevailing rates in the period. It is thus shown that on the whole the physician's

record of the previous obstetrical history of the mother on the birth certificate is substantially reliable. It is also shown that the variation of the rates of previous loss according to the factors of order of birth and age of mother conform to known facts. These considerations indicate that such errors as may have been entered on individual certificates are not selective for the problem under investigation.

GENERAL RESULTS

Of the 161,177 births of orders 2 and over entering into this study, 4,184 were stillbirths and of the remaining 156,993 live births 4,645 were neonatal deaths (deaths under 1 month of age). The stillbirth rate of this group was 26.0 per 1,000 total births (including stillbirths) and the neonatal mortality rate was 29.6 per 1,000 live births, or a combined loss (late fetal and neonatal mortality rate) of 54.8 per 1,000 total births. There were 411 puerperal deaths among the mothers of these births. The puerperal fatality rate was 25.5 per 10,000 total births.[4]

An indication of the association between previous losses and the rate of loss of mother and infant in the current delivery may be obtained indirectly from the fact that the siblings of the 152,348 infants who survived the neonatal period suffered a rate of loss of 110.5 per 1,000 total previous births, while the siblings of the 8,829 infants who were either stillbirths or neonatal deaths suffered a rate of loss of 230.7, and the rate of loss of the previous children of the 411 mothers who died in childbirth was 157.3. The association implied by these figures will be investigated more directly. For this purpose, the mothers entering into the study are divided into various groups according to the survival of their previous issue. All mothers who have previously lost 1 child will be considered in one group denoted by L_1. Every mother falls in one of the groups L_0, L_1, L_2, L_3, etc., denoting mothers who have lost respectively none, one, two, three, etc., of their previous children. L_{1+} will denote the group of mothers who have lost 1 or more of their previous children.

Of the 161,177 births of this study, 124,008 fell in the group L_0 and 37,169 fell in the group L_{1+}. Thus 76.9 percent of all the births of orders 2 and over were to mothers who had lost none of their previous children, and 23.1 percent were to mothers who had lost 1 or more previous children. In the first group (L_0) there were 2,401 stillbirths, 2,561 neonatal deaths, and 260 puerperal deaths. The corresponding numbers in the group with one or more previous losses (L_{1+}) were 1,783, 2,084, and 151, respectively. The respective rates in the

[4] The "puerperal fatality rate" was defined in the previous papers of this series as the number of deaths of mothers who were delivered either of a live birth or of a stillbirth per 10,000 total deliveries (not births). However, since the rates for infant loss are based on births, it was found desirable for the purpose of this study to base also the puerperal fatality rates on births rather than on deliveries. The error introduced by this procedure is slight since multiple births form only about 1 percent of total births.

groups L_0 and L_{1+} were 19.4 and 48.0 for stillbirth, 21.1 and 58.9 for neonatal mortality, and 20.9 and 40.6 for puerperal fatality. Thus the rates of loss of both mother and infant were about twice as high in the group with a history of previous loss as in the group with no previous losses.

Causes of death.—The puerperal fatality rate was higher for group L_{1+} than for the group L_0 in each of the causes of death. Table 2 presents for the two groups L_0 and L_{1+} the distribution of the maternal deaths by cause of death (according to the classification of the 1929 revision of the International List and the Manual of Joint Causes of Death). In addition the table presents the puerperal fatality rates specific for the various causes per 100,000 births as well as the percentage distribution by cause. From the rates and the percentage distribution in the table it appears that while the increase in the group L_{1+} was present in all causes, the relative increase was greater for some causes than for others. Consequently the percentage distribution of the deaths is somewhat different in the groups L_{1+} and L_0. For example, a considerably larger proportion of the deaths in the group L_{1+} was due to accidents of pregnancy (International List No. 141) and to abortion [5] with septic condition (International List No. 140).

TABLE 2.—*Distribution of puerperal deaths by cause of death according to the survival of mother's previous children, second births and over, New York State (exclusive of New York City), 1936–38*

Previous losses	Total (all causes)	Primary cause of death							
		Abortion with septic conditions [1] (140)[2]	Abortion without mention of septic conditions [1] (141)	Hemorrhage (144)	Puerperal septicemia (145)	Toxemia (146–7)	Accidents of childbirth (149)	Embolism and thrombosis (148)	All other (150)
	Number of puerperal deaths								
None (L_0)	260	3	16	68	47	51	53	20	2
One or more (L_{1+})	151	7	15	30	24	33	31	11	------
Total	411	10	31	98	71	84	84	31	2
	Puerperal fatality rates per 100,000 births								
None (L_0)	209.7	2.4	12.9	54.8	37.9	41.1	42.7	16.1	1.6
One or more (L_{1+})	406.3	18.8	40.4	80.7	64.6	88.8	83.4	29.6	------
Total	255.0	6.2	19.2	60.8	44.1	52.1	52.1	19.2	1.2
	Percentage distribution of puerperal deaths								
None (L_0)	100.0	1.2	6.1	26.2	18.1	19.6	20.4	7.7	.8
One or more (L_{1+})	100.0	4.6	9.9	19.9	15.9	21.9	20.5	7.3	------
Total	100.0	2.4	7.5	23.8	17.3	20.4	20.4	7.5	.5

[1] The title "abortion" is, in a sense, misleading since under this classification are coded also deaths of mothers of viable offspring when the cause of death is an accident of pregnancy.
[2] Figures in parentheses are International List numbers.

[5] See footnote to table 2.

Correspondingly a smaller proportion of the deaths in L_{1+} was due to hemorrhages (other than placenta praevia) and to puerperal septicemia.

Number of previous losses.—The rate of loss of both mother and infant was directly related to the number of previous losses. The distribution of the births according to the number of previous losses was as follows:

Number of previous losses	Number of total births	Percent of total births
0	124,008	76.9
1	27,416	17.0
2	6,395	4.0
3 and over	3,358	2.1
Total	161,177	100.0

The distribution of the stillbirths, neonatal deaths, and puerperal deaths according to the number of previous losses and the respective rates is shown in table 3 and figure 1. It will be noted that the higher the number of previous losses to the mother, the greater was the chance of death to both mother and infant. The increase with advancing number of previous losses was more pronounced for the loss of offspring than it was for the loss of mother.

TABLE 3.—*Neonatal mortality and puerperal fatality rates according to the number of previous losses to the mother, second births and over, New York State (exclusive of New York City), 1936–38*

Previous losses	Live births	Still-births	Neonatal deaths	Puer-peral deaths	Rates		
					Still-birth [1]	Neonatal mortal-ity [2]	Puer-peral fatality [3]
0	121,607	2,401	2,561	260	19.4	21.1	20.9
1	26,301	1,115	1,334	100	40.7	50.7	36.5
2	6,020	375	446	33	58.6	74.1	51.6
3 and over	3,065	293	304	18	87.3	99.2	53.6
Total	156,993	4,184	4,645	411	26.0	29.6	25.5

[1] Stillbirth rates per 1,000 total births (live births and stillbirths).
[2] Neonatal mortality rates per 1,000 live births.
[3] Puerperal fatality rates per 10,000 total births.

ORDER OF BIRTH AND AGE OF MOTHER

The rates of loss of both mother and infant are known to depend on parity and age of mother, the rates being generally higher for the higher orders of birth and for the older mothers. It is, of course, also obvious that the chances of having had a previous loss increase with parity. For example, the mothers in the group L_0 had had an average of 2.24 previous children, while the mothers in the group L_{1+} had had an average of 4.35 previous children. It is therefore possible that the higher rates found in the group L_{1+} over those of L_0 may be a consequence of the difference in parity in the two groups. In order

to determine whether the higher rates associated with previous losses are independent of parity it becomes necessary to compare the rates of L_{1+} and those of L_0 in each order of birth. This is accomplished in table 4 and figure 2, which present the distribution of the live births, stillbirths, neonatal deaths, and puerperal deaths by order of birth in the two groups L_0 and L_{1+}.

