LEAGUE OF NATIONS

HEALTH SECTION

EPIDEMIOLOGICAL INTELLIGENCE

EPIDEMICS IN RUSSIA SINCE 1914

REPORT

TO THE

HEALTH COMMITTEE OF THE LEAGUE OF NATIONS

BY

PROFESSOR L. TARASSÉVITCH
(MOSCOW)

PART I

TYPHUS — RELAPSING FEVER
SMALLPOX

N° 2

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INTRODUCTION.

The report which I have the honour to submit was drawn up at the request of the Delegates of the Health Organisation of the League of Nations, Dr. Norman White and Dr. L. Rajchman. It is essential that the European medical world should be fully informed of the epidemic catastrophe from which we have been suffering for the last four years, and the end of which is not yet in sight. Apart from its undoubted scientific interest, the question is also of the greatest practical importance, more immediately, no doubt, for us Russians, but also for our Western colleagues, since the epidemic centre in Russia, which is so widespread and so virulent, constitutes a serious and constant menace to our neighbours. An improvement in the epidemic situation of Russia and a consequent elimination of this danger can only be achieved by a common co-ordinated effort, since we are not in a position, from our own resources, to lead the campaign against epidemics to a successful issue.

The most essential condition for successful common action, even in a specialised and limited field, is the possession of full, regular, and reliable information. I felt it to be a duty and a great honour to help to supply this information, and that is the reason why, in spite of difficulties both of a general and a personal nature, I have accepted the proposal made to me.

I have undertaken this task with the greatest pleasure, and also with profound gratitude, with the hope of assisting in the campaign against epidemics, a campaign so arduous and, alas, in spite of our strenuous efforts, with such small results.

S. d. N. 625. 3/22. Imp. Kundig.

I. CHARACTER AND PLAN OF THE REPORT: SOURCES OF INFORMATION.

Owing to the almost complete interruption of relations between Russia and Europe during the last four years, the West was not in a position to form an accurate judgment of the epidemic situation. Rumours and reports, even when they came from trustworthy persons whose sincere intention was to make the truth known, merely created confusion, since these persons had not the necessary information at their disposal to enable them to appreciate and to judge of the situation as a whole. It was reported, for instance, that typhus and relapsing fever were raging; that cholera was spreading in an alarming manner; there was talk of the plague, etc., etc., but nothing was known as to the extent, the locality, the nature, and the course of these diseases.

Having been requested to supply this information, I will begin first of all by stating exactly the purpose and the plan of my report, as well as the sources of information at my disposal. If the extent and diversity of the epidemics from which Russia has suffered, especially since 1918, and the great differences existing in the conditions in various localities, etc., are taken into consideration, it will be easily understood that to make a more or less complete and detailed statement would require not one report but a whole series of special reports and a considerable amount of time. The difficulty is increased by the fact that any person who is in any degree competent is, with us, extremely overworked and possesses neither the time nor the necessary strength to do rapidly any additional work. The first report can therefore only consist of a brief survey of the epidemics; it will give no more than the general outlines and main features, without entering into details, however interesting these may be, and without attempting to give explanations or formulate any judgments. In this report figures, tables, and diagrams must be allowed to speak, and they speak eloquently enough; the report must be limited to merely an explanatory text or brief commentary on these figures and diagrams. All the details and all the practical and theoretical aspects of the matter may be stated, if necessary, in subsequent reports, of which each will deal with a special question, and to which the present report may serve as an introduction.

In my summary statement I will deal at greater length with typhus and relapsing fever in view of their predominance and importance, and with cholera, which, we are told, arouses particular interest in Europe. In addition to epidemiological data, a few observations on mortality in general and on the extent of the depopulation of Russia will be given, as well as some details illustrating the situation in various parts, and some observations on the epidemiological forecast which may be made as to future conditions. The statement regarding the present situation will be preceded by a short summary of the previous position regarding epidemics. This position is not sufficiently known outside Russia, and the knowledge is necessary as a basis of comparisons which would make it possible to appreciate, at their true value, the whole extent of the present catastrophe and partly also its origin. The sources of information and the documents which I have used are the following:

(1) All the works, articles and reports published in recent years [1]. Owing to general difficulties and to the situation of the printing trade in particular, these publications are unfortunately too few to give anything approaching a complete account of the situation. Moreover, the absolute lack of any

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[1] I will make all necessary bibliographical references, and I will send to the Health Section of the League of Nations all printed documents, so that those of my colleagues who are particularly interested in these questions may have access to all the supplementary data and all the details which have already been published in Russian.

bibliographical publications, the defective state of the postal service, the slow and difficult communications between the different parts of Russia render impossible any certainty that all the publications which have appeared have been collected, in spite of all the efforts made in that direction. It is possible that a certain number of articles and works have escaped my notice; but it is not likely that that number is very great.

(2) Unpublished statistical and demographic data collected by our most eminent medical statisticians. I wish to express here my profound gratitude to my colleagues on the Council of the Pirogoff Society, to Dr. P. Kourkine, doyen of medical statistics in our country, and the author of an excellent atlas[1] and of a whole series of works on medical statistics and demography, and also to Dr. A. Tchertoff, head of the statistical service for the City of Moscow. I owe a great deal to the exceptional kindness and courtesy of Dr. P. Kouvchinnikoff, head of the statistical branch of the Department of Public Health, who placed at my disposal the diagrams he had prepared for the fifth Congress of Russian bacteriologists and epidemiologists (Moscow, May 1921), and also a whole series of statistical tables which will be reproduced and commented on in this statement. I desire to tender him my most cordial thanks.

(3) All the figures and summary data give an accurate general idea, especially as regards numbers. But it should further be explained briefly that the epidemiological tables vary according to localities, and that these data are based on the evidence of persons who have long been resident in such and such a locality, and whose competence and scientific and professional integrity can be relied upon. When I was invited to draw up the present report, I therefore approached my colleagues, professors, directors of scientific institutions, etc., scattered over the whole of Russia from Irkutsk to Odessa, begging them to reply to a short questionnaire which consisted of the following three main questions (we will omit the details here):

(*a*) What was their estimate of the local situation in respect of epidemics, the actual morbidity and mortality — in other words, what co-efficient of correction should be applied to official statistical returns ?

(*b*) What are the particular features as regards such and such a locality which should be reported, in order to complete a general survey of the question ?

(*c*) What forecast for the immediate future should be made regarding epidemics ?

Although I have not yet received all the replies, those which have already come to hand have enabled me to supplement the data at my disposal in Moscow. I wish to express my most cordial thanks to those of my colleagues who have been good enough to reply to my short questionnaire.

II. BRIEF STATEMENT REGARDING EPIDEMICS IN RUSSIA.

(a) *During the war*; (b) *during the Revolution.*

(*a*) It is well known that Russia has always been in an unfortunate position as regards health conditions in general and epidemics in particular; in that respect it occupies the lowest rank in Europe,

[1] The second edition of this atlas is already completed. It would be of the greatest value to all those who are interested in the health situation in Russia. Unfortunately, under the present technical conditions, it is very difficult to edit this atlas, and it is impossible to say, even approximately, when it will be published.

and a certain number of diseases which have almost completely disappeared from the West continue to rage in our country, so that it has even become customary to speak of "Russian cholera", "Russian typhus" and "Russian relapsing fever", etc.

At the beginning of the war the possible outbreak of epidemics and the consequences involved thereby, especially in view of the extent of the war and the immense number of troops engaged, was viewed with apprehension by a certain number of medical men who knew the conditions habitually obtaining in this country, and who had studied the effects of disease in our former wars. These, with the exception of the Japanese war, had always been accompanied by epidemics, causing greater loss than the actual fighting. These medical men urged the necessity of taking preventive measures of an extensive nature. Their appeals were at first disregarded: it was hoped that the war would not last more than a few months and that there would not be time for epidemics to spread to any alarming extent, and this state of affairs was only gradually changed. The cases of typhus and relapsing fever brought from the Turkish and Galician fronts, and the centres of cholera in Galicia and Poland, were the first to attract general attention. The initiative was taken by the Pirogoff Association, which convened a special congress in December 1914 to discuss questions concerning the preventive measures necessitated by the war [1]; the congress pointed out the danger from epidemics, and indicated the general measures which should be taken. A definite line of action was given to the movement by the Unions of the Zemstvos [2] and of the Towns [3]; it was chiefly owing to the activity of these two associations that it was possible to start and extend the campaign against epidemics, both at the front and behind the lines. The results obtained surpassed all expectations to such an extent that the promoters of the campaign were accused in certain quarters of unjustified apprehension. If the tables showing the morbidity due to the principal epidemics are consulted, it will be at once obvious that the figures for the years 1914-1915 and 1916 do not differ widely from those for the previous years, and appear indeed to be more favourable in certain cases.

It is worth noting that before one of the measures so easily applied in the European armies, namely anti-typhoid and anti-cholera vaccination, could be enforced, almost a year's propaganda was necessary to overcome the prejudices which existed even in medical circles, and that vaccination was not finally and officially sanctioned until August 1915.

It was still longer before anti-tetanic inoculation could be introduced; it began to be regularly applied from the summer of 1916, when all objections and doubts were overcome through the report received from the Commission which had been sent to England and France by the Union of the Zemstvos.[4] The campaign in favour of disinfection as a means of combating typhus and relapsing fever extended over a considerable period. At the Congress of Therapeutics at Moscow in 1916 there were still to be found supporters of the theory of infection by droplets. These scientific polemics have, however, been rather useful than otherwise. They increased enthusiasm and aroused general interest, and so

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[1] *Work of the Congress of Bacteriologists and Representatives of the Medico-sanitary Organisations.*(Moscow, 28-30 December, 1914.) Edited by L. Tarassévitch and V. Favre. Published by the Pirogoff Association. (Moscow, 1914.)

[2] L. Tarassévitch. "Campaign against Epidemics. "*Report to the principal Committee of the Union of the Zemstvos. Committee Bulletin* No. 11, 1915.

[3] L. Tarassévitch "Campaign against Epidemics. "*Report to the second Congress of the representatives of the Union of Towns.* (Moscow, March, 1915.)

[4] See publications of the two Unions, especially those of the Union of the Zemstvos, the minutes of all the numerous meetings held at Moscow, Kieff, Smolensk, etc. See especially the work of the Congress of the Pirogoff Association in April 1916 at Petrograd, concerning health questions arising from the state of war (Moscow, 1917).

helped the campaign. No further doubts were entertained as to the value of measures of general hygiene, which was applied uninterruptedly as far as circumstances would allow. In any case, health conditions in the army, although not so entirely satisfactory as in Western Europe, continued to be satisfactory. It would undoubtedly be an exaggeration to attribute this entirely to sanitary measures, however effective they may have been. One of the principal reasons was the satisfactory situation of the country, whose resources had not yet been exhausted; moreover, the epidemics necessarily took a certain time to spread over the whole country. The preventive measures, moreover, which were taken energetically and in good time, indicated why. The example of the epidemic of typhus at Samara in 1915 brought by Turkish prisoners can be cited. Even the great retreat of 1915, and the tidal wave of refugees spreading as far as Siberia, did not modify this situation to any considerable extent. The increase of smallpox, typhus, etc., did not greatly exceed the fluctuations noted before the war. We have of course only general figures at our disposal, and can only deal with isolated centres of epidemic infection comparatively few in number and of small extent. If only the tables of morbidity are considered (see Table 1), it is easy to be misled into considering the health situation during the war as entirely favourable. There are several conditions tending to modify such an impression, which must be taken into account. The registration service was considerably affected by the war, and the figures are less complete than they otherwise would be; a fairly large part of the population, and that which is by its method of life particularly exposed to contagion and to a certain number of epidemic diseases — the male adults — was mobilised and absent at the front. It may even be concluded that in cases in which the figures of morbidity apparently remain the same as before the war, there is in reality a more or less considerable increase of morbidity. It must therefore be concluded that during the war [1] the general epidemic situation became more and more aggravated.

From the winter of 1916-1917 the situation clearly began to grow worse. Fatigue and the exhaustion of resources began to show their effects. On the further sectors of the front, where means of communication, transport, etc., were lacking, especially on the Roumanian and Caucasian fronts, there was an outbreak of extensive epidemics of typhus. Although it was not possible to suppress them at once, their spread into Russia was prevented. In the summer of 1917 a violent outbreak of scurvy [2] occurred on all the fronts, and there were several outbreaks of dysentery, etc. The imminence of demobilisation caused grave apprehension for many reasons, and especially from the point of view of the spread of epidemics. Once again, in spite of the spontaneous character of the demobilisation and the attendant disorder, these apprehensions were not justified. Medical and other resources were still at hand. The medical sanitary organisation of the Zemstvos and the Towns, and a part of that of the Unions, were still in existence, so that, although the seeds of epidemics were being sown, their growth was at least, and unfortunately for the last time, delayed.

In the winter of 1917-1918 serious signs were already making their appearance, the first of which was the outbreak of typhus at Petrograd. The endeavours made to draw attention to the danger, which this time was not confined to a mere threat but was really existent, met with no response, and were moreover badly received in various quarters. The initiative was once again taken by the Pirogoff Association, which established an Epidemics Commission under the Presidency of Professor

[1] The Pirogoff Association has drafted a scheme for studying the consequences of the war from a health point of view, but has been unable to carry it out through lack of means. The Health Commissariat has lately organised a special Commission to study these consequences. The participation in the work of this Commission of the most-renowned specialists (Kourkine, Novosselsky, Levitzky, Tcherrtoff, etc.) guarantees the interest of its results.

[2] Marseoff. "Epidemiology of Scurvy in 1917". *Obchestvenny Vratch* 1918.

Diatroptoff, and convened meetings of the Russian Bacteriologists and Epidemiologists in order to throw light upon the situation and to find a remedy. Circumstances were, however, too adverse : civil war, the importance and predominance of political questions over all others, and the violent social crisis, allowed no forethought for the future and for the prevention of epidemics.

In the summer of 1918, the attention of the newly formed (July 21st, 1918) Commissariat of Public Health was drawn to the outbreak of cholera in several places. A Central Epidemics Commission under the Presidency of the Commissioner — Dr. Semachko — and a Health and Epidemics Department, with Dr. Syssine at its head, were formed, and the promulgation of decrees and instructions to regulate the campaign against cholera, etc., was started. The Commission on Sera and Vaccines was re-established. Thanks to the considerable stocks of vaccines left by the two unions, the vaccination campaign could be carried on to the full extent permitted by the situation. In any case, the epidemic did not spread and quickly disappeared. In the autumn, " Spanish influenza " was brought into Russia from the west (an exceptional case) by the prisoners of war returning from Germany, and very quickly spread over the whole country, causing an absolute panic in several districts (confusion with pneumonic plague, etc). Fortunately, both epidemic and panic soon disappeared of their own accord and were quickly forgotten. The decrease of "Spanish influenza," however, coincided with the outbreak of the epidemic of typhus (in October-November 1918), which this time took a firm hold and spread with a rapidity which recalls the great epidemics of mediæval times which people thought had disappeared for ever from the civilised world. This epidemic still continues and is, with relapsing fever, the dominating epidemic in Russia. As I must examine separately and in detail the principal diseases which have arisen in Russia during the last few years, I will close this historic summary at this point. I should mention, however, that to these two diseases, the following must be added: smallpox, cholera, malaria, and in 1921, enteric fever. Health conditions are becoming worse and worse. Depopulation is increasing and it is impossible to foresee or predict when it will cease.

The winter of 1919-1920 was particularly bad. There was a fairly marked improvement in 1920-1921, but the famine which arose during the summer of 1921 once again altered the situation and produced new troubles of which it is difficult to foresee the extent and duration.

To realise the volume of the evil, it is sufficient, before beginning the examination of the principal epidemics, to glance at the tables and figures showing the progress and extent of the various epidemic diseases since the beginning of the 20th century.

III. — PRESENT STATISTICS OF INFECTIOUS AND EPIDEMIC DISEASES: THEIR CHARACTER AND VALUE.

(Tables and diagrams.)

The medical regime maintained by the Zemstvos, and the Russian Medical Statistics, met with a well-deserved success at the Health Exhibition of Dresden; there is no need for me to dwell upon the matter. I would only like to remark that even before the war the figures of morbidity were almost invariably incomplete and could only be considered as representing minima which had always to be increased more or less in order to arrive at an estimate of the truth. Dr. Novosselsky [1] — one of our

[1] Novosselsky. " The materials for the geography and statistics of Typhus." *Scientific Medicine*, 1919, Nos. 1 and 2.

most-renowned statisticians — states "that it is impossible to establish a uniform co-efficient of error since the accuracy of official statistical data depends directly upon the medical organisation, which varies greatly in the different districts." These statistics are satisfactory, and sometimes excellent, in the districts (*gouvernements*) provided with Zemstvos; they are extremely unsatisfactory where compiled by administrative organisations. Moreover, if we consult relevant documents, we find that certain authors, such as Dr. Schverine (12th Medical Congress of the Zemstvos of Smolensk), consider that registration shows only a fifth of the real morbidity, while others, such as Dr. Kourkine (for the Moscow government), consider that the statistical data are almost correct. It may be said that for 1909-1914 the figures given by the statistical services should, on an average, be multiplied by two to obtain the real total of morbidity [1]. All this was disorganised by the war. The medical profession at home suffered considerably from the mobilisation of doctors, and all the services, including that of statistics, were more or less similarly affected thereby. The co-efficient of error should therefore be increased to about 2 ½ or 3. This is not only my opinion, but also that of many of our authorised statisticians whose opinion I have asked. It goes without saying that these co-efficients are only given as a guide, and with every reserve. The situation grew worse and worse in this respect during the Revolution. To avoid the accusation of exaggerated pessimism, I will give the opinion of the head of the Sanitary and Epidemics Department — Dr. Syssine [2] — who states that registration ceased completely for a certain time, that some time had to elapse before the decree concerning the statistics of typhus and relapsing fever, promulgated in July 1918, could be applied, and that the lack of medical staff, specially in the country, undoubtedly had a considerable influence on the registration of diseases which was reduced to zero in certain districts, and in some cases over long periods, by the conditions arising from the civil war. It is for this reason that I consider that the official figures of morbidity should be multiplied by co-efficients varying between 2 and 5, and even higher according to the epidemics, in order to obtain a true estimate of the extent of the epidemics raging in Russia. As this co-efficient varies, as I have stated, following epidemics, districts and periods (it decreases progressively), I shall give the necessary information on the progress of the epidemics in the course of this statement.

Even for Moscow, where registration is carried out better than elsewhere, the error is estimated at 25 % (E. Ivanoff), 50 % (Prokofieff) [3] and even 100 % (Tchertoff). In the rural districts of Moscow, registration was much less satisfactory on account of the lack of doctors. I discovered in fact, in the summer of 1919, that the majority, in all probability, of the inhabitants of a village 20 kilometres from Moscow, had had typhus — in a light form, it is true [4] — without either consulting a doctor or making a declaration. In other districts still worse supplied in this respect, especially in districts in which civil war was being carried on, and in which, generally speaking, the epidemics were most severe, registration may be said to have been non-existent.

If all these considerations are taken into account, it will readily be admitted that the co-efficients of error sugested are in no way exaggerated. I have made an enquiry on the matter, and the most optimistic replies suggest 2-3, whilst others, more pessimistic, suggest 5 or even higher. It seems therefore preferable to take an average, as it is quite impossible to determine the exact figure. It must

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[1] The deficiencies of statistics of morbidity unaccompanied by the registration of the corresponding mortality, above all when there is no compulsory declaration of infectious disease, are well known. It is useless to dwell further upon this subject.

[2] A. Syssine. "The epidemic of Typhus and Relapsing Fever in Russia in 1918-1920." *Work of the Fourth Congress of Russian Bacteriologists and Epidemiologists*, 25-31 August, 1920 (pp. 5-41).

[3] A. Prokofieff. "Epidemic of Typhus in 1918-1920." *Moscow Medical Journal*, May 1921 (pp. 30-33).

[4] In the case of light or non-symptomatic forms of disease, the peasants very rarely consult doctors, and this is necessarily detrimental to the value of statistics.

be added that this average, in view of what I have stated above, can only be applied with accuracy to data which refer to the country as a whole. It varies, moreover, with different periods; it must be taken as higher for the years 1918-1919, when disorganisation was at its height, than for the present time. The best registration was carried out for cholera[1] (the official figures may be taken as almost correct), and for smallpox, to a lesser degree, and so on.

We have dealt upon this question at some length in order that a more or less accurate idea may be obtained of the value of the tables and diagrams which I am about to give.

Finally, to conclude this preliminary information, I must indicate the data upon which the tables and diagrams which have been compiled, as I have stated, by Dr. Kouvchinnikoff, are based[2]:

(1) For the period 1900-1914 — based on the annual report of the chief medical inspector on the state of public health and on those of the organisation of medical health.

(2) For 1915 — based on the reports of the sanitary inspectors collected by the Statistical Service of the Health Commissariat in accordance with the scheme of reports above mentioned.

(3) For 1916 and 1917 — based on the reports submitted once a fortnight by the Departmental Governors to the Chief Health Officer, the Prince of Oldenburg; these reports constitute the only existing data for these two years.

(4) For 1918 and 1919 — based on the annual reports of the Departmental Health Services in accordance with the scheme drawn up by the Statistical Commission of the Health Commissariat and by the Central Office of Statistics.

(5) Finally, for 1920 and 1921 — based on the telegraphic reports sent each week by the Services mentioned in paragraph (4); these latter data can only be considered as preliminary, although they do not show any marked changes after four or five months, the period during which supplementary information was still received. Up to July 1921, the data may be taken as almost correct, but for the second half of 1921 they are, on the contrary, quite incomplete.

All these data vary further according to the districts and population to which they refer. It is impossible to give a correct statement of the corresponding figures of population, which are at present subject to very large and sometimes very sudden variations, as a result of emigration *en masse*.

The figures regarding territories are simpler.

The figures refer:

(1) For 1900 to 1913 to the whole Empire (including Siberia, the Caucasus and Central Asia, with the exception of Poland and Finland).

(2) For 1914 to the same territory with the exception of the districts of Vilna, Kovno and Kholm.

(3) For 1915 to the same territory with the further exception of the districts of Grodno, Perm, Vladimir, Oufa, Petrograd, Jaroslav and Courland.

(4) For 1916 excluding Kamtchatka and adding the districts of Vladimir, Oufa, Petrograd and Jaroslav.

(5) For 1917 and 1918 on account of the disorganisation of the statistical system by the Revolution during the last months of 1917, and the cessation of all regular information, it is impossible to give even approximate data.

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[1] Now, as formerly, when any epidemic attracts attention particularly, its registration improves; special services are established, the number of doctors is increased, etc.

[2] The origin of those which belong to other authors will be specially indicated in the text.

(6) For 1919 and following years it is further necessary to take into account the very considerable variations to which the territory belonging to the Soviet Republic was subjected by the vicissitudes of the civil war. In any case the data for 1918 and 1919 refer to Russia in Europe and especially to the Central and Northern parts, with the exception of the occupied territory, the Eastern department about as far as the Urals, the department of Kharkoff (the only one of the Ukraine) and of Kouban (the only one of the Caucasus).

(7) For 1920 and 1921 information becomes much more extensive, covering the Ukraine to the South-West, the West of Siberia, the Department of Stavropol and an indeterminate part of Turkestan. At the same time there is a distinct improvement in registration.