It is seen from the table and the figure that for puerperal fatality as well as for infant loss the rates in the group L_{1+} were higher than those in the group L_0 for every order of birth except one. The increase in the rates of both puerperal fatality and infant loss asso-

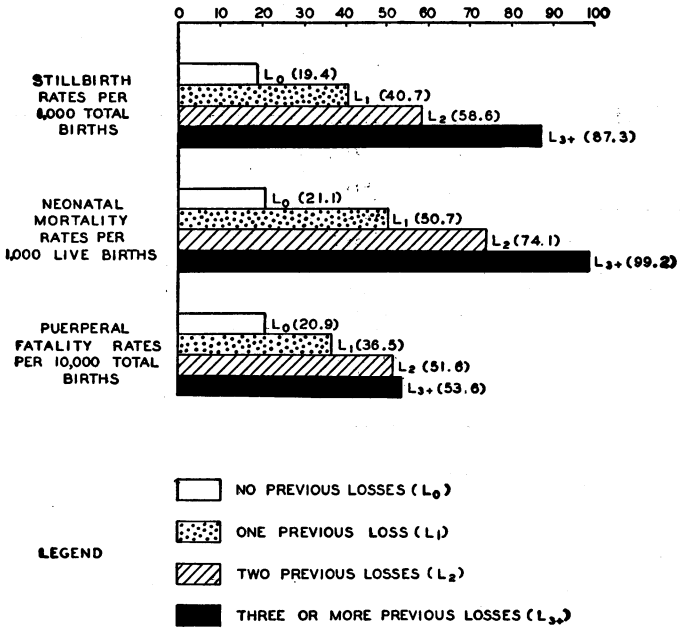

FIGURE 1.—Stillbirth, neonatal mortality, and puerperal fatality rates according to the number of previous losses to the mother, second births and over, New York State, exclusive of New York City, 1936-38.

ciated with previous losses was more pronounced in the lower orders of birth than in the higher. The largest increase in the stillbirth and neonatal mortality rates was noted for second births. This extra hazard to second births whose siblings were lost results in somewhat different distributions of the stillbirth and neonatal mortality rates by order of birth in the two groups L_0 and L_{1+}. Whereas in the group L_0 the stillbirth and neonatal mortality rates were lowest for lower orders of birth and increased with advancing parity, in the group L_{1+} the rates for second births were very high. In fact the rates for the highest orders of birth were of the same order of magnitude as those for second births. For puerperal fatality the increase among second births in the group L_{1+} over that of L_0 was not as large as in the case of the rates for infant loss.

TABLE 4.—*Stillbirth, neonatal mortality and puerperal fatality rates by order of birth and previous obstetrical history of mother, second births and over, New York State (exclusive of New York City), 1936–38*

Order of birth	Live births		Stillbirths		Neonatal deaths		Puerperal deaths	
	No previous losses	At least 1 previous loss	No previous losses	At least 1 previous loss	No previous losses	At least 1 previous loss	No previous losses	At least 1 previous loss
	L_0	L_{1+}	L_0	L_{1+}	L_0	L_{1+}	L_0	L_{1+}
2	57,372	5,270	954	282	1,155	452	109	16
3	28,545	6,353	537	300	569	364	47	17
4	15,319	5,474	323	227	348	286	34	23
5	8,472	4,243	227	215	194	252	21	23
6 and 7	7,840	6,481	200	323	195	343	28	27
8 and 9	2,799	3,784	102	225	65	177	14	29
10 and over	1,260	3,781	58	211	35	210	7	16

Order of birth	Rates					
	Stillbirth [1]		Neonatal mortality [2]		Puerperal fatality [3]	
2	16.4	50.8	20.1	85.8	18.7	28.8
3	18.5	45.1	19.9	57.3	16.2	25.6
4	20.6	39.8	22.7	52.2	21.7	40.3
5	26.1	48.2	22.9	59.4	24.1	51.6
6 and 7	24.9	47.5	24.9	52.9	34.8	39.7
8 and 9	35.2	56.1	23.2	46.8	48.3	72.3
10 and over	44.0	52.9	27.8	55.5	53.1	40.1

[1] Stillbirth rates per 1,000 total births (live births and stillbirths).
[2] Neonatal mortality rates per 1,000 live births.
[3] Puerperal fatality rates per 10,000 total births.

It may be of interest to note that the increase with parity in the group L_0 was very much more pronounced for stillbirths and puerperal fatality than it was for neonatal mortality, while in the group L_{1+} the increase in the neonatal mortality rate with advancing parity was similar to that of the other two rates. The difference between the stillbirth rate and the neonatal mortality rate may also be noted in a different way. In the group L_0 the stillbirth rate for the higher orders of birth was considerably higher than the neonatal mortality rate, whereas in the lower orders of birth the rate was slightly higher for neonatal mortality than for stillbirths. In the group L_{1+} no such difference appears. This fact may be of some significance, particularly because the stillbirth rate is presumably more closely related to obstetrical problems than the neonatal mortality rate. It is thus noteworthy that when the habitual offenders (the group L_{1+}) have been excluded there remains only a slight increase in the neonatal mortality rate with parity, while in the stillbirth and the puerperal fatality rates the increase with parity is considerable even after all the women who had had previous losses have been eliminated.

Table 5 presents the rates for puerperal fatality and for infant loss (combined stillbirth and neonatal deaths) by order of birth according to the number of previous losses to the mother. It may be observed that the late fetal (stillbirth) and neonatal mortality rate increased

very markedly with advancing number of previous losses in every order of birth. The increase in the puerperal fatality rate with increasing number of previous losses was neither very marked nor regular.

Following the late fetal and neonatal mortality rates horizontally along the table, that is, keeping the order of birth constant and noting

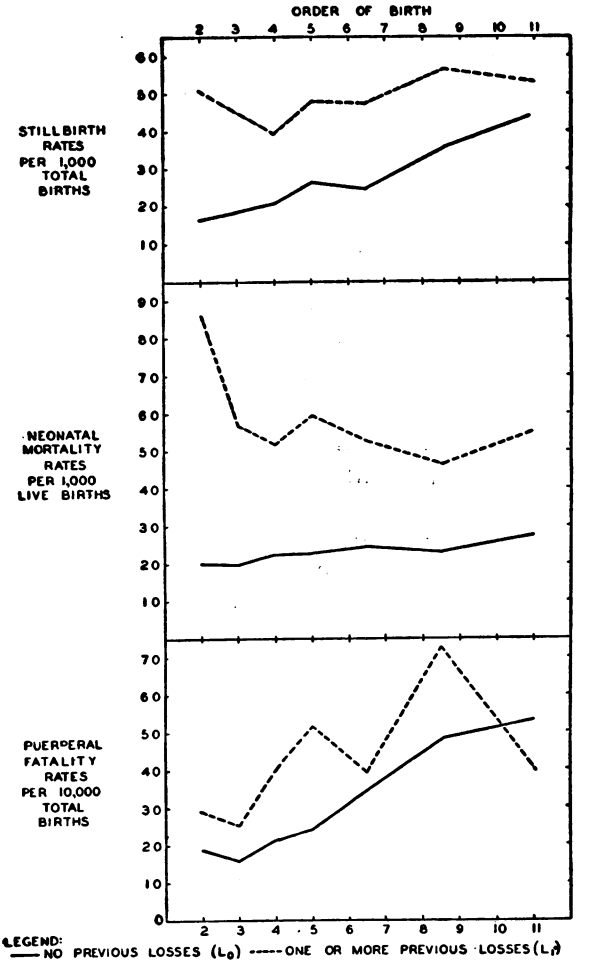

FIGURE 2.—Stillbirth, neonatal mortality, and puerperal fatality rates by order of birth for mothers who had lost none of their previous children (L_0), and for mothers who had lost one or more previous children (L_{1+}), second births and over, New York State, exclusive of New York City, 1936-38.

the variations with advancing number of losses, it will be observed that the rate increased progressively from a minimum in L_0 to a maximum in the groups with the largest number of losses. When the rates are followed vertically down the table, that is, when the number of losses is kept constant and the variations with order of birth are noted, it is found that in the group L_0 the rates increased progres-

TABLE 5.—*Late fetal and neonatal mortality and puerperal fatality by order of birth according to the number of previous losses to the mother, second births and over, New York State (exclusive of New York City), 1936–38*

Order of birth	Total births				Late fetal and neonatal deaths				Puerperal deaths			
	Number of previous losses				Number of previous losses				Number of previous losses			
	0	1	2	3 and over	0	1	2	3 and over	0	1	2	3 and over
2	58,326	5,552			2,109	734			109	16		
3 and 4	44,724	10,577	1,657	120	1,777	838	292	47	81	33	5	2
5, 6, and 7	16,739	7,763	2,527	972	816	610	311	212	49	36	10	4
8 and over	4,219	3,524	2,211	2,266	260	267	218	338	21	15	18	12

Order of birth	Rates							
	Late fetal and neonatal mortality (combined)[1]				Puerperal fatality [2]			
2	36.2	132.2			18.7	28.8		
3 and 4	39.7	79.2	176.2	391.7	18.1	31.2	30.2	166.7
5, 6, and 7	48.7	78.6	123.1	218.1	29.3	46.4	39.6	41.2
8 and over	61.6	75.8	98.6	149.2	49.8	42.6	81.4	53.0

[1] Stillbirths and neonatal deaths (combined) per 1,000 total births (including stillbirths).
[2] Per 10,000 total births (including stillbirths).

sively with advancing order of birth, while in the groups that had had previous losses the increase with order of birth was not so pronounced. In fact in the case of late fetal and neonatal mortality, the rates started high for the lower orders of birth and decreased with increasing order of birth. This finding may be explained partly by the fact that the losses represent a larger proportion of the births in the lower than in the higher orders of birth; the mothers of the lower orders of birth who had had a particular number of losses are presumably a more vulnerable group than are the mothers of the higher orders of birth who had had the same number of losses. It should also be considered that a selective factor may be operating in that mothers who lose many of their offspring may represent a weaker group. Thus some of the women who are characteristic of this group and who probably would have contributed a relatively large number of losses are not present among the mothers of this study. Their absence from the group of women who are being delivered in a given year may be accounted for by death in a previous pregnancy, by therapeutic sterilization, or by use of contraceptives.

Age of mother.—The analysis of the association between infant and puerperal fatality and the previous losses according to age of mother yields results which are substantially the same as those by order of birth. Age of mother is known to be strongly related to the fatality of both mother and infant (*3*, *4*). The stillbirth and neonatal mortality rates are relatively high for young and for old mothers and

generally lower for mothers in the intermediary ages. Puerperal fatality increases continuously with advancing age.

The increase in the puerperal fatality rate and in the late fetal and neonatal mortality rate associated with previous losses was present to a considerable degree in every age group of mother. The increase in the mortality of the group L_{1+} over that of L_0 was more pronounced for the younger than for the older mothers. The mortality of both mother and infant increased with advancing age of mother in both groups L_{1+} and L_0. The main difference between puerperal fatality and the stillbirth and neonatal mortality rates was that whereas the rates for infant loss were generally higher for young mothers than for mothers of the intermediary ages, the puerperal fatality rate was at a minimum for the youngest mothers and increased thereafter with advancing age. This was true both for mothers who had had previous losses (L_{1+}) and for mothers whose previous children had all survived (L_0).

As the number of previous losses increased, there was a regular increase in the late fetal and neonatal mortality in every age group of mother. In the case of puerperal fatality the increase over the group with no previous losses was noticeable, but the increase with the number of previous losses was not regular. The puerperal fatality increased sharply with advancing age of mother in each one of the groups L_1. The U-shaped pattern of the late fetal and neonatal mortality rates, that is, the higher rates for young and older mothers and lower rates for the intermediary ages, was also present in each one of the groups L_1.

Order of birth and age of mother are, obviously, closely correlated. The older mothers generally had previously had more births than the younger mothers. The more births to the mother the greater are the chances of having lost one or more of the previous children. Consequently, in order to obtain a clearer picture of the association between loss of mother and infant in the current delivery and the previous losses to the mother, it is desirable to study not only the factors of order of birth and age of mother separately but also in conjunction with one another. This is accomplished in table 6, which presents the association between puerperal fatality, late fetal and neonatal mortality, and the history of previous losses to the mother by order of birth and age of mother.

This table shows that the increase in the rate of loss of both mother and infant associated with previous losses was present to a considerable degree also when the two factors of order of birth and age of mother were eliminated, for the increase in the group L_{1+} over that of L_0 was present in practically every one of the combinations of order of birth and age of mother. Thus, for example, for second births the rate in the group L_{1+} was higher than that in the group L_0 in every

age group of mother. Similarly, in any one of the age groups of mother the rates in L_{1+} were higher than those in L_0 in each one of the orders of birth. It is therefore indicated that the higher rates of puerperal fatality and of infant loss associated with the loss of previous children to the mother may not be explained on the basis of the difference in parity and age between the two groups L_{1+} and L_0.

TABLE 6.—*Late fetal and neonatal mortality and puerperal fatality rates by order of birth, age of mother and previous losses, second births and over, New York State (exclusive of New York City), 1936–38*

Age of mother (years)	Total births							
	Order of birth							
	2		3 and 4		5, 6, and 7		8 and over	
	No previous losses	At least 1 previous loss	No previous losses	At least 1 previous loss	No previous losses	At least 1 previous loss	No previous losses	At least 1 previous loss
	L_0	L_{1+}	L_0	L_{1+}	L_0	L_{1+}	L_0	L_{1+}
Under 20	3,268	449	396	182				
20–24	20,840	1,976	9,800	2,825	605	468		
25–29	19,476	1,675	15,295	3,965	4,590	3,225		
30–34	10,674	993	11,774	3,199	5,728	3,558	1,408	2,615
35–39	3,504	375	5,991	1,734	4,203	2,847	1,632	3,018
40 and over	560	84	1,463	449	1,612	1,163	1,179	2,366
	Late fetal and neonatal mortality rates [1]							
Under 20	43.8	171.5	60.6	153.8				
20–24	34.3	122.5	33.8	86.7	44.6	104.7		
25–29	31.6	124.8	32.2	85.0	38.3	83.1		
30–34	38.9	131.9	40.0	94.7	44.7	95.3	43.3	85.7
35–39	52.5	162.7	56.3	110.7	56.6	114.2	62.5	99.4
40 and over	66.1	166.7	82.0	160.4	73.2	129.8	82.3	126.0
	Puerperal fatality rates [2]							
Under 20	9.2	22.3						
20–24	11.5	15.2	5.1	10.6	33.1	64.1		
25–29	19.0	29.9	17.0	37.8	15.3	24.8		
30–34	29.0	50.4	18.7	25.0	22.7	28.1	42.6	42.1
35–39	34.2	53.3	36.7	40.4	45.2	45.7	61.3	56.3
40 and over	35.7		41.0	155.9	49.6	137.6	42.4	71.9

[1] Stillbirths and neonatal deaths per 1,000 total births (including stillbirths).
[2] Per 10,000 total births (including stillbirths).

PREMATURE BIRTH

That a tendency to premature birth is of a repetitive character has been shown in a previous study (*1*). That is, it was shown that mothers who had previously had one or more premature births are more likely to have premature births in an ensuing pregnancy than are mothers who have been delivered of all their previous births at term. It is also known that the stillbirth and neonatal mortality rates as well as the puerperal fatality rate associated with premature deliveries are very much higher than those associated with full-term deliveries. This increase is of a larger magnitude in stillbirth and

neonatal mortality than it is in puerperal fatality (*2*, *4*). It is therefore to be expected that the incidence of premature birth, that is, the number of premature deliveries per 1,000 total births, should be higher among mothers who had had previous losses than among mothers who had not had such losses. Since premature birth takes such a heavy toll of infants in their first month of life, it is desirable to investigate separately for full term and premature infants the association between infant and puerperal fatality and previous losses.

The incidence of premature birth was more than twice as high among mothers who had had previous losses as among mothers all of whose previous issue survived. Among the mothers of the 124,008 births in the group L_0 there were 5,146 premature births (41.5 per 1,000 total births) while among the mothers of the 37,169 births in the group L_{1+} there were 3,400 premature births (91.5 per 1,000 total births). The incidence of premature birth increased sharply with increasing number of previous losses. For mothers who had lost only one of their previous children the incidence was 79.9. It increased to 113.7 for mothers who had lost two of their previous children. The incidence was 133.0 in the group L_3 and 159.4 in the group L_{4+}. The incidence of premature birth in the entire group of births of orders 2 and over was 53.0 per 1,000 total births.