All this information is necessary, not only for statistical accuracy, but also because, without it, a comparison with the data of previous years would necessarily be more or less erroneous. It appears clearly from the above that, in order to make such a comparison and obtain an idea of the true number of sick and dead in the whole of Russia, it is absolutely essential to take the co-efficients which I have suggested into consideration.

I now turn to Table 1, which gives the morbidity in absolute and relative figures (per 10,000 of population) for nine forms of epidemic, of which the three forms of typhus, and smallpox, are of particular interest.

It will be noticed:

(*a*) that these figures greatly exceed those for Western Europe, and that they only decrease very gradually and with periodical fluctuations; that the periods of increase and decrease vary with the diseases;

(*b*) that the three years preceding the years 1912-1914 are rather favourable than otherwise;

(*c*) that the three years of the war (1915-1917) show approximately the same results. I have already shown how these figures should be regarded and why it may reasonably be assumed that there was a progressive increase of morbidity during the war;

(*d*) finally, it will be seen that during the three years of the Revolution (1918-1920) the situation was completely changed, and Russia was faced with an outbreak of the great epidemics of former times. This table therefore illustrates and supports my necessarily brief historical summary.

IV. TYPHUS.

(See Tables 1-5 *and Diagrams.)*

It has already been observed that typhus exists in an endemic state in Russia. An annual average of 82,447 cases was registered during the 20 years preceding the war. In years of famine and bad harvest, the number of cases rose to 184,162 (1892 famine), which gives a proportion of 15.5 per 10,000 of the population, and to 180,724 (1909 bad harvest), which gives a proportion of 11.6 per 10,000 of the population. The lowest figure registered is 36,887, or 2.8 %, in 1897. If the differences in registration referred to in the previous chapter are taken into account, the true average morbidity must be taken to be not 82,447 but a higher figure, about 150,000. The disease was specially endemic in certain districts: 76 % of the total morbidity is supplied by the country population and 24 % by the urban (Novosselsky, *l.c.*); in 1914 this proportion is even more marked — 81% and 19%. It must not, however, be forgotten that in Russia the country population is far more numerous than the urban population.

If the various districts are considered, a still greater disproportion will be found to exist. The regions most affected are those of the South-West, the agricultural centre, the Ukraine and White Russia. On the other hand, Poland, the Baltic provinces, Siberia and the Caucasus are much less affected. The departments which show the highest morbidity in 1906-1913 (Novosselsky, *l.c.*) are: Department of Orol 22.4 %; of Tambov 20.9 %; of the Black Sea 17 %; of Kherson 16.6 %; of Smolensk 16.1 %; of Volhynia 16 %; of Kharkoff 15.7 %, and so on. Certain departments of the Caucasus and Turkestan, that of Suwalki, Estland, show a figure of less than 0.1 %. The average mortality varies between 5 and 12 %. There is nothing to be said regarding the differences which have been observed according to age, sex, seasons, etc., which is not already established and well known.

During the war (see Tables 1-3 and Diagrams) from 1915 onwards the situation grew continuously worse. In 1915, 100,497 cases were registered, which shows an increase of 12.5 % over 1914. This increase must be regarded as the result of the great retreat on the Western front, of the wave of refugees going from Poland towards Siberia, and of the arrival of Turkish prisoners of war in great numbers. In 1916, there was a further increase; 154,806 cases were officially registered. Conditions appear to be more favourable in 1917, when only 118,057 cases were registered. This improvement is, however, in my opinion only imaginary; the registration service had been disorganised to such an extent by the Revolution, above all during the last months, that the co-efficient of error should be considerably increased, probably to 2.5 or 3. If it is at the same time borne in mind that the territory and population of Russia are progressively decreasing, it will be realised that the percentage of cases should increase more than the absolute figures. I should observe that in all calculations of this nature it is impossible to guarantee complete objectivity; the subjective element is inevitable. If I have dwelt at some length on this subject, it is for two reasons: (1) the official figures are given in the Tables and in the Diagrams — it would be superfluous to repeat them in the text; (2) as these figures are very incomplete, I feel that it is desirable to give my Western colleagues a more or less accurate and complete idea of the truth, as it is viewed by the epidemiologists, statisticians and the majority of Russian doctors who have had long experience in dealing with our epidemics. In any case, if it is permissible to question the absolute accuracy of such co-efficients and to consider them too high or too low, it cannot be doubted that the war paved the way for the outbreak of the typhus epidemic. The preventive measures employed as far as was possible only limited the extent of the evil and delayed its development. If the example of important epidemic centres, such as Samara (1915) proves the success of these measures when taken energetically and applied systematically, above all by the Union of the Zemstvos and of the Towns, the recent appearance of new centres of infection shows the impossibility of entirely controlling epidemics during war in a country, where they exist in an endemic form and into which they are still often introduced from the front (especially from that of the Caucasus and, to a certain extent, from the Austrian front). Under peace conditions, they might be definitely checked, but unfortunately such conditions do not yet exist and the evil continues to spread.

It is generally admitted that the pandemic disease which is still raging broke out at Petrograd in December 1917. An entirely different conclusion might be drawn from Table 2 (monthly morbidity in 1912-1920) in which the figures up to March 1918 are considerably lower than for previous years; this table indeed appears to show an actual decrease in the epidemic, which does not begin to spread until March, and does not spread to any marked extent until November 1919. It would, however, be wrong to form any such conclusion; the system of registration ceased to work almost everywhere, and was only started again on the establishment of the Health Commissariat, which prescribed the compulsory declaration of certain diseases, typhus, relapsing fever, smallpox and cholera. Although this decree could only be gradually and incompletely applied, it produced a certain number of results;

the figures are doubtless incomplete, especially at the beginning, but they allow one to form a fairly accurate idea of the progress, violence and territorial distribution of epidemics, etc. In certain towns, notably at Petrograd and Moscow, the registration service continued to act and it is thus possible to establish the beginning of pandemic disease. The following table, which is copied from Federoff,[1] shows the progress of the epidemic in Petrograd :

	1917			1918		
	Morbidity	Average per day	Mortality	Morbidity	Average per day	Mortality
January	32	—	2	652	21.0	56
February	19	—	1	389	26.0	22
March	48	—	3	981	31.1	50
April	57	—	7	1,139	37.8	103
May	47	—	4	1,096	35.4	138
June	28	—	2	733	34.5	80
July	30	—	2	353	11.4	6
August	12	—	1	204	6.6	21
September	19	—	1	197	6.5	14
October	21	—	1	441	11.0	27
November	44	1.5	6	1,375	45.8	128
December	214	6.1	10	3,416	110.2	219
TOTAL	517	—	40	10,976	—	913

	1919			Morbidity	
	Morbidity	Average per day	Mortality	1920	1921
January	5,006	161.5	409	3,394	1,250
February	5,642	201.5	466	4,846	544
March	6,600	212.9	560	4,804	263
April	5,120	177.0	601	2,049	91
May	4,641	149.7	475	1,140	54
June	2,264	75.5	206	612	68
July	869	28.0	166	165	46
August	543	17.8	34	84	26
September	977	32.5	35	279	262
October	1,101	35.5	56	311	609
November	1,486	49.5	134	492	1,091
December	2,108	68.0	197	720	—
TOTAL	36,357	—	3,439	18,896	4,304

[1] FEDEROFF, "Supplementary Statistics of Typhus at Petrograd in 1918-1919." *Work of the Typhus Conference*, Petrograd, 1920 (page 2).

Federoff's Table stopped at January 1920. The later figures are taken from the Table of Kouvchinnikoff, in which neither daily averages nor mortality are indicated.

Morbidity throughout the whole army in 1917 for typhus reached the proportion of 2.2 % and on the Roumanian front was much higher: 15.7 % in March and 2.2 % in April.

The maximum figure for one year at Petrograd during the epidemic of 1878-1882 was 8,215 (Arkhangelsky), and is, as may be seen, greatly exceeded by the present figures. The reasons are not far to seek: the uncontrolled demobilisation spreads the germs, and the internal disorganisation of the country provides the means for them to spread. Lack of food, heating and soap, and overcrowding, etc., are more than sufficient to explain why the epidemic spread with such rapidity and took such a firm hold: all these conditions became worse and worse in 1918 and 1919 and only began to improve gradually from 1920 onwards. A peculiarity which seldom occurs should be noted, namely, the greater morbidity of women as compared with men — 54.77 % against 45.23 %. This may be explained by the successive mobilisations and absence at the front, and by the fact that the women were obliged to undertake work which exposed them to infection more than ordinary housework would have done. The example of Petrograd is sufficient to show the progress of the epidemic in large towns. The same thing occurred at Moscow at a later date. Moscow itself afterwards became the centre of the state upon which everything, including the germs of epidemics, converged. To avoid repetition, I will omit the data concerning other towns; the differences are only in quantity as regards the time of outbreak, rapidity, intensity, etc. Certain authors, Syssine[1] for example, emphasise the fact that in the present pandemic the morbidity of townsfolk exceeds that of countryfolk, which is contrary to previous observations. It is quite true that conditions of life have greatly changed and that these changes affect the towns rather than the country, but when it is remembered that the registration of disease is fairly well carried out in the towns, whereas in the country it is often non-existent, it will be realised that it is difficult to draw conclusions from figures of this kind. There is no doubt that the figures previously established (76 % of morbidity in the country, 24 % in the towns) are now changed in favour of the country; but to what extent has yet to be discovered.

In the summer of 1918 morbidity decreased, as is always the case, but it still remained high. Cholera became the chief trouble and then "Spanish influenza". From November onwards there was an increase of typhus everywhere, Petrograd, Moscow, etc. This may be seen by a glance at Tables 1, 2 and 3. Preventive measures were taken by doctors, medical associations, and the Health Commissariat; all kinds of Commissions, Conferences, etc., were convened to examine the causes of the epidemic and to endeavour to discover a remedy. I shall not dwell at any length on the latter. The epidemiology of typhus and its preventive measures have been well worked out, especially by Charles Nicolle, and the experience of the recent world-war has definitely confirmed the scientific information by the results obtained.[2]

There was therefore no need to invent new methods: it was simply necessary to create the will

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[1] Syssine. "Pandemic of Typhus and of Relapsing Fever," contained in the *Report of the Work of the Fourth Congress of Russian Bacteriologists and Epidemiologists*, Moscow 1920.

[2] The data concerning the infectivity of human blood were established 40 years ago by Russian experts by tests made upon themselves. Minkh, the pathologist of the Odessa hospital, inoculated himself with relapsing fever in 1874. Motchoukovsky carried out the same test at Odessa with typhus; and Metchnikoff with relapsing fever in 1881. These experiments have been forgotten because they were made too early, when the progress of science had not yet made it possible to estimate them at their true value. Minkh, in an article published in 1876, strongly supported the theory that the propagation of these two typhus diseases could only be produced by the agency of blood-sucking insects (he was thinking chiefly of bugs), and was so far a partisan of this theory that he advised all doctors who intended to work in epidemic centres to take insecticides with them as the best preventive measure. This seems all the more remarkable when it is remembered that nothing definite was then known on the epidemiological attributes of insects: the classical works of Laveran, Ross and Masson were not published until several years afterwards. In 1892 Minkh published further articles on the same subject, observing that, in spite of the incredulity with which his opinions were received, he was still prepared to support and defend them.

and the means to apply the methods which had already been put to the test and proved effective. The will was not lacking either among the doctors or among the representatives of the official organisation of the Health Commissariat: much energy was shown and no sacrifice was thought too great — as is shown by the death-roll of doctors and medical staff. On the other hand, means were almost completely lacking, and this fact, especially in view of the enormous extent of the trouble, deprived the campaign of almost all practical value, except in a few districts like Moscow, where certain results were obtained. A glance at the tables and diagrams will suffice to show that the pandemic followed its natural course in spite of all the efforts made to check it.