The late fetal and neonatal mortality rate among premature births was 568.5 per 1,000 total premature births. The corresponding rate among full-term births was 26.0. The rate was, therefore, over 20 times as high among premature as among full-term births. The puerperal fatality rate was 152.1 per 10,000 total births when pregnancy terminated prematurely and 18.1 when delivery was at term. Thus the puerperal fatality rate was over 8 times as high among the premature as among the full-term deliveries. The higher rates for puerperal fatality and for infant loss associated with previous losses were present to a considerable degree in the premature as well as in the full-term deliveries. Thus the puerperal fatality rate among full-term deliveries was 16.0 in the group L_0 and 25.8 in the group L_{1+}. The corresponding rates among the premature deliveries were 134.1 and 179.4, respectively. Similarly the late fetal and neonatal mortality rates of full-term births were 20.0 for the group L_0 and 47.1 for the group L_{1+}. The corresponding rates for the premature births were 501.4 and 670.0, respectively. The increase in the rates of loss of mother and infant associated with previous losses was relatively greater among the full-term than among the premature births. It is therefore indicated that only a part of the extra hazard to mother and infant in the families which had sustained the loss of previous children is due to a repetitive tendency to premature birth among some of the mothers. There appears to be higher risk of death to mother and

infant in the families in which there were previous losses which may not be explained by the factor of premature birth.

DISCUSSION

The fatality of the mother and the infant are very strongly correlated. The rate for infant loss in the form of stillbirth and neonatal mortality rises considerably when the mother dies in childbirth and, similarly, puerperal fatality increases sharply when the infant is either stillborn or dies neonatally. For births of orders 2 and over, the late fetal and neonatal mortality rate was 53.8 per 1,000 total births when the mother survived and 450.1 when the mother died. The puerperal fatality rate was 14.8 per 10,000 total births when the infant survived and 209.5 when the infant was either a stillbirth or a neonatal death. Since the puerperal fatality rate as well as the rate of infant loss was found to be related to the previous losses to the mother it may be desirable to consider this three-way relationship between puerperal fatality, late fetal and neonatal mortality, and the previous losses to the mother.

Among the 124,008 births in the group with no previous losses (L_0) there were 4,858 cases in which the infant was lost and the mother survived, there were 156 cases in which the mother was lost and the infant survived, and 104 cases in which both mother and infant were lost. The corresponding figures in the group with one or more previous losses (L_{1+}) were as follows: Among 37,169 births, in 3,786 cases the infant alone was lost, in 70 cases the mother only was lost, and in 81 cases both the mother and the infant were lost. From these figures the following probabilities of losing infant only, mother only, and both mother and infant may be determined for the group L_0 and for L_{1+}. In terms of chances per 10,000 births these probabilities were:

	Mothers who had had no previous losses (L_0)	Mothers who had had one or more previous losses (L_{1+})
Losing infant only	391.7	1018.6
Losing mother only	12.6	18.8
Losing both mother and infant	8.4	21.8

Several interesting points appear in these probabilities. In the first place, the association between puerperal fatality and the rate of infant loss in the current delivery is apparent from the relatively high probabilities of losing both mother and infant. The theoretical probabilities of losing both mother and infant, based on the assumption that there is no correlation between the two, would be 0.84 per 10,000 births in L_0 and 4.2 in L_{1+} compared with the actual observed probabilities of 8.4 and 21.8 in L_0 and L_{1+}, respectively. The fact that

the probabilities are higher in L_{1+} than in L_0 for each one of the three classifications (that is, for loss of infant only, mother only, and both mother and infant) would indicate that the previous losses to the mother are independently related to both puerperal fatality and infant loss. However, the relation seems to be much more pronounced for infant loss than for puerperal fatality, for the increase in the probabilities is greater for the former than for the latter. Thus, the probabilities of losing infant only are 2.6 times as great in the group L_{1+} as in the group L_0. The probabilities of losing both infant and mother are also 2.6 times as high in L_{1+} as in L_0. On the other hand, the chances of losing mother only are only 1.5 times as high among mothers with a history of previous losses as among mothers whose previous issue all survived. In fact, the association between previous losses and the rate for infant loss is so strong that whereas in the group L_0 the chances of losing both mother and infant (8.4) were lower than those of losing mother only (12.6), in the group L_{1+} the probability of losing both mother and infant (21.8) was higher than the probability of losing mother only (18.8). In every 10,000 births in the group L_{1+} there were 40.6 cases in which the mother died and in 21.8 of these the infant was also lost. It appears therefore that when a mother who had had previous losses dies in a subsequent delivery there is more than a 50–50 chance that the infant will also be lost either through stillbirth or neonatal mortality.

The very strong association between the rate for infant loss in the current delivery and the previous losses to the mother makes it difficult to study in more detail the relation between puerperal fatality and previous losses independently of infant loss. For example, the 50 percent increase in the probabilities of losing mother only (18.8 in L_{1+} against 12.6 in L_0) may be considered only a minimum measure of the extra risk to the mother associated with previous losses, since the majority of the most vulnerable mothers (those in which both mother and infant died) have been of necessity excluded. Moreover, the factors of order of birth and age of mother may not easily be taken account of, since the number of puerperal deaths remaining after elimination of the cases in which both mother and infant were lost is too small to yield stable rates.

The fact that the previous losses to the mother are more strongly related to the rate of infant loss than to puerperal fatality is instructive. Whether the causes underlying these cases of repeated losses are environmental or congenital or both, they would seem to affect puerperal fatality to a lesser degree than they do the stillbirth and neonatal mortality rates. One may speculate that, among other things, the father may also play an important part in these cases of repeated losses in the family. It is possible that some of the cases in which the infant is repeatedly lost may have their origin in some

defect in the father. Moreover, it is reasonable to assume that certain vital factors in the father are more closely related to the survival of the fetus than to that of the mother. It would probably be difficult to study this relationship for many of these vital factors. However, for the more easily accessible index, that of age, a definite relationship has been established between age of father and the survival of his offspring (*5*). The stillbirth and neonatal mortality rates were found to be high for very young and old fathers and relatively low for fathers aged 25–34. It may therefore be indicated that the study of infant loss should embrace also factors in the father. This seems to be especially important in the cases of habitual aborters, or in cases of families in which many infants have been lost through stillbirth and neonatal mortality.

SUMMARY

This is the third in a series of studies on childbirth mortality (mother and infant) based on the vital statistics records of over a quarter of a million deliveries occurring in New York State (exclusive of New York City) in the 3-year period 1936–38. The maternal death certificate was matched with the birth or stillbirth certificate of the infant. Similarly the death certificate of every infant who died under 1 month of age was matched with the birth certificate of the same infant. The information from each of the matched certificates was brought together on the same punch card.

Women whose deaths were associated with miscarriages, abortions, ectopic pregnancies, and those who died undelivered were excluded. These studies are concerned with the risk to the mother which is associated with the delivery of an offspring of viable age. The risk is defined as "puerperal fatality" and is measured by a "puerperal fatality rate" defined as the number of deaths of women who were delivered either of a live birth or of a stillbirth per 10,000 total deliveries.

This paper deals with puerperal fatality and late fetal and neonatal mortality in their relation to the mother's previous infant losses. The following findings are recorded:

1. Of the 161,177 births of orders 2 and over entering into this study, 76.9 percent were to mothers whose previous issue had all survived and 23.1 percent were to mothers who had lost one or more previous children.

2. The rates of loss of both mother and infant were about twice as high in the group with a history of previous loss as in the group with no previous loss. The respective rates in the two groups were 40.6 and 20.9 per 10,000 total births for puerperal fatality, 48.0 and 19.4 per 1,000 total births for stillbirth, and 58.9 and 21.1 per 1,000 live births for neonatal mortality.

3. While the increase in the fatality of mothers with previous losses was present in all causes of death, the relative increase was greater for some causes than for others. Thus, a considerably larger proportion of deaths in this group of mothers was due to accidents of pregnancy (International List No. 141) and to abortion (International List No. 140) and a smaller proportion of the deaths was due to hemorrhage and septicemia.

4. The higher the number of previous losses to the mother, the greater was the chance of death to both mother and infant. The increase with advancing number of previous losses was more pronounced for the loss of offspring than it was for the loss of mother.

5. The higher rates of puerperal fatality and of infant loss associated with the loss of previous children to the mother may not be explained on the basis of differences in parity and age of mother. The increase in the rates among mothers with a history of previous losses was present in every one of the combinations of order of birth and age of mother.

6. The higher rates for puerperal fatality and for infant loss associated with previous losses were present to a considerable degree in the premature as well as in the full-term deliveries. The puerperal fatality rate for full-term deliveries was 16.0 among mothers with no history of previous losses and 25.8 among mothers who had lost one or more of their previous children. The corresponding rates among the premature deliveries were 134.1 and 179.4, respectively. Similarly, the late fetal and neonatal mortality rates were 20.0 and 47.1 among full-term births and 501.4 and 670.0 among the premature.

7. The previous losses to the mothers were found to be more strongly related to loss of offspring than to loss of mother. The suggestion is made that the father may also play an important part in these cases of repeated losses in the family.

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COURT DECISION ON PUBLIC HEALTH

City ordinance relating to the purchase and sale of eggs upheld.—(Minnesota Supreme Court; *State* v. *Houston*, 298 N.W. 358; decided May 29, 1941.) An ordinance of the city of Minneapolis relating to the

purchase and sale of eggs established grades for the retail trade of eggs in the city. All eggs that were not graded had to be marked "unclassified" but nothing in the ordinance made grading compulsory. The defendant was charged with selling a quantity of eggs, some of which were in fact grade B and undergrade, as grade A. He was convicted of violating the ordinance and appealed to the Supreme Court of Minnesota.

It was urged on appeal that the ordinance was void, the first reason assigned being that the city lacked the power to pass it. In holding that this contention was without merit the appellate court said that the necessary authority was found in several provisions of the city charter. There were quoted portions of the charter which authorized ordinances for the government and good order of the city and which gave authority, by such ordinances, to license and regulate shops for the sale of provisions, to regulate the inspection of provisions, and to make all regulations which might be necessary and expedient for the preservation of health and the suppression of disease. The court said that, regardless of whether the ordinance was authorized by the general welfare clause of the charter, it was clear that it was authorized by the other subsections quoted. "While the word 'eggs' is not specifically mentioned, in any of the subsections, the word 'provisions' is used, and eggs are provisions as that term is commonly understood."

The next claim made by the defendant was that, if the city ever possessed the power to pass the ordinance, such power was taken away by the enactment of chapter 471, Laws of 1937. This law related to the grading, etc., of eggs and, by virtue of the authority granted therein, the State department of agriculture promulgated certain regulations regarding the grading and sale of eggs, which regulations were substantially the same as those contained in the city ordinance. There was no express provision in the statute prohibiting any municipality from legislating on the same subject matter, nor was anything found in the act from which such prohibition might be implied. The supreme court stated that a municipality, if it had proper delegated authority and if it legislated consistently with State law, could make an act an offense against the municipality although it was by statute an offense against the State. "Such an ordinance does not punish the violation of the State law but establishes a local law, the infraction of which it punishes." The court held that the ordinance did not conflict with the State law, was not an infringement thereof, and that the statute did not take from the city council the power to pass the ordinance.

The final claim of the defendant was that the ordinance was unnecessary to the regulation of the subject matter and was so unreasonable as to be an arbitrary exercise of power and void. In rejecting this contention it was said that courts had no power to declare an ordinance

void as being unreasonable unless the unreasonableness was so clear, manifest, and undoubted as to amount to a mere arbitrary exercise of the power vested in the legislative body, and that the court did not so consider the instant ordinance.

The judgment appealed from was affirmed.

DEATHS DURING WEEK ENDED JULY 5, 1941

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

	Week ended July 5, 1941	Corresponding week, 1940
Data from 88 large cities of the United States:		
Total deaths	7,773	7,116
Average for 3 prior years	7,187	
Total deaths, first 27 weeks of year	238,766	238,492
Deaths per 1,000 population, first 27 weeks of year, annual rate	12.3	12.3
Deaths under 1 year of age	444	436
Average for 3 prior years	476	
Deaths under 1 year of age, first 27 weeks of year	14,119	13,669
Data from industrial insurance companies:		
Policies in force	64,397,986	65,119,180
Number of death claims	8,913	8,858
Death claims per 1,000 policies in force, annual rate	7.2	7.1
Death claims per 1,000 policies, first 27 weeks of year, annual rate	10.0	10.1

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

REPORTS FROM STATES FOR WEEK ENDED JULY 12, 1941

Summary

A total of 187 cases of poliomyelitis was reported for the current week, as compared with 82 cases for the preceding week. The highest incidence was shown for the South Atlantic and East South Central States, which reported 127, or approximately 68 percent, of the total number of cases reported for the week. The 5-year (1936–40) median for the week is 135 cases.

Increases in the States having the largest numbers of cases, as compared with last week, were as follows: Georgia, 19 to 40; Alabama, 22 to 40; South Carolina, 3 to 13; Kentucky, 2 to 10; Florida, 6 to 11; Illinois, 5 to 9; Minnesota, 2 to 6; Pennsylvania, 4 to 7; Tennessee, 0 to 5; Texas, 4 to 8; Washington State, 0 to 5; and California, 3 to 8.

To date (first 28 weeks) this year, a total of 983 cases has been reported in the country as a whole, which was exceeded in only two of the preceding 5 years—1939 (1,011 cases) and 1937 (1,346 cases). For the corresponding period of 1940, 948 cases were reported, although the total for that year (9,799) was higher than for any other year since 1935, when 10,839 cases were recorded.

An outbreak of encephalitis has been reported in North Dakota, with 35 cases since January 1, of which 25 occurred during the period July 1–12. Seventeen of the cases were in Cass County.

Of 17 cases of Rocky Mountain spotted fever reported for the current week, 9 occurred in the eastern States, and 4 in North Carolina; and of 52 cases of endemic typhus fever, 18 were in Georgia, 13 in Texas, and 11 in Alabama. Four cases of tularemia were reported in Mississippi.

The death rate for the current week in 88 major cities in the United States is 11.1 per 1,000 population (annual basis), as compared with 10.9 for the preceding week and with a 3-year (1938–40) average of 10.8. The cumulative rate for these cities to date (first 28 weeks) this year is 12.3, the same as for the corresponding period of last year.

Telegraphic morbidity reports from State health officers for the week ended July 12, 1941, and comparison with corresponding week of 1940 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40
	July 12, 1941	July 13, 1940		July 12, 1941	July 13, 1940		July 12, 1941	July 13, 1940		July 12, 1941	July 13, 1940	
NEW ENG.												
Maine	0	1	1	------	------	------	103	141	50	0	0	0
New Hampshire	0	0	0	------	------	------	15	0	3	0	0	0
Vermont	0	0	0	------	------	------	47	8	12	0	0	0
Massachusetts	4	2	3	------	------	------	493	774	377	2	0	1
Rhode Island	1	0	0	------	------	------	9	59	17	0	0	0
Connecticut	1	0	1	------	1	1	220	8	51	0	0	0
MID. ATL.												
New York [4]	14	15	25	[1] 3	[1] 2	[1] 3	915	681	840	8	1	2
New Jersey	6	9	7	1	4	4	500	749	247	3	0	0
Pennsylvania	4	9	15	------	------	------	1,086	245	287	3	1	3
E. NO. CEN.												
Ohio [2]	2	8	10	1	6	6	435	12	77	1	0	2
Indiana	1	2	6	5	------	6	31	9	9	0	1	1
Illinois [2]	12	25	22	2	2	7	228	256	91	1	0	2
Michigan [2]	4	1	14	1	6	------	518	370	137	1	1	1
Wisconsin	1	0	3	6	9	9	606	621	190	1	2	0
W. NO. CEN.												
Minnesota	1	1	1	------	------	1	7	18	29	0	0	0
Iowa [2]	4	0	2	2	3	------	71	35	35	0	1	0
Missouri	1	0	6	------	------	------	58	2	15	1	0	1
North Dakota [4]	3	0	1	------	------	------	8	0	0	0	0	0
South Dakota	0	0	1	------	------	------	7	0	2	1	0	0
Nebraska	0	1	1	------	------	------	9	13	8	0	1	1
Kansas	1	4	3	------	1	2	55	53	10	1	1	1
SO. ATL.												
Delaware	0	0	0	------	------	------	6	0	1	0	0	0
Maryland [2 3]	1	0	2	1	1	2	247	4	27	1	0	1
Dist. of Col.	0	5	5	------	------	------	37	1	33	0	0	0
Virginia [2]	2	4	7	26	36	------	279	36	60	0	1	3
West Virginia [3]	3	2	3	------	2	7	203	6	20	2	2	1
North Carolina [2 3]	3	2	9	------	------	1	285	48	82	1	1	3
South Carolina	8	3	3	105	105	69	182	6	8	0	0	1
Georgia [3]	2	2	5	6	28	------	93	15	------	0	0	1
Florida [3]	1	3	3	23	2	------	16	16	11	0	0	1
E. SO. CEN.												
Kentucky	1	1	4	------	4	2	77	42	15	0	1	2
Tennessee	1	2	3	21	12	12	71	25	22	3	1	1
Alabama [3]	5	1	9	5	7	7	62	53	10	2	1	1
Mississippi [3 5]	3	8	8	------	------	------	------	------	------	1	0	0
W. SO. CEN.												
Arkansas	2	2	5	1	1	4	50	16	16	1	1	1
Louisiana	1	4	4	1	10	18	1	1	6	0	1	1
Oklahoma	3	4	4	5	13	7	41	4	14	1	1	1
Texas [5]	10	13	20	289	44	67	145	125	85	2	1	1
MOUNTAIN												
Montana [2]	3	0	0	------	------	------	21	22	22	0	0	0
Idaho	1	1	1	------	------	1	3	12	5	1	0	0
Wyoming [2]	0	0	0	------	------	------	5	12	3	0	0	0
Colorado	4	5	5	6	------	------	32	10	16	0	0	0
New Mexico	1	0	0	------	------	------	13	10	8	0	0	0
Arizona	0	0	1	27	24	10	37	41	17	0	0	0
Utah [2 3]	0	0	1	------	------	------	8	69	32	0	0	0
Nevada [2]	0	------	------	------	------	------	26	------	------	0	------	------
PACIFIC												
Washington	0	1	0	3	------	------	7	48	48	0	0	0
Oregon	4	1	1	7	1	4	17	35	18	0	0	0
California	12	10	18	33	5	16	179	129	323	0	2	2
Total	131	152	300	580	329	374	7,564	4,840	3,912	38	22	37
28 weeks	6,851	8,050	12,244	596,541	167,313	150,230	817,027	217,367	262,949	1,275	1,026	1,963