The preventive campaign, in its general outlines, consisted of the following measures:

1. Propaganda and continuous education of the masses by pamphlets, leaflets, posters, courses, lectures, museums, exhibitions, travelling exhibitions in trains, etc. I allude to this propaganda, first, because it was organised and continues to be carried on almost everywhere with the greatest zeal and for all forms of epidemics. It is perhaps the only measure which has been thoroughly and effectively applied.

2. Cleanliness campaign — carried out by this propaganda, by means of decrees and regulations, the organisation of baths (special bath weeks), and washing places, and by the institution of Cleanliness Committees composed of workmen entrusted with the supervision and direction of the movement, etc.

3. Establishment of about 250,000 hospital beds;

4. Installation on the railways, which played a predominant part in the development of the pandemic, especially at junctions, of special isolation points where travellers were controlled, disinfected and supplied with clean underclothing, and where sick persons and suspects were detained, etc. It was in the towns and in the army that the greatest endeavour was made to apply certain, or in some cases all, of these measures. But was it possible? The specialists who are consulted and the subordinates who often receive instructions which it is impossible to carry out are, as one knows, generally inclined to pessimism; the administrators and directors are inclined rather to be optimistic in judging the measures which they suggest and the results which they seek to obtain. Let us hear what the optimists have to say. Dr. Semachko [1], Health Commissioner, states: "The work of safeguarding Public Health has, during the last three years, been carried out under conditions of extreme difficulty. The results of the Imperialist struggle, insufficient nutrition, lack of the necessities of human life, the housing crisis, the lack of medicines caused by the blockade, and finally, the absorption of doctors and medical resources by the army — all these causes contributed in the highest degree to the bad health conditions. It was therefore quite natural that the epidemics succeeded one another uninterruptedly." Dr. Syssine [2], his assistant for the Anti-epidemic Service, states: "The population, exhausted by the long war, subjected to a serious economic crisis, suffering from lack of nourishment and bad food both in the towns and in the country, and crowded together in dirty and unheated houses, provided an excellent breeding-ground for typhus; a rich and terrible harvest was reaped from the seeds sown during the war."

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[1] N. Semachko. "Moscow Epidemics and their Treatment," *Red Moscow*, 1917-1920, page 403.
N. Semachko. *Report to the Eighth Congress of Soviets*, pages 6-7, Moscow 1920. *Report to the Ninth Congress* 1921.
N. Semachko. *Power of the Soviet and Public Health*, pages 4 and 5, Moscow 1920.

[2] Syssine. *Typhus and the Campaign against it.* Moscow 1920, page 9.

It would be easy to give many such quotations, but it seems hardly necessary. It is perfectly clear to all those experienced in epidemics and their preventive measures, that when there is a lack of nourishment, of all the necessities of human life, of doctors and medical resources (and, for the campaign against typhus, a lack of heating, soap and linen), the campaign must necessarily be useless, and the best that can be hoped is to diminish to a certain extent the number of inevitable victims. This, however, it is possible to do, and therefore, in spite of all difficulties, doctors and persons responsible for Public Health must continue their work uninterruptedly until the end.

One of these measures deserves to be considered for a few moments, namely, preventive inoculation. In view of the extraordinary development of the epidemic and our almost complete inability to arrest its progress, it is very natural that recourse should be had to all possible and conceivable methods, however uncertain they may be. The success of anti-typhus and anti-cholera inoculation has, to some extent, convinced their old opponents. As public opinion demanded inoculation against typhus, certain doctors, comparatively few in number, endeavoured to satisfy this demand, regardless of the absence of any scientific and solidly established basis for such experiments (the papers written by Hamdi and some more recent publications on this subject are not, as is generally admitted, very convincing), and without considering that, even assuming a certain measure of success for this form of inoculation, it would be impracticable to employ it wholesale. For a campaign against an epidemic of such dimensions, it would have been necessary to inoculate millions and millions of persons; what extensive bleeding would have to be resorted to to provide the quantity of blood required for this purpose?

There was a whole series of difficulties to be overcome in view of the surroundings among which these events were taking place; lack of confidence, the animosity against the educated classes and against doctors in particular, etc. It was therefore necessary to proceed against these and it was for that reason that we advised the Scientific Medical Council to issue a recommendation restricting the practice of inoculations of this kind.[1]

The Council decided that inoculation against typhus could not be considered as a preventive measure of a general kind and that it could only be carried out, as an experiment, by specially authorised laboratories working under the supervision of a Commission established by the Council for this purpose. Finally, that it should only be practised on the medical epidemiological staff, who, owing to their high morbidity, were better subjects than any other persons for testing the value (if any existed) of this form of inoculation, and who were best placed for receiving information and instruction regarding the purpose and value of such a measure. The idea was to reduce the danger of regrettable misunderstandings. This recommendation was confirmed by the Health Commission and the brief episode of inoculation according to the system of Hamdi and others was thus brought to an end without further difficulty. The experiments made at Petrograd, Moscow, Rostoff, Kharkoff and Odessa[2] soon convinced even those who had originally been adherents to this system and reduced them

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[1] The Scientific Medical Council is an institution for the discussion, from a scientific point of view, of such questions of public health as require previous opinion from specialists. These opinions are of a purely advisory character and have no binding force till they have been approved by the Health Commission. The members of the Council, who number 28, are elected by the faculties of medicine at Moscow and Petrograd, by certain higher schools and by scientific institutions, such as the Academy of Science. The Council elects its own officers, who consist of the President (L. Tarassévitch), the Vice-President (P. Diatroptoff), and the Scientific Secretary (V. Ivanoff).

[2] See the manuscript records of the Scientific Medical Council and its Commission, the reports of Diatroptoff, Barykin, Marzinovsky, Zlatogoroff (*Proceedings of the Second Congress*), Gahn ("Typhus," *Proceedings of the Odessa Commission* 1921), Rosnatovsky (*Epidemiological Records of Rostoff* 1921), etc.

to silence. All are now agreed in declaring that inoculation has no influence whatever either on morbidity or mortality, and it has already been swept into oblivion. The system of inoculation with dead cultures of proteus X met with a similar failure.

In this connection the experiment was also made of treating convalescents with serum, by auto-serotherapy, by vaccinotherapy, etc. The results were either nil or unreliable [1].

After this short survey of our preventive methods, I will consider the progress of the epidemic, that is to say, I will make some short explanatory comments on the tables and diagrams.

The epidemic began in November 1919; it attained its climax during the winter and spring of 1919/20, after which it began to decline in a slightly decreasing curve or perhaps this decline marks its transition to a chronic condition. If we take the totals of the registered cases, we get:

For the year 1918 (3 last months)	50,386
» » » 1919	2,229,971
» » » 1920	2,649,814
Total	4,930,171

Or, for the periods of the epidemic:

(1) 1/X 1918—1/X 1919	1,754,722
(2) 1/X 1919—1/X 1920	3,175,399
Total	4,930,121 [2]

This immense total, will be even greater if we add to it the morbidity of 787,626 for the Ukraine, of 334,582 for Siberia, and of 4,200 for Turkestan (for the same period 1/X 1918—1/X 1920). It will then exceed six millions. Stated as a comparison, that would represent 196 per 1,000 in 1919 and 264.9 per 1,000 in 1920 (Table 1). Syssine places these totals at even a higher figure for the 37 governments of European Russia, namely, at 330 and 417 in 12,000, which represents more than 7 % of the total population in two years. But these estimates still fall short of the facts. In order to get to greater accuracy, Syssine proposes to take the co-efficient of error at 2 ½; *i.e.* he estimates the total morbidity at 15 millions.

I explained to Dr. Rajchman and Dr. Norman White my view that it would be necessary to accept the total of 20 millions, being guided principally by the condition of Central Russia. Now, after detailed enquiries and after having heard the opinions of my colleagues in different centres of Russia, I must admit that I was too optimistic, and it would be more correct to increase my estimate to 25, perhaps even to 30 millions for the period of the last four years.

(*a*) It is practically impossible, under present conditions, to determine with scientific accuracy the actual morbidity and mortality, but it is desirable, in fact necessary, to obtain as accurate figures

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[1] See the corresponding reports in the records mentioned above. A discussion of these records might be of some interest, but as clinical, therapeutic, and such questions are not within our sphere we cannot devote any time to them.

[2] In comparing these figures and certain other data in the text and tables, some rather remarkable differences will no doubt be noticed. There is no reason to be surprised at these differences. The information comes in very slowly and the totals increase as time goes on; accordingly, the reports which appear later always show larger totals: therefore, if differences are noticed in the totals, the higher figures must always be considered as the more accurate. In other cases, the figures and estimates relate to different districts. In view of the very qualified value of the figures in the preceding chapter, no great importance need be attached to these differences.

as possible. I have tried to do so by all sorts of methods, and I hope, if time allows, to give an account of these efforts, with all necessary details, in a separate article. For the moment it will suffice to explain that, no matter what method is chosen, the results obtained are practically the same; *i.e.* the true total of cases of typhus for Russia, with her present frontiers, during the period 1918–1921, for four years, is between 20 and 30 millions.

The official returns for these years are as follows (I give them in round figures for the sake of simplicity):

1918	150,000
1919	2,200,000
1920	2,600,000
1921	600,000
Siberia	350,000
The Ukraine	800,000
Total	6,700,000

If we take 2 ½ as the minimum co-efficient of error, we get 16 ½ millions. If we add 5 millions for the periods during which no statistics were collected and for the vast regions for which no statistics are obtainable, this gives 21 ½ millions, which, in my view, is the most optimistic estimate.

If, instead of proceeding by this summary method, an attempt is made to apply a separate co-efficient to each statistical return, the result will not be very different, thus:

	Official totals	Co-efficient	
1918	140,000	5	700,000
1919	2,200,000	3	6,600,000
1920	2,600,000	2 ½	6,500,000
1921	600,000	2	1,200,000
Siberia . . . . . (for 2 years).	350,000	5	1,750,000
The Ukraine	800,000	4	3,200,000
For places and periods for which no statistics are available .			5,000,000
			24,950,000

(*b*) *Alternative Method*:

Petrograd, with its population of 700,000, registered 70,000 cases during these four years; Moscow, with one million inhabitants, registered 120,000 cases. So that, for 1,700,000 inhabitants we have 190,000 cases. The co-efficient of error for these two towns is at least 25 %, and may be as much as 50 %. The true morbidity may therefore be estimated at 250,000 to 300,000, which gives a comparative morbidity of 15 % to 18 %. If the comparative morbidity is assumed to be the same for the whole of Russia with its 130 million inhabitants, we get a total of 20 to 23 million cases. But all the data in our possession incline us to believe that the morbidity in the greater part of Russia (except in the very sparsely populated governments in the north) must be higher than in the two capitals, where there were means available for combating the disease. If the comparative morbidity is assumed to be 20%, a total of 26 millions is obtained; and if, like the pessimists, we assume it to be 25%, the total will be as much as 32 ½ millions. For these reasons, and on account of other considerations

of the same nature, I believe that a total of 25 millions is nearest to the truth: in any case, the true total lies, in my view, between a minimum of 20 millions and a maximum of 30 millions.

And the epidemic has by no means disappeared.

If we go by the results of the last census of the population of the whole of Russia, as it now exists, which was carried out on August 28th, 1920 [1], we get a total of 131,546,045 from which, however, must be deducted the populations of Republics such as Azerbaidjan, Georgia, Armenia, etc., regarding whose health conditions we have no data, and which have not hitherto been included in our morbidity statistics. The conclusion is that the comparative morbidity should be estimated at 20-25 % of the whole population.

What more striking example could be found, particularly in Europe, of the natural and unimpeded progress of the epidemic !

The data for the territorial distribution (see Table 3) show that in 1918 the disease was most intense in the agricultural district: *i.e.* in the normal disease centre. The list is headed by the government of Tambov, and the eight governments of the agricultural district, which show a general morbidity of 58 %.

It should not be forgotten that, from the point of view of registration, the year 1918 is the most defective, and that the co-efficient of error should certainly be much increased; probably nearly 10. In 1919 the epidemic spread through all Russia, no district being spared; the north-east region was the least affected. The district most affected was, once again, the same centre (50 % of all deaths); next came the province and the city of Moscow, which — being the capital of the State and the centripetal point, of national life—is especially affected by epidemics raging in the country, owing to its communications with all parts of Russia; next in order came the provinces of Samara, Simbirsk (the Volga region in general) and the provinces bordering on the Moscow province. From the autumn of 1919 onwards, all the region between the Volga and the Urals, as well as the Ukraine, suffered severely from the epidemic; so did Siberia. In 1920 the situation was, with but slight changes, the same. In the Tambov province alone there were, in two years, 370,025 cases (from 1 X 1918 to 1 X 1920). As the population of this province was (according to the census of August 28th, 1920) 3,394,813, the relative morbidity amounted to about 11 %. On the basis of our co-efficient of error, varying, that is, from 2 to 5, this morbidity should be estimated as representing at least quarter of the population, and in certain districts almost half especially if one takes into consideration not only the years 1919 and 1920 but the period 1918-1921.

The City of Moscow, with its 1,020,218 inhabitants, and its (84,300 plus 24,492) 108,792 cases, shows an official rate of morbidity which is very similar, *i.e*, 10 %, but actually almost 15 %, since for Moscow it should really be sufficient to increase the official statistics by from 25 % to 50 %.

Finally, let us examine the position in respect of one of the least affected provinces, Olonetz, 217,007 inhabitants: cases of typhus, 3,209; official morbidity rate 1.5 %, hence the real morbidity is nearly 7 %. (All these figures make it advisable to abandon the usual calculation per 10,000, and to reckon in simple percentages.)

These three examples, which could easily be multiplied by combining in different ways the data figuring in the tables compiled by Dr. Kouvchinnikoff, should suffice to show the degree of variation in the intensity of the epidemic. These examples also show that:— (1) even in the regions least affected, the morbidity is very much higher than in Western Europe, and much higher also than formerly in

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[1] See *Bulletin of the Central Statistical Bureau* No. 15 of November 8th, 1921.

Russia; (2) the sweeping fire of the epidemic pursues its natural course, and is only brought to a standstill where there is an almost complete lack of combustible material, that is to say, a district where almost the whole of the population is, by the fact that it has already had the disease, immune from further contagion; (3) finally, the estimates of co-efficients of error proposed by us are very near the facts. This last conclusion is the more justified since the information in respect of Siberia and the Ukraine and all the regions which remained a greater or shorter time outside the Soviet Republic, is still very incomplete. Dr. Gretchitcheff [1], for instance, points out that the epidemic in Siberia began at Tcheliabinsk in October 1918, that it spread by means of the railways, and resulted, in 1918 and 1919, in a rate of morbidity exceeding all figures hitherto known; it was, for instance, 25 times greater than in the Great Epidemic of 1911. The nearer one got to the region in which the Civil War was raging, the greater was the morbidity; taking the number of cases registered among the civil population and in the Army, it is seen that:

at Krasnoiarsk	— military	cases	30%	civil	cases	70%
at Irkutsk	»	»	35%	»	»	65%
at Omsk	»	»	60%	»	»	40%
at Tcheliabinsk	»	»	70%	»	»	30%
at Kourgan	»	»	80%	»	»	20%
at Troitsk	»	»	90%	»	»	10%

"Thus the typhus helped the Red Army to defeat the Army of Koltchak" adds the rapporteur, The conditions which increased the development of the epidemic were, according to Gretchitchoff, even more terrible than those detailed by the Health Commissioner (see above) for Russia in Europe. The co-efficient of error suggested above would not suffice; 334,582 should be multiplied by at least 5; for I have already pointed out that the figures varying from 2 to 5 should only be considered as an average.

In the Ukraine, according to the report of Dr. Ilnitsky, Dr. Khovorostansky, Dr. Igumnoff, etc., typhus was also raging with great intensity during these years. The provinces of Kharkoff and Poltava came first from the point of view of morbidity. For many districts, which were important centres of endemic typhus, such as the Podolia province, etc., data are absolutely lacking: accordingly, the official figure of 787.626 (for the period 1 X 1918 to 1 X 1920) is far from the truth. In the north of the Caucasus (Kouban etc.), according to doctors' statements, the epidemic raged so fiercely, especially during the period of Denikin's retreat, that, in many areas, the whole population was infected.

Now that we know the extent of the pandemic, its progress both as regards the number of cases and the speed of its propagation, and can form a fairly accurate estimate of the conditions which paved the way for it and still promote its growth, the question to be asked is what are the chief factors of its dispersion. The reply is simple. The principal factor is the railway: typhus chiefly affected and still affects the districts provided with railways, in the proportion of the volume and activity of Traffic. An example may be given of the department of Orel, one of the principal endemic centres, (it was previously the principal one, as may be seen from Table 3), the departmentof Dmitroff, which, although the poorest and worst-supplied, shows a comparatively low morbidity, and those of Mtzensk, Kromi,

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[1] M. Gretchitcheff. "Typhus and Relapsing Fever in Siberia." *Report to the fourth Congress of Bacteriologists and Epidemiologists.* Collected documents bearing on the work of the Congress, pp. 42 to 46.

Orel, and Eletz, which are affected to a much greater degree, as is shown by the following table compiled by Dr. Israelson [1].

Districts	Mtzensk	Kromi	Orel	Eletz	Bolkhof	Livni	Malo-Arkangelsk	Dnitroff
General infectious morbidity per 10,000	359	184	1,639	130.56	58.1	57.56	46.7	42.1
Typhus morbidity per 10,000	191.2	107.7	76.1	76.6	37.7	37.1	21	25

If it is considered that the districts of Livni and Malo-Arkangelsk suffered much more than any others from the military operations, there remains only one possible explanation for such a high morbidity in comparatively richer districts which were but little affected by the civil war, namely — that afforded by the greater development of railways. Similar information is supplied by Dr. Igumnoff for the Kharkoff Department. It is, moreover, an explanation which has everywhere been proved correct. In 1919 and even now, in certain districts (in the famine areas, the Ukraine, etc.), no person travelling by rail can consider himself free from the danger of infection until two weeks after the journey. Even high officials travelling in special carriages do not always escape infection. For the ordinary traveller who has to use the *teplouchki* (goods-truck with iron stoves which hardly ever act and often only exist in name), infection is almost a certainty. In 1918-1919 it was principally the *mechotchniki* (sack carriers) who, coming chiefly from the large cities where terrible conditions prevailed, travelled in search of provisions, chiefly flour, to save their families from starvation, and in the course of their wandering collected lice and typhus more often than the much-sought-after provisions. They were thus the chief contributors to the general diffusion of typhus. To the innumerable *mechotchniki* must be added the refugees of all kinds, the townsfolk fleeing to the country to escape starvation, etc. At Saratoff, for example, in the suburb known as the "military town," where there were 9,000 refugees, no less than 3,000, that is 40 %, had typhus, in the course of two months, (December 1918-January 1919) [2]. In 1919-1920 the movement of troops caused by the civil war became the chief source of propagation. Morbidity at the front began to exceed that behind the lines to a greater and greater extent. The epidemic had, however, reached such a point in extent and intensity that this factor should perhaps be considered as a supplementary and auxiliary cause rather than as a determining one.

I will not dwell on the clinical aspects of typhus during this pandemic. A special article by experts is necessary to deal with these aspects to any useful extent. I may simply note the general predominance of cardiac and nervous symptoms, which were always a characteristic of typhus.

At present, however, these two classes of symptoms are more marked than ever, and they present a number of peculiar features. These are all the more interesting since similar peculiarities now occur in the clinical course of all infectious diseases; it must be recognised, therefore, that the terrain consti-

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[1] Israelson. "The epidemics in the Department of Orel in 1920," *Bulletin of the Public Health Department of the Orel Department*, 1921, pp. 45-54.

[2] Teziakoff. "The typhus epidemic in the Department of Saratoff," *Bulletin of the Saratoff Health Office*. 1920 NL.

tutes a determining factor, since it is affected by the extremely unfavourable conditions of present-day life, which in turn affects the course of the disease.[1]

Though I am unable to enter into the clinical aspects of the matter, I must deal more in detail with the question of mortality. The usual average mortality in typhus varies, as has already been said, between 7 and 12 %. If we examine the fluctuations in mortality in the same environments according to various conditions (age, sex, state of nutrition, etc.), it will immediately be apparent that they follow exactly the laws established in the classical works of Marchison, that is to say, the two principal factors in the gravity of the disease and the mortality are the age of the patient and his general condition, in so far as this is determined by the conditions in which he lives (nutrition, exhaustion, etc.). In addition, there are undoubtedly very considerable variations according to race, locality and the character of the epidemic; there are variations even in the course of the same epidemic according to the period of the epidemic: for instance, the accounts of our medical men who have returned from captivity in Germany show that mortality was much lower among Russian prisoners than among Germans who had caught the infection, in spite of the much more unfavourable conditions prevailing among the prisoners. It is not possible at present to give an entirely satisfactory explanation of these variations; this interesting question will have to be investigated further. Two explanations are perhaps the most plausible, *i.e.*, the variations in the virulence of an unknown microbe on the one side, and particularly, the different degree of receptivity and resistance in which, in my opinion, natural immunisation certainly plays a part — immunisation which may be hereditary or may be acquired as the result of slight abortive attacks, especially in the case of children living in localities where the disease is endemic. When comparing the figures of mortality according to periods and localities, it will be seen that the lowest mortality at the beginning amounted to about 7 or 8 % in 1918; that it rose progressively and reached 12 to 14% according to the approximate estimates of various writers. If we consider different localities, the figures are as follows:

Moscow (Prokofieff, *l. c.*)		10 %	Average
Petrograd (Federoff, *l. c.*) 1918/1919	1918	8.3 %	
	1919	9.7 %	
Odessa (Sigal, *l. c.*). The mortality in the hospitals was in	1919	9.8 %	
	1920	11.0 %	
Rostoff (Zavadsky).		10.6 %	
Government of Saratoff	1919	13.8 %	
» » Orel (Israelson)	from	8 to 10 %	

[1] Since I cannot enter more in detail into this question, which is of such interest from the clinical and pathological point of view, I will refer to the more important publications on this matter:

Professor Schervinsky. *Present-day diet and its pathological effects.* Prorada, 1919, 4-6.

Professor Davidovsky. "Typhus," *Anatomical pathology and general pathology.* Moscow 1920.

Professor Pletneff. "Typhus," Petrograd 1921. *The work of the N. Congress of Bacteriologists and Epidemiologists*, Moscow 1921, with numerous articles on clinical subjects.

Vratchebnoyé Delo. Medical Journal of Kharkoff, the only one which has continued to appear. See in particular the special numbers dealing with typhus, influenza, etc.

"Work of the Conference held at Petrograd from February 16th to 19th, 1920." *Epidemiological Magazine of Rostoff*, edited by Professor Barykine, Rostoff 1921.

Odessa Magazine on Typhus, two editions 1920 and 1921, edited by Dr. Zabolotnyj and Dr. Voronine.

Sigal. *Reports on typhus and relapsing fever in the fever hospital at Odessa*, 1920 *and* 1921, etc.

Government of Kursk	1919	6.5 %	Average
	1920	9 %	
» » Ivano-Voznessensk	1919	12.9 %	
» » Viatka	1919	8 %	
	1920	12 %	

and so on.