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 12, 1941, and comparison with corresponding week of 1940 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40
	July 12, 1941	July 13, 1940		July 12, 1941	July 13, 1940		July 12, 1941	July 13, 1940		July 12, 1941	July 13, 1940	
NEW ENG.												
Maine	0	0	0	0	3	10	0	0	0	0	2	1
New Hampshire	0	0	0	1	1	1	0	0	0	0	0	0
Vermont	0	0	1	3	2	2	0	0	0	0	0	0
Massachusetts	0	0	1	62	66	66	0	0	0	3	2	2
Rhode Island	0	0	0	0	4	6	0	0	0	1	2	0
Connecticut	0	2	0	8	26	13	0	0	0	0	5	4
MID. ATL.												
New York [5]	2	1	4	113	181	155	0	0	0	8	1	13
New Jersey	0	0	1	37	110	31	0	0	0	2	8	6
Pennsylvania	7	0	0	50	120	121	0	0	0	8	14	14
E. NO. CEN.												
Ohio [3]	3	1	1	47	52	78	0	0	0	6	6	9
Indiana	1	3	1	22	7	18	0	1	2	7	0	8
Illinois [3]	9	0	5	97	206	87	4	1	11	12	9	17
Michigan [3]	3	4	3	74	102	129	4	0	0	5	6	3
Wisconsin	0	1	0	37	53	55	0	2	2	1	0	1
W. NO. CEN.												
Minnesota	6	0	1	20	24	31	0	0	4	0	3	0
Iowa [3]	2	5	0	17	10	19	2	11	11	0	1	2
Missouri	1	0	1	18	5	18	0	1	5	9	4	7
North Dakota [4]	0	0	0	1	3	3	0	5	4	1	1	0
South Dakota	2	0	0	3	5	5	4	16	5	1	0	0
Nebraska	0	0	0	9	3	5	0	1	3	0	1	1
Kansas	0	4	2	19	25	25	0	0	1	1	1	5
SO. ATL.												
Delaware	0	1	0	4	3	2	0	0	0	1	0	1
Maryland [2 3]	1	0	0	14	7	15	0	0	0	5	4	4
Dist. of Col.	0	0	0	3	8	3	0	0	0	0	0	3
Virginia [2]	5	1	1	8	10	10	0	0	0	8	8	18
West Virginia [3]	0	2	2	7	16	16	0	0	0	2	5	5
North Carolina [2 5]	0	2	2	1	16	17	0	1	0	7	4	19
South Carolina	13	3	1	6	0	1	0	0	0	10	10	16
Georgia [5]	40	0	1	7	4	5	0	0	0	19	15	39
Florida [5]	11	0	0	0	2	2	0	0	0	5	4	1
E. SO. CEN.												
Kentucky	10	3	3	24	14	10	0	0	0	10	8	37
Tennessee	5	0	2	17	5	4	0	0	0	11	3	32
Alabama [5]	40	5	3	8	10	10	0	1	0	7	2	15
Mississippi [3 5]	2	0	0	10	1	3	0	0	0	7	5	11
W. SO. CEN.												
Arkansas	0	2	1	0	5	5	0	0	0	14	25	25
Louisiana	1	3	1	1	6	6	0	0	0	12	22	21
Oklahoma	1	2	1	11	3	5	0	2	1	17	8	20
Texas [5]	8	7	7	12	8	17	0	3	0	43	33	33
MOUNTAIN												
Montana [3]	0	1	0	14	3	8	0	1	1	0	1	1
Idaho	0	0	0	10	0	3	1	0	2	1	0	0
Wyoming [3]	0	0	0	1	3	3	0	0	0	0	0	0
Colorado	0	0	0	5	16	16	0	1	2	1	2	2
New Mexico	0	1	1	0	1	4	0	0	0	0	1	5
Arizona	0	0	0	0	1	2	0	0	0	3	5	4
Utah [2 3]	0	1	0	4	4	6	0	0	0	0	0	1
Nevada [3]	0	-----	-----	0	-----	-----	0	-----	-----	0	-----	-----
PACIFIC												
Washington	5	17	0	11	14	14	0	1	1	1	3	3
Oregon	1	2	0	4	4	9	1	1	1	0	1	3
California	8	27	19	58	53	66	0	0	7	4	3	11
Total	187	101	135	878	1,225	1,298	16	49	91	253	238	437
28 weeks	983	948	948	88,657	115,292	132,945	1,149	1,843	7,557	2,944	3,099	4,601

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 12, 1941, and comparison with corresponding week of 1940—Continued

Division and State	Whooping cough	
	Week ended—	
	July 12, 1941	July 13, 1940
NEW ENG.		
Maine	27	12
New Hampshire	1	0
Vermont	1	16
Massachusetts	116	105
Rhode Island	12	2
Connecticut	21	63
MID. ATL.		
New York [5]	301	265
New Jersey	135	142
Pennsylvania	293	357
E. NO. CEN.		
Ohio [2]	267	270
Indiana	30	12
Illinois [2]	145	157
Michigan [3]	268	261
Wisconsin	168	108
W. NO. CEN.		
Minnesota	76	43
Iowa [2]	55	7
Missouri	64	33
North Dakota [4]	20	9
South Dakota	3	6
Nebraska	11	6
Kansas	164	61
SO. ATL.		
Delaware	7	11
Maryland [2 3]	65	144
District of Columbia	1	13
Virginia [2]	46	110
West Virginia [3]	36	91
North Carolina [2 6]	229	121
South Carolina	165	15
SO. ATL.—continued		
Georgia [6]	10	20
Florida [6]	13	10
E. SO. CEN.		
Kentucky	64	92
Tennessee	56	48
Alabama [6]	26	17
Mississippi [3 6]	----------	----------
W. SO. CEN.		
Arkansas	13	36
Louisiana	27	64
Oklahoma	27	19
Texas [6]	250	210
MOUNTAIN		
Montana [2]	10	8
Idaho	27	14
Wyoming [3]	10	6
Colorado	196	11
New Mexico	15	18
Arizona	14	0
Utah [2 3]	79	117
Nevada [2]	24	----------
PACIFIC		
Washington	117	65
Oregon	16	28
California	402	242
Total	4,123	3,465
28 weeks	127,297	90,001

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended July 12, 1941, 17 cases, as follows: Ohio, 1; Illinois, 1; Iowa, 1; Maryland, 1; Virginia, 1; North Carolina, 4; Montana, 2; Wyoming, 2; Utah, 3; Nevada, 1.
[3] Period ended earlier than Saturday.
[4] Encephalitis, North Dakota, Jan. 1–June 30, 1941, 10 cases; July 1–12, 1941, 25 cases.
[5] Typhus fever, week ended July 12, 1941, 52 cases, as follows: New York, 1; North Carolina, 2; Georgia, 18; Florida, 5; Alabama, 11; Mississippi, 2; Texas, 13.