Although these figures cannot claim to be absolutely accurate, it must nevertheless be recognised that they give a general idea of the actual state of affairs; we may therefore estimate the average mortality for all periods and all localities at 10 or 12 %. The number of deaths from typhus may accordingly be estimated at approximately 1,000,000, if official statistics are alone considered; at 1,500,000 to 1,800,000 if the total of the morbidity suggested by Syssine be accepted; and at 2.5 or 3 millions according to my estimate, which, I am convinced, is more likely to be correct. Under certain circumstances, the percentage is considerably higher. Thus, in 1920, at Nijni-Novgorod in the compulsory labour camps mortality rose to 68%, and at Tioumane, among the prisoners of war, it amounted to 80 %. It is more than probable that this appalling precentage was nearly reached among the retreating armies, etc. Thus, in the city of Novo-Nikolaievsk in Siberia, between November 1919 and April 1920, there were, according to Gretchicheff, from 25,000 to 40,000 deaths from typhus, and partly also from relapsing fever. This figure is enormous when it is considered that the population of Novo-Nikolaievsk consists of only 68,000 inhabitants, to which, however, soldiers and prisoners must be added, whose numbers are very hard to determine.

As regards variations according to nationality, it is interesting to note that the mortality among Jews is considerably lower than among Russians, half as low or even lower. According to Dr. Sigal,[1] mortality among the Russians at Odessa amounted to 13.1 %, that of Jews to 5.6 %. According to Professor Zavadski, the respective figures for Rostoff are 11 % and 8 %. Attempts to analyse and explain this fact and others of a more or less similar nature have led Dr. Sigal to the conclusion that the increase in mortality during such and such a period among different groups must be attributed to the impaired powers of resistance to the disease, resulting from the varying conditions of life. One fact deserves attention from every point of view, that is, the morbidity and mortality among medical men and the medical staff.[2]

It has been known for a long time that the rate of mortality among Russian medical men in general, and particularly from typhus, is very high. It exceeds by 30 % the rate of mortality among persons

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[1] Sigal. *Report of the fifth fever hospital for the first year of its existence*, Odessa 1920. *Report for the second year*, 1921.

Professor Zavadsky. "Clinical Analysis of Typhus," *Rostoff. Epidemics Magazine*, 1921.

Professor Ignatovsky. *Typhus*, pages 44 and 59.

[2] "The material situation and mortality among Russian doctors from 1890 to 1902." *Work of the ninth Pirogoff Congress.*

S. Novosselsky. "Mortality among doctors in Russia," *Journal of the Society for Mutual Medical Assistance*, Petrograd 1909.

V. Avramoff. "Morbidity and mortality through typhus among the medical staff of the Red Army in 1918 and 1919." *Journal of the Health Department*, 1919, November 1st.

V. Kagane. "Morbidity and mortality of the medical staff." *Report submitted to the first Congress of Bacteriologists and Epidemiologists of the Ukraine*, Kharkoff 1920.

K. Sichidlovsky. "Typhus among the medical personnel and in the hospitals generally, in 1918 and 1919" (in manuscript).

L. Tcherkess. "The morbidity of the medical personnel in respect of typhus." *Odessa Magazine on Typhus*, 1921.

of the same age but belonging to other professions. These figures are particularly significant when it is considered that mortality in Russia exceeds that in any other European State. The principal causes of the excessive mortality among Russian medical men are tuberculosis, suicide, and typhus. During these latter years, the morbidity and mortality among doctors have far exceeded the previous level, which was already high and terrible enough. According to Avramoff, in 1919 one-third of the doctors of the Red Army, and one-twentieth of the "Feldchers" (assistant surgeons or hospital orderlies) have suffered from typhus, and the mortality among doctors rose to 19.67 %; it was therefore nearly three times higher than the general mortality, which is estimated at about 7 to 8 % for the same period. According to more recent data, the total number of army doctors who have had typhus up to January 1st, 1921, is 3,911, 827 of whom died, which shows the mortality to have been 21.1 %[1].

According to Igumnoff[2], in 1919, in the government of Kharkoff, out of 263 medical men 47, *i.e.* 17.9 %, were infected, and 9 died (a mortality, of 19.1 %). Among assistants the morbidity amounted to 7.9 %, that is, less than half, and the mortality to 17.2 %. The subordinate medical staff shows comparatively an even greater morbidity, amounting to 28.3 %, but the figures for mortality are low, *i.e.*, 4.7 %.

According to Igumnoff, the figures for morbidity and mortality among doctors and the medical staff are as follows:

	Number	Total No. of patients	Percentage	Deaths	Percentage
Doctors	263	47	17.9	9	19.1
Assistant surgeons . .	661	52	7.9	9	17.3
Medical staff	148	42	28.3	2	4.7

Although, as regards morbidity, the doctors are in a better position than the medical staff, the former, as regards mortality, retain the sad priority which they hold in the Red Army and the whole of Russia. Among the doctors in the mining regions of Louzovka, mortality amounted to 22.2 %, while in other classes it did not exceed 10.5 % (M. Kochkine).

The late Schidlovsky, one of the most eminent members of the Council of the Pirogoff Society, wrote a very interesting work on this subject. He shows that the morbidity of the medical staff in the government of Moscow in 1918/19 amounted to 1,461 in nine months, thus exceeding the total of cases observed during previous epidemics beginning from 1890, and he points out that the general mortality then only amounted to 8.4 %, but that it varied greatly according to professions, as the following table will show:

	Mortality	Average age
Doctors, male and female . . .	26.8 %	38.6
Male doctors	31.6 %	40.6
Women doctors	21.6 %	36.5
All assistants	14.5 %	33.6
Sisters and ward staff	8.5 %	24.6
Nurses	5.1 %	27.1

[1] Lapchine (in manuscript).
[2] *Vratchebnoye Delo*, 1919, No. 16.

Although these variations may partly be explained by the difference in age — for which Schidlovsky established the above averages — the differences shown in each column of these tables are too marked for this explanation to be entirely satisfactory. It must be recognised that, in the case of doctors, other contributive factors are at work, such as physical and intellectual overwork, extreme depression, etc.

Before leaving the question of figures, I will add that, during the first period of the epidemic from July 1st, 1918 to July 1st, 1919, that is during its least intensive and least severe period (as reference to Table 2 will show), the mortality among doctors and the civilian medical staff was estimated as follows (Kouvchinnikoff):

Doctors	21.3% (per 100 patients)
Assistants	12.9%
Sisters of charity and members of nursing brotherhoods	6.6%
Nurses	6.2%
Health Staff	15.0%

There is no need to add any comments to the figures given above; they speak for themselves. One observation, however, must be made: the number of the victims and of the lives sacrificed bears clear and eloquent witness to the fact that Russian doctors have remained faithful to their traditions, that they have served and continue to serve their country, humanity, and science to the utmost of their capacity, and that each of these martyrs to duty has carved the epitaph: "Feci quod potui..."[1].

Fresh victims must be added to this sad list; I need only mention Dr. Farrar (of the Nansen organisation) and Dr. Gärtner (of the German Red Cross). We, who are always on the brink of death and disaster, are accustomed to bear such blows in silence. But we cannot keep silent when noble and generous men who leave their country, their homes, their families, their accustomed occupations to come to our assistance, join our ranks and are struck down in our midst. We tender our profoundest sympathy, gratitude, and respect to their colleagues and to their families. These martyrs have not fallen in vain; they give us new strength and courage, they bear the torch which is to lighten our darkness and they implant in us the faith that one day unity and peaceful work will reign throughout the world and throughout our country.

All that has previously been said serves to show that the course of the epidemic was determined by general conditions and that it followed, and is still following, its natural development, — I have always laid stress on this aspect of the question at bacteriological congresses where I was asked to make a statement on the epidemics situation; for instance, in 1918, in April 1919, at the last Pirogoff Congress, where I foretold that the 1919-1920 epidemic would be much more severe than that of 1918-1919; and again in August 1920 (4th Bacteriological Congress), when I foretold a considerable decrease in the epidemic for the period 1920-1921, due to the immunisation (according to the calculations referred to above) of a large proportion of the population, particularly of those who, owing to the conditions in which they live, are more exposed to infection. As regards the period 1921-1922 I, together with the rest of the world, had hoped that this improvement would continue since, apart from immunisation, the effect of more peaceful conditions in the country could be reckoned on, that is to say, that the cessation of civil war would prove a powerful factor. For a few months these hopes appeared to

[1] The bibliographical references given in the text show that, in spite of difficulties of every description, scientific work has never ceased and that, if conditions in the printing trade were more satisfactory, results would soon become known.

be justified, but a fresh misfortune has befallen Russia — so sorely tried already : famine has broken out and has unfortunately modified these comparatively hopeful prophecies. This is clearly shown in the returns for the last months. Even if the effects of the immunisation of the population continue, and if typhus does not exceed, or even attain the severity of the epidemic of the winter and spring 1919-1920, the evil nevertheless remains; morbidity and mortality will infallibly increase and the epidemics will not die down, they will only assume a different form; even if typhus itself should decrease, it will merely be replaced by relapsing fever, enteric fever, etc. Before leaving the subject of typhus, I must complete this account by giving the figures for 1921, those for the preceding years having already been given and discussed. The comparison and verification of the data for 1921 is not yet complete, especially as regards the second half of that year [1]. I quote these figures here, however, independently of the tables which represent what may be termed the "final" figures, though they are necessarily incomplete.

The totals established on	January	February	March	April	May	June	July
October 30th, 1921	114,239	113,788	79,396	56,298	39,917	17,810	5,094
November 15th, 1921	115,951	114,985	99,643	84,204	58,464	24,537	14,576

These figures show clearly why I am not in a position to trace with sufficient accuracy the course of the typhus epidemic during these last months.

Subject to these reservations the following, figures will show the course of the typhus epidemic in 1921:

	January	February	March	April	May	June
Russia in Europe	80,297	85,168	77,845	68,703	53,250	28,685
Siberia.	3,919	4,943	4,913	3,208	2,923	2,768
Caucasus.	190	209	37	219	179	95
Middle East	593	730	757	574	784	495
Railways and Waterways	3,660	4,060	3,741	2,854	7,930	1,207
Prisons.	374	345	295	185	334	155
Totals . . .	89,633	95,455	87,788	75,743	59,450	33,405

	July	August	September	October	November	December
Russia in Europe	15,981	10,272	10,365	13,358	24,980	35,276
Siberia.	821	555	516	1,193	4,453	5,496
Caucasus	36	29	37	38	81	163
Middle East	281	61	45	?	?	1,904
Railways and Waterways.	762	319	494	889	2,185	9,164
Prisons.	52	58	128	174	206	326
Totals	17,933	11,294	11,580	15,652	31,904	50,329

[1] The supplementary information only reaches us, and can only be collated, after a considerable delay, as a comparison between the totals of the tables for August 30th and November 15th, 1921, will show.

These figures give a total of 579,566, a smaller total, therefore, than that for the years 1919-1920. If we consider, however, that the figures for the last month, although they are still incomplete, show a rapid increase, the forecast immediately becomes less favourable, especially if, for instance, we compare the various weekly figures for Moscow, which we owe to the courtesy of Dr. E. Ivanoff and Dr. J. Diakoff, who have been good enough to reply to the questions I had submitted to them.

1919		1920		1921	
2-8 XI	388	31 X-6 XI	27	30 X-5 XI	91
9-15 XI	670	7-13 XI	30	6-12 XI	89
16-22 XI	663	14-20 XI	20	13-19 XI	98
23-29 XI	812	21-27 XI	44	20-26 XI	171
30 XI-6 XII	862	28 XI-4 XII	68	27 XI-3 XII	171
7-13 XII	908	5-11 XII	78	4-10 XII	224

These figures prove that the situation has grown considerably worse since last year. The conditions created by the famine are more than sufficient to counteract the good effects due to the immunisation of a large portion of the population, which it was hoped would stem the overwhelming tide of disease.

RELAPSING FEVER.

Relapsing fever has always existed in my country in an endemic form, but it was less widespread than typhus; the average number of cases for 25 years (1887-1911) only amounted to 31,720. The maxima in 1908 and 1909 were 128,494 and 128,728, the minimum in 1909 being 10,544. The geographical distribution of these two epidemics was also somewhat different. The districts most affected were those between the Volga, the Ural and New Russia; Poland, the Baltic Provinces and Turkestan were almost entirely immune from relapsing fever as well as typhus, with an average morbidity of 0,1 °/₀₀₀ (0,1 in 10,000).

While typhus was particularly prevalent in the country, relapsing fever was much more marked in the towns. During the period from 1901-1914, 62 % of the total cases occurred among the urban population, while only 38 % occurred among the rural population. If we consider that in Russia the urban population constitutes only a small portion of the total number of inhabitants (approximately 15 %) this difference is even more striking. What is the explanation ? Some writers, such as Novosselsky (*l.c.*), believe that it can be explained by the fact that acquired immunity plays a much smaller part in relapsing fever than in typhus; that portion of the population of the towns which is most exposed to infection (frequenters of night-shelters, etc.), and which becomes more or less immune from typhus, is not sufficiently immune from relapsing fever and, therefore, repeated re-infections swell the total of cases. That there is a difference in the degree of immunity is well known. Even during the last epidemic at Rostoff Dr. Fayn[1] found among 1,121 cases of typhus 42 cases of re-infection, *i.e.* 3 %, and among 5,444 cases of relapsing fever 576 cases of re-infection, *i.e.* 10.5%, that is to say, the cases of re-infection where three times as numerous. Is this fact sufficient, however, to explain the

[1] V. Fayn. "Statistical data on the epidemic of typhus and relapsing fever at Rostoff." *Epidemiological Magazine of Rostoff*, 1921, pages 5-10.

variations referred to ? This is the more difficult to answer since in the present pandemic form of the disease the differences are also very marked, as will be shown later; this would lead one to suppose that the cause may be found, not only in an inequality of immunisation, but also in variations between the microbes, differences between the conditions of their development and their preservation in the human body and mainly, perhaps, in the bodies of lice. This problem still remains to be solved.

In relapsing fever, mortality is notoriously lower than in typhus; it varies between 2 and 3 %. In 1911 mortality rose to 2.9 % and in 1914 to 2.6 %. During the present epidemic it varies between 1.8 and 4 %, but reaches more often the latter figure.

During the wars relapsing fever gradually increased in the army and among the civilian population. The figures for the army were:—

From August to December 1914.	35	cases
» » 1915.	4,333	»
» » 1916.	27,958	»
1917 (up to 1st October)	43,193	»
Total.	75,429	cases.

During the same period there were only 21,093 cases of typhus; in the army, therefore, relapsing fever clearly predominated. Attention must be drawn to the fact that the prevalence of relapsing fever in the army is again apparent in the present pandemic form of the disease. An increase of cases among the civilian population must also be noted, especially in the districts in the neighbourhood of the front. In 1916 there were 99,034 cases, that is to say five times the number of cases reported in 1914; this increase is, however, not as marked in the civilian population as in the army.

The general course of the pandemic form of relapsing fever is similar to that of typhus. The incubation period in relapsing fever is, however, longer and the disease develops more slowly. From these facts it might be concluded that the stronger infection stifles the weaker and that the latter only reaches its full development after the former has lost its virulence. The same conclusions might also be drawn from some facts apparent in clinical observations regarding mixed infection [1]; that is to say when, after recovery from typhus, attacks of relapsing fever supervene under conditions which exclude any possibility of a fresh infection, and which point to a more or less simultaneous infection. But we cannot say anything definite on this matter, the facts being too complex and as yet too little known or explained.

It is difficult to form even an approximate idea of the progress of relapsing fever in 1918, since the registration services were only very imperfectly kept up. In 37 governments of European Russia 15,568 cases were registered, 3,698 for Moscow alone, since at Moscow registration continued to be carried on more or less regularly. Relapsing fever began to increase in October, for which the following figures are available:

1918, October-December	4,070	cases
1919	309,115	»
1920, up to 1st October	1,296,045	»
Total	1,609,230	»

[1] Mixed infection, which has frequently been observed, has formed the subject of interesting reports by Dr. Elistratoff (*Work of the fourth Congress*), Dr. Tcherkess (*Odessa Magazine*), Dr. Sigal (*l.c.*),etc. I would

If we add the figures for the Ukraine and Siberia relating to the periods for which data are available, we obtain the following totals:—

Russia in Europe	1,X 1918-1,XI 1920.	1,609,233
Ukraine [1]	1,I 1920-1,X 1920.	163,866
Siberia [2]	. . . . .	230,047
Turkestan	. . . . .	1,063
		2,004,209

The respective distribution, as established for the Soviet Republic, is particularly interesting as the following table shows:

	Civilian population	Railway staff and their families	Red Army	Total
1918	3,662		408	4,070
1919.	191,343	7,982	109,786	300,111
1920 (10 months)	570,180	55,492	670,676	1,296,348
Totals	765,185	63,474	780,870	1,600,529

These figures show a remarkable morbidity among the railway staff and their families and bear out what has already been said regarding the part played by lines of communication: they show, above all, the greater morbidity in the army, which amounts to 49 % of the total morbidity, that is to say that it is nearly 25 times greater than that of the civilian population. We do not know the strength of the army, but in any case it cannot amount to more than 3 to 5 % of the civilian population. The eastern and southern fronts were the most affected. In the interior of the country, it was the government of Tambov which in 1920 headed the list with 87,282 cases. The agricultural centres of the east came next, then in Siberia [3] the governments of Omsk (64,062), of Tomsk and Enisseisk; in the Ukraine the government of Kharkoff (56,585), of Ekaterinoslav, of Donetz and of Poltava — that is to say those governments which have the best railway communications. The north was very little affected. As regards details of the distribution according to periods and localities, I refer to the corresponding tables and diagrams. In the case of relapsing fever, as in that of typhus, the registered figures are very much lower than the truth, and I am of opinion that, for reasons similar to those I have stated with regard to typhus, the total number of cases for the whole of Russia and for the period of the four years from 1918-1921 must be estimated at 8 or 10 millions. Considering the fact that the virulence of typhus is

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only draw attention to the clinical interest of these observations, into which, however I cannot enter here, since the clinical aspect of the subject lies outside the scope of this report. In mixed infections mortality is, needless to say, considerably higher. Sigal gives the following figures: mortality from typhus 9.8 %; from relapsing fever 2.3 %; from mixed infection (two types of typhus) 22 % in 1919 and 10 %, 1.8 % and 14.3 % in 1920.

[1] According to Ilnitsky (*l. c.*, p. 48) a much larger number, *i.e.* 198,000 in seven months.

[2] According to Gretchicheff (*kl.c.*, p. 44), in Siberia during the epidemic of relapsing fever of 1918-1919 the morbidity was 250 times more intense than in 1911.

[3] See footnote [3] on preceding page.

approximately three times greater than that of relapsing fever, and that, on the other hand, the immunity in the case of relapsing fever is much less marked, it was to be expected (and I have always laid stress on this fact) that this year relapsing fever would be more severe than typhus, as has proved to be the case. (See figures for 1921 below.) The outlook, which at the beginning of the year was somewhat brighter as regards typhus, is becoming darker again owing to famine and the conditions it brings in its train. It is darker still as regards relapsing fever, which is developing more and more rapidly, and is clearly getting the upper hand. Since the general data for these last months are still too incomplete, I have requested Dr. Ivanoff, head of the Epidemics Department at Moscow, to communicate to me the comparative weekly figures for the years 1919-20-21 for the city of Moscow. The figures which he has kindly sent me are as follows:—

1919		1920		1921	
2-8 XI	153	31 X-6 XI	27	30 X-5 XI	177
9-15	261	7-13	23	6-12	149
16-22	168	14-20	48	13-19	148
23-29	193	21-27	32	20-26	288
30.XI-6.XII	167	28 IX-4 XII	54	27 XI-3 XII	386
7-15	187	5-11	85	4-10	410

These figures clearly show a marked improvement in the year 1920 and the present advance in the disease. During these last weeks relapsing fever has been increasing to an alarming degree and a continuance of this advance must be expected, when it is remembered that the figures for the years 1919-20 are final, while those for the year 1921 are only provisional, as Dr. Ivanoff points out and as has already been shown. The mortality in relapsing fever is comparatively low, very much the same as before, or slightly higher. It is a well-known fact that it rises considerably under special circumstances: among retreating armies, for instance, and in the case of bilious relapsing fever, etc.

The morbidity figures for the year 1921 are as follows: (N. B. — These are still very incomplete as regards the last months since they cannot be definitely ascertained for two or three months.)

	January	February	March	April	May	June
Russia in Europe	89,222	83,846	70,728	56,563	44,205	40,176
Siberia	4,783	5,261	5,384	2,727	2,335	845
Caucasus	328	368	419	360	329	338
Middle East	816	725	714	297	839	953
Railways and Waterways	4,166	4,983	3,783	3,335	3,010	2,906
Prisons	1,523	1,352	1,690	606	583	447
	100,838	96,585	82,117	63,888	51,301	45,665

	July	August	September	October	November	December
Russia in Europe	26,212	27,632	22,077	27,646	40,755	42,353
Siberia	1,091	1,045	1,087	1,431	4,609	8,420
Caucasus	301	304	194	136	243	431
Middle East.	932	400	208	60	?	7,951
Railways and Waterways	1,907	1,670	1,787	2,124	5,029	13,278
Prisons.	189	161	202	873	1,249	647
	30,632	31,212	25,555	32,270	51,885	72,085

In comparison with the year 1920 the epidemic appears therefore to be on the decrease, while it is on the increase as compared with 1919. For the months of November and December the figures for 1921, although they are not yet complete, considerably exceed those for all the preceding years.

SMALLPOX

The morbidity of smallpox in Russia before the war must be considered very high, especially when preventive measures such as vaccination are taken into account when the results obtained in Europe are considered at the same time. If we examine Tables 1 and 2 and the diagram, the periodical fluctuations in periods of from roughly 5 to 7 years will immediately become apparent; the highest years since 1890 were 1892, 1898, 1904, 1910, 1915 and 1919. The two last periods are decidedly shorter; I will refer to them later. These fluctuations must therefore be considered inherent to the natural course of epidemiological conditions, that is to say, to the periodical accumulation of "terrains de culture," due to the failure to practise revaccination at regular intervals. There are, moreover, marked differences between the various maxima: the highest figures refer to years of famine (1892) and other national misfortunes. The reasons are not difficult to find: during such disastrous years, the likelihood of infection is considerably increased, and at the same time the regular application of special prophylactic measures also diminishes since medical activity has partly to be diverted into other channels.