PLAGUE INFECTION IN CALIFORNIA

IN FLEAS FROM RATS IN ALAMEDA COUNTY

Under date of July 2, Dr. Bertram P. Brown, State Director of Public Health of California, reported plague infection proved, by animal inoculation and cultures, in a pool of 23 fleas from 102 rats, *R. norvegicus*, submitted to the laboratory on June 6 from Berkeley, and in a pool of 16 fleas from 4 rats, *R. norvegicus*, submitted to the laboratory on June 13 from Oakland, both in Alameda County, Calif.

IN FLEAS AND GROUND SQUIRRELS IN KERN AND MONTEREY COUNTIES

Dr. N. E. Wayson, Medical Officer in Charge, Plague Suppressive Measures, San Francisco, Calif., reported plague infection proved, by animal inoculation and cultures, in ground squirrels, *C. beecheyi*, and in fleas from ground squirrels of the same species, as follows:

Under date of June 30, 1941

In 7 ground squirrels submitted to the laboratory on June 4 from a location in Hunter Liggett Military Reservation 25 miles southwest of King City, Monterey County.

In a ground squirrel submitted to the laboratory on June 5 from a ranch 6 miles south of Davis Ranger Station, Kern County.

Under date of July 5, 1941

In a pool of 9 fleas from 1 ground squirrel found dead on June 6 on a ranch 3 miles south of Davis Ranger Station, Kern County.

In a ground squirrel submitted to the laboratory on June 11 from a ranch 6 miles south of Davis Ranger Station, Kern County.

In 25 ground squirrels submitted to the laboratory on June 5 from a ranch in Hunter Liggett Military Reservation 6 miles west of Jolon, Monterey County.

In a pool of 27 fleas from 4 ground squirrels collected on June 5 on the same ranch, 6 miles west of Jolon, Monterey County.

Collected on a ranch in Hunter Liggett Military Reservation 25 miles southwest of King City, in Monterey County, in a pool of 228 fleas taken on June 3 from ground squirrel burrows; in a pool of 17 fleas from 3 ground squirrels; and in a pool of 103 fleas from 5 ground squirrels submitted to the laboratory on June 4.

Under date of July 2, Dr. Bertram P. Brown, State Director of Public Health of California, reported plague infection proved, by animal inoculation and cultures, in fleas and ground squirrels, *C. beecheyi*, as follows:

In a pool of 24 fleas from 29 ground squirrels submitted to the laboratory on June 9 from San Antone Road, Hunter Liggett Military Reservation, Monterey County.

In a ground squirrel submitted to the laboratory on June 24 from a ranch at Keene, Kern County.

In a pool of 74 fleas from 9 ground squirrels submitted to the laboratory on June 6 from a ranch 6 miles south of Davis Ranger Station, Kern County, and in another pool of 64 fleas from 6 ground squirrels submitted to the laboratory on June 5 from the same ranch.

OUTBREAK OF ENCEPHALITIS IN NORTH DAKOTA

Under date of July 14, 1941, Dr. Maysil M. Williams, State Health Officer, reported an outbreak of encephalitis in North Dakota. To that date a total of 35 cases had been reported this year, of which 25 occurred during the period July 1–12.

Seventeen, or approximately 50 percent, of the cases were reported from Cass County, the other cases being scattered throughout the State. The first case in Cass County was reported on July 1. The first four cases occurring in that county which were investigated, and on which clinical reports were furnished by Dr. Williams, were diagnosed as encephalomyelitis, and in one of these cases there was a definite history of equine encephalomyelitis on the farm where the patient lived, but no history of direct contact. No paralysis was reported in three of these cases but in one ataxia was present in the upper extremities.

Twenty-four of the thirty-five cases were in adults and 11 were in children under 15 years, 4 cases being in infants 1 year of age or younger.

In 1940, 10 cases of encephalitis had been reported in North Dakota up to August 1, and 24 cases, with 11 deaths, were reported for the entire year. For the first 6 months of 1941, approximately 280 cases of encephalitis have been reported in the United States. For the calendar year 1940, a total of 1,217 cases was reported for the country as a whole.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 28, 1941

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	96	28	14	2,192	302	701	8	354	38	1,255	-------
Current week [1]	52	19	11	2,767	261	607	0	352	31	1,295	-------
Maine:											
Portland	0	------	0	0	1	0	0	1	0	7	27
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	6
Manchester	0	------	0	0	0	1	0	0	0	0	14
Nashua	0	------	0	0	0	0	0	0	0	0	6
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	0	9
Rutland	0	------	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	0	------	1	126	6	59	0	10	0	33	212
Fall River	2	------	0	5	0	4	0	2	0	5	33
Springfield	0	------	0	59	0	8	0	1	0	4	51
Worcester	0	------	0	11	8	1	0	1	0	4	58
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	13
Providence	1	------	0	17	1	5	0	3	0	6	54

[1] Figures for Barre estimated; report not received.

City reports for week ended June 28, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Connecticut:											
Bridgeport	0	------	0	20	1	5	0	0	0	3	26
Hartford	0	------	0	7	0	3	0	1	0	1	51
New Haven	0	------	0	4	1	1	0	0	0	8	30
New York:											
Buffalo	0	------	1	44	8	16	0	3	0	12	128
New York	13	1	1	346	69	116	0	91	6	92	1,626
Rochester	0	------	0	107	0	0	0	0	0	9	74
Syracuse	0	------	0	21	1	4	0	0	1	38	36
New Jersey:											
Camden	1	------	1	2	1	1	0	2	0	9	27
Newark	0	1	0	40	0	11	0	7	0	23	104
Trenton	0	------	0	10	2	4	0	1	0	0	34
Pennsylvania:											
Philadelphia	1	2	3	38	7	50	0	21	3	68	506
Pittsburgh	2	------	0	285	3	11	0	8	0	33	141
Reading	0	------	0	14	0	1	0	0	0	3	20
Scranton	0	------	------	16	------	0	0	------	0	0	------
Ohio:											
Cincinnati	1	------	0	7	2	9	0	5	1	7	148
Cleveland	0	3	0	11	0	20	0	9	2	82	176
Columbus	0	------	0	46	1	4	0	3	0	14	107
Toledo	0	------	0	269	2	1	0	1	1	28	73
Indiana:											
Anderson	0	------	0	2	0	0	0	0	0	0	12
Fort Wayne	1	------	0	1	2	0	0	1	1	0	37
Indianapolis	0	------	0	62	4	7	0	5	0	8	108
South Bend	0	------	0	11	0	0	0	0	3	1	15
Terre Haute	0	------	0	1	2	0	0	0	0	0	19
Illinois:											
Alton	0	------	0	5	0	0	0	0	1	0	8
Chicago	6	------	1	64	14	71	0	44	1	47	722
Elgin	0	------	0	0	0	0	0	0	0	0	13
Moline	0	------	0	1	0	0	0	0	0	4	15
Springfield	0	------	0	28	1	2	0	0	0	0	28
Michigan:											
Detroit	2	------	0	247	11	55	0	6	1	102	267
Flint	0	------	0	5	3	1	0	0	0	7	29
Grand Rapids	0	------	0	49	1	4	0	0	1	4	32
Wisconsin:											
Kenosha	0	------	0	2	0	1	0	0	0	0	13
Madison	0	------	0	16	0	4	0	0	0	2	8
Milwaukee	0	------	0	305	5	19	0	2	0	56	89
Racine	0	------	0	24	0	3	0	0	0	6	13
Superior	0	------	0	1	0	1	0	0	0	8	13
Minnesota:											
Duluth	0	------	0	0	0	1	0	0	0	19	19
Minneapolis	0	------	0	8	2	6	0	0	0	18	104
St. Paul	0	------	0	0	3	7	0	2	0	23	62
Iowa:											
Cedar Rapids	0	------	------	0	------	1	0	------	0	0	------
Davenport	0	------	------	0	------	0	0	------	0	0	------
Des Moines	0	------	------	6	------	2	0	------	0	0	36
Sioux City	0	------	------	0	------	0	0	------	0	17	------
Waterloo	1	------	------	16	------	0	0	------	0	1	------
Missouri:											
Kansas City	0	------	0	45	4	1	0	2	1	9	95
St. Joseph	0	------	0	2	3	0	0	0	0	0	27
St. Louis	0	1	0	62	4	13	0	13	2	27	255
North Dakota:											
Fargo	0	------	0	1	3	0	0	0	0	4	6
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	------	8	------	0	0	------	0	0	7
South Dakota:											
Aberdeen	0	------	------	1	------	0	0	------	0	0	------
Sioux Falls	0	------	------	0	------	0	0	------	0	0	6
Nebraska:											
Lincoln	0	------	------	3	------	1	0	------	0	3	------
Omaha	0	------	0	2	3	0	0	0	0	0	63
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	2
Topeka	2	------	0	5	1	1	0	0	0	39	15
Wichita	0	------	0	2	4	0	0	0	0	10	22

City reports for week ended June 28, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Delaware:											
Wilmington	0	------	0	1	2	0	0	0	0	2	22
Maryland:											
Baltimore	3	------	0	257	8	9	0	7	0	66	218
Cumberland	0	------	0	1	0	0	0	0	0	0	14
Frederick	0	------	0	1	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	1	1	1	80	6	3	0	14	0	9	195
Virginia:											
Lynchburg	0	------	0	42	1	0	0	1	0	6	9
Norfolk	0	------	0	4	2	0	0	1	0	2	21
Richmond	0	------	0	29	3	5	0	1	0	0	48
Roanoke	0	------	0	1	0	0	0	0	0	0	15
West Virginia:											
Charleston	0	------	0	0	3	0	0	3	2	2	31
Huntington	0	------	------	2	------	0	0	------	0	1	------
Wheeling	0	------	0	18	2	0	0	0	0	0	21
North Carolina:											
Gastonia	0	------	------	4	------	0	0	------	0	1	------
Raleigh	0	------	0	4	1	0	0	1	0	9	21
Wilmington	0	------	0	7	1	0	0	0	0	22	6
Winston-Salem	0	------	0	0	1	0	0	1	0	2	11
South Carolina:											
Charleston	0	------	0	1	1	1	0	2	0	2	14
Florence	0	------	0	0	1	0	0	1	0	0	9
Greenville	0	------	0	0	1	0	0	0	0	1	23
Georgia:											
Atlanta	1	------	0	1	1	1	0	3	0	1	80
Brunswick	0	------	0	0	0	0	0	0	0	3	4
Savannah	0	------	0	10	4	1	0	2	1	0	35
Florida:											
Miami	0	------	0	2	1	0	0	1	0	3	20
St. Petersburg	0	------	0	3	0	0	0	0	0	0	10
Tampa	0	------	0	1	1	1	0	1	0	0	22
Kentucky:											
Ashland	1	------	0	0	0	0	0	1	0	0	5
Covington	0	------	0	1	0	1	1	1	0	0	16
Lexington	0	------	0	2	0	0	0	0	0	0	11
Louisville	0	------	0	66	8	10	0	6	0	19	103
Tennessee:											
Knoxville	0	------	0	7	2	1	0	1	0	1	25
Memphis	0	------	2	16	1	2	0	3	0	27	68
Nashville	0	------	0	7	0	4	0	1	0	12	43
Alabama:											
Birmingham	0	1	0	6	1	1	0	3	1	1	59
Mobile	1	------	0	1	2	2	0	1	0	0	28
Montgomery	1	------	------	0	------	1	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	1	0	------	1	0	------
Little Rock	0	------	0	4	0	0	0	1	0	1	19
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	5
New Orleans	0	------	0	1	6	0	0	7	1	13	140
Shreveport	0	------	0	0	4	1	0	1	0	1	40
Oklahoma:											
Oklahoma City	1	------	0	0	2	0	0	2	1	1	46
Tulsa	1	------	0	5	3	0	0	1	1	0	34
Texas:											
Dallas	0	------	0	28	0	6	0	2	1	1	66
Fort Worth	0	------	0	0	3	0	0	0	0	0	34
Galveston	0	------	0	0	2	1	0	0	2	0	20
Houston	2	------	0	1	3	3	0	8	0	7	71
San Antonio	1	3	0	0	6	0	0	7	0	13	76
Montana:											
Billings	0	------	0	0	2	0	0	0	0	0	13
Great Falls	0	------	0	1	1	0	0	0	0	1	9
Helena	0	------	0	0	0	0	0	0	0	1	7
Missoula	0	------	0	0	0	0	0	0	0	0	3
Idaho:											
Boise	0	------	0	0	0	2	0	0	0	1	7
Colorado:											
Colorado Springs	0	------	0	3	1	2	0	1	1	0	8
Denver	4	4	0	52	1	2	0	2	0	137	81
Pueblo	0	------	0	6	1	3	0	0	0	7	9

City reports for week ended June 28, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Arizona:											
Phoenix	0	18	----	2	----	0	0	----	0	0	----
Utah:											
Salt Lake City	0	----	0	8	1	4	0	0	0	7	30
Washington:											
Seattle	3	----	0	2	2	0	0	4	0	24	86
Spokane	0	----	0	0	0	2	0	0	0	6	27
Tacoma	0	----	0	1	2	1	0	2	0	5	39
Oregon:											
Portland	1	1	0	0	2	4	0	1	0	3	8
Salem	0	----	----	0	----	0	0	----	0	0	----
California:											
Los Angeles	2	1	0	27	2	19	0	22	0	26	351
Sacramento	2	----	0	4	3	1	0	1	0	12	30
San Francisco	0	1	0	1	4	6	0	7	0	19	157

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				South Carolina:			
Worcester	1	1	0	Charleston	0	0	1
New York:				Georgia:			
New York	3	1	4	Atlanta	0	0	15
Pennsylvania:				Alabama:			
Philadelphia	1	0	0	Birmingham	0	0	1
Ohio:				Mobile	0	0	1
Cleveland	1	0	1	Louisiana:			
Illinois:				New Orleans	0	0	1
Chicago	1	1	0	California:			
Maryland:				Los Angeles	0	0	1
Baltimore	2	0	0				

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Columbus, 1. Deaths: New York, 3; Columbus, 1.
Pellagra.—Cases: Savannah, 3.
Rabies in man.—Deaths: Memphis, 1.
Typhus fever.—Cases: Miami, 2; Tampa, 2; Mobile 1; Los Angeles, 1. Deaths: Houston, 1.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 14, 1941.—During the week ended June 14, 1941, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2	1	6	5		2	3	2	21
Chickenpox		3		94	239	142	44	79	27	628
Diphtheria		8		23	1	2	1	1		36
Dysentery				1						1
Influenza		8			2		14			24
Measles		2		421	1,000	65	50	86	79	1,703
Mumps		2		140	141	20	28	13	5	349
Pneumonia		1			8		1		4	14
Poliomyelitis					1		2			3
Scarlet fever		25	8	91	171	7	6	20	18	346
Trachoma							2		3	5
Tuberculosis	1	2	6	77	63	2	30	4		185
Typhoid and paratyphoid fever				13	5			1		19
Whooping cough				42	141	2		4	13	202

GUATEMALA

Vital statistics—Year 1940.—The following table shows the numbers of deaths from certain causes in Guatemala for the year 1940:

Cause	Number of deaths	Cause	Number of deaths
Accidents	417	Other diseases of the circulatory system	329
Appendicitis	20	Suicide	8
Cancer	466	Traumatism, accidental	105
Diabetes	23	Tuberculosis	1,386
Diseases of the heart	465		

NOTE.—Estimated population, 1938: 3,044,490.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS of June 27, 1941, pages 1347-1349. A similar table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Smallpox

Peru.—During the period January 1 to March 31, 1941, 249 cases of smallpox were reported in Peru, by Departments, as follows: Cajamarca, 5; Cuzco, 48; Huancavelica, 7; Junin, 119; Lambayeque, 1; Libertad, 12; Lima, 3; Piura, 14; Puno, 39; Tumbes, 1.

Typhus Fever

Peru.—During the period January 1 to March 31, 1941, 453 cases of typhus fever were reported in Peru, by Departments, as follows: Ancash, 14; Apurimac, 2; Arequipa, 7; Ayacucho, 30; Cuzco, 74; Huancavelica, 2; Junin, 31; Libertad, 6; Lima, 1; Puno, 265; Tacna, 21.

Yellow Fever

Belgian Congo.—Two fatal cases of yellow fever have been reported in Belgian Congo, one of the deaths occurring at Libenge on June 17, the other at Kimvulu on June 21, 1941. The entire population at both places has been vaccinated and strict quarantine measures have been taken.

Peru.—During the period January 1 to March 31, 1941, 5 cases of yellow fever were reported in Junin Department, Peru.

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