The annual course of this disease shows a tendency to drop in the winter and spring, from November to April. As regards geographical distribution, it must particularly be noted that, apart from the same agricultural centres and a few governments in the Ukraine, some of the more northern governments are affected, those of Perm, Viatka and Vologda. The towns and governments where vaccination was more general (Moscow, Petrograd, etc.) showed a much lower morbidity. The years 1912 and 1913 were particularly fortunate and show the lowest figures. During the last months of 1914, the figures began to rise again, the epidemic developed with unusual rapidity and reached its maximum in 1915. This rapid and premature increase must be attributed to the conditions created by the war, to mass movements of troops and of the civilian population, and to a decrease in the medical activities of the Zemstvos, due to the repeated mobilisation of doctors. After this, the epidemic decreased in 1916, and this decrease was very marked in 1917. In my opinion, however, the latter was only apparent;

a careful consideration of Table 2 will show that this drop occurred suddenly and prematurely in March, that is immediately after the Revolution. Since there can be no direct connection between smallpox and the Revolution, the reason must be sought elsewhere, and would probably be found in the revolutionary disorganisation of all services, particularly of the Registration Department. In 1917 the figures for the months of September to December, which usually show an upward curve, are lower than any ever reached before, varying between 1213 and 1992. There can be no doubt that this drop is purely fictitious. The same might be said for the year 1916. There was a marked increase in December, which can be explained, apart from the spread of the epidemic, by the fact that the Registration Services were reopening their work. The fact that the cities and the governments of Moscow and of Petrograd, where registration was carried on, showed very little or no difference between the years 1916 and 1917 (see Table 5) confirms this view. The year 1919 shows a considerable increase in smallpox as in typhus, although the advance in the latter is much more marked; the number of cases of smallpox was trebled as compared with the preceding year and about double the usual average. The conditions are the same as those indicated with regard to typhus — overcrowding, dirt, mass movement of the population, the lack of medical care, etc. It is interesting to note (see Table 5), that the centre and the maximum of the epidemic differ very greatly from those of typhus in its pandemic form. I have observed that the principal centres of the latter scourge are to be found south and east of Moscow. As regards smallpox, it is the north which holds the record. The governments of Twer, of Iaroslav and of Novgorod, show the highest figures: 14,987, 13,212, 12,667. The government of Moscow comes second, showing 11,725 cases. The epidemic was more prolonged than usual, extending into June, and only began to decrease noticeably in July. The year 1920 was much more favourable. This may probably be attributed to two different causes: the beginning of the natural decrease and a greater activity in applying vaccination and revaccination. In April 1920, the Commissary for Public Health promulgated a decree making vaccination compulsory. Even now, this decree is very far from being generally applied; it must, however, have produced some effect. Its application was delayed and continues to be delayed by the dearth of doctors, and partly also by the lack of vaccine of a reliable quality. The general adverse conditions also exert an unfavourable influence on the work of lymph, vaccine and other institutions and all the efforts made are not sufficient to overcome the difficulties. Moreover, owing to unfavourable transport conditions (slow communications, lack of refrigerating apparatus, etc.[1]), vaccine, which at its place of origin was declared to be perfectly good, with an inoculability exceeding 90 %, is often found when it arrives to be almost inactive and sometimes produces no positive reaction whatever after inoculation; such cases have repeatedly come to the knowledge of the Commissariat of Public Health and of the Board of Control. Every effort is made to remedy this state of affairs, but not always with success.

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[1] All anti-smallpox, anti-typhus and anti-cholera vaccines are under State control at the Institute of Control of Sera and Vaccine. Several very regrettable accidents have shown how important it was to possess an appropriate organisation, and wherever this organisation is at work, no further accidents have been observed, except as regards the inactivity of anti-smallpox vaccine — this, however, is explained by the causes which I have just pointed out. The Board of Control forms part of the Scientific Institute of Public Health, which is composed of seven Departments: Control (under the direction of Tarassévitch), Health (Diatroptoff), Microbe biology (Barykine), Diseases due to Protozoa (Marzinovsky), Physiology of Nutrition (Schaternikoff), Biological Chemistry (Bach), Experimental Biology (Koltzoff). The Institute as a whole is under the direction of a Board of which the Directors of these Departments and one representative of the Sanitary and Epidemic Services (Syssine) form part. The Board elects its own secretariat, which is composed of a president (Tarassévitch), a vice-president (Diatroptoff), and a scientific permanent secretary (Lubarsky, assistant director of the Institute of Control).

THE COURSE OF SMALLPOX IN 1921 WAS AS FOLLOWS:

	Jan.	Feb.	March	April	May	June
European Russia	15,024	16,296	13,206	12,765	9,539	4,009
The Caucasus.	101	92	73	71	75	79
Middle East	335	433	431	83	?	?
Railway and Waterways .	552	640	694	487	457	397
Prisons	4	8	1	—	—	3
Totals . . .	16,076	17,489	14,415	13,453	10,172	4,788

	July	Aug.	Sept.	Oct.	Nov.	Dec.
European Russia	2,556	1,035	1,238	1,235	1,051	1,232
The Caucasus.	28	3	6	18	20	35
The Middle East	?	?	?	?	?	?
Railway and Waterways .	222	189	148	92	113	135
Prisons	—	2	31	1	—	—
Totals . . .	2,806	1,229	1,423	1,352	1,888	1,403

It will be seen, therefore, that, during the first half of the year, the smallpox morbidity considerably exceeded that of the preceding year, although it was less high than in the year 1919. In the second half this morbidity tended to drop, but the figures for the last months are as yet incomplete, so that I am unable to form a definite judgment.

TABLE No. 1.

Incidence of Infectious Diseases in Russia from 1900 until 1920.

Total of cases and ratio per 10,000 of population.

	Smallpox		Measles		Scarlet Fever		Diphtheria		Typhus		Relapsing Fever		Enteric Fever		Dysentery		Influenza	
Years	Total	p. 10,000	Total	p. 10,000	Total	p. 10,000	Total	p. 10,000	Total	p. 10,000	Total	p. 10,000	Total	p. 10,000	Total	p. 10,000	Total	p. 10,000
1900	103695	7,8	185479	13,9	273249	20,5	175272	13,1	52523	3,9	10544	0,8	247274	18,6	240142	18,0	1539849	115,6
1901	93062	6,9	290060	21,4	294268	21,7	181782	13,4	52601	3,9	12409	0,9	299637	22,1	319389	23,6	1180496	87,2
1902	90752	6,6	339772	24,7	243541	17,7	172935	12,5	59184	4,3	18767	1,4	271579	19,7	253981	18,5	1462756	106,3
1903	88264	6,3	210717	15,0	282850	20,2	215775	15,4	70402	5,0	17105	1,2	341506	24,4	345914	24,7	1563227	111,6
1904	103717	7,3	321906	22,6	323488	22,7	213131	15,0	54178	3,8	12179	0,9	255351	17,9	218771	15,4	1855937	130,3
1905	102773	7,1	272193	18,8	393906	27,2	247650	17,1	76831	5,3	16658	1,2	356535	24,7	313598	21,7	1626510	112,5
1906	98438	6,7	258723	17,6	409521	27,9	333207	22,7	52412	3,6	27117	1,8	449657	30,6	339816	23,1	1969501	133,9
1907	108780	7,3	327804	21,9	356760	23,8	322352	21,5	51984	3,5	56715	3,8	399730	26,7	284170	19,0	2511928	167,8
1908	127726	8,4	357081	23,5	285464	18,8	308436	20,3	103259	6,8	128494	8,4	419065	27,5	309403	20,3	3050473	200,5
1909	143790	9,5	382612	24,5	416767	26,7	461722	29,6	180724	11,6	128728	8,3	511000	32,8	373306	23,9	3024207	193,9
1910	165265	10,5	390614	24,7	500726	31,6	681538	43,1	138577	8,8	61579	3,9	499295	31,5	424261	26,8	3165652	200,0
1911	119113	7,4	306584	19,1	414944	25,8	558349	34,7	120671	7,5	39457	2,5	412782	25,7	457361	28,4	2996556	186,4
1912	81588	5,0	419807	25,6	350256	21,4	431845	26,3	100928	6,2	34544	2,0	376246	22,9	436120	26,6	3440282	209,8
1913	72236	4,6	535076	32,9	460108	28,3	506257	31,1	118419	7,3	30690	1,9	432275	26,6	511018	31,4	3608957	222,0
1914	94162	6,3	391232	26,0	365259	24,3	419409	27,9	89463	5,9	17061	1,1	355453	23,6	394879	26,2	3577966	237,7
1915	121680	8,8	319868	25,0	371970	27,0	309994	25,0	92845	6,5	14536	1,1	275468	19,3	292301	21,1	2399091	179,9
1916	106301	6,9	—	—	201179*	13,1	147213*	16,1	115874	8,3	14787	1,0	170822	11,2	111146*	7,2	—	—
1917	64892	4,3	—	—	64484*	4,3	64433*	5,1	97270	7,1	21764	1,5	150657	10,1	148580*	10,0	—	—
1918	54856	4,8	20897*	3,7	30757*	4,2	44456*	6,1	141638	12,3	16662	2,3	109264	13,0	59750*	9,2	—	—
1919	166340	14,6	70734*	11,6	37026*	5,0	29799*	3,9	2240858	196,7	227927	29,1	252066	32,1	137169*	18,6	—	—
1920	98179	8,7	28284*	7,1	56693*	7,9	26333*	3,9	2677500	264,9	1031624	97,9	424481	34,3	324389	34,1	—	—

* Incomplete.

Table No. 2.

Monthly Notifications of Infectious Diseases in Russia in 1912-1920.

	January	February	March	April	May	June	July	August	Sept.	October	November	Dec.
						I. SMALLPOX.						
1912	10421	10738	9287	8112	6697	3943	2985	2795	3335	5059	6565	6024
1913	7301	7077	7601	5887	6240	4689	2996	2479	3089	5115	6499	6530
1914	8307	8672	9566	8542	7221	3135	3482	3652	4833	7285	11088	11420
1915	11856	12665	12828	12824	10014	7109	4948	4988	5989	8850	11972	13053
1916	14602	13680	13739	10954	10265	7021	3988	3042	3325	5580	8660	11445
1917	13713	12240	7916	6617	7594	4448	2736	1514	1213	1414	1992	1590
1918	5394	5082	6624	6822	6751	5358	3320	2014	1928	2210	3106	6247
1919	11315	16268	24219	26324	23873	20437	11075	3561	2677	3408	5349	10241
1920	10916	10581	10138	10911	13244	10331	6314	2935	3131	3479	5226	9268
						II. TYPHUS.						
1912	11049	11678	11346	12337	9900	5410	3932	3328	3155	4139	6075	7688
1913	12703	13631	14828	13908	12400	8608	5811	4593	4654	6198	8086	9231
1914	10003	10716	12841	12573	10021	6062	3987	2975	3238	3499	4769	6182
1915	7673	8035	9158	9349	7718	5201	4288	4387	4707	7026	9723	11907
1916	15914	15644	16065	13905	11436	6851	3647	2306	1789	2299	4209	7604
1917	9792	10675	9884	11872	15940	7906	3477	2950	3476	2140	3074	2607
1918	7157	7496	13623	13942	12149	10472	6701	4441	4182	6735	11821	31446
1919	92319	171283	279643	288906	275435	198955	117598	57746	43876	66995	120314	232971
1920	491490	655848	505356	389586	288426	152865	82729	41509	35550	28475	42762	62904
						III. RELAPSING FEVER.						
1912	3207	3063	3171	3513	3227	2197	1809	1501	1346	1618	2192	2371
1913	3243	3175	3485	3404	2954	2545	2122	2027	1635	1426	1635	1694
1914	1506	1586	1786	1797	1651	1454	1175	429	852	831	892	941
1915	1007	971	890	874	868	686	641	761	951	1232	1606	1955
1916	1571	1390	1489	952	699	628	567	772	783	1277	1977	2632
1917	3423	3080	3301	3941	3084	1598	863	946	599	303	236	119
1918	1294	956	1658	2398	2356	1507	1275	819	796	881	927	1795
1919	4567	5298	8843	5718	8153	9097	12727	12469	11114	23001	32357	55585
1920	115676	156021	148837	108644	87343	79136	54293	45389	41456	41008	49278	61669
						IV. ENTERIC FEVER.						
1912	34326	32658	30112	30042	25229	22594	23360	30044	30892	30610	30947	28628
1913	33059	30420	31496	29563	27450	24782	27225	35055	45803	44849	41913	39563
1914	37843	32245	31336	27469	23152	21760	22390	28609	28921	28781	27166	24833
1915	22857	21694	21592	19992	17171	16295	16808	22999	24440	26995	27545	25832
1916	20152	15799	15929	13486	11854	9439	10245	13541	15283	14330	14845	14806
1917	15731	12972	9449	11176	12238	8849	8374	14244	20290	17050	10673	5105
1918	12190	9593	10229	9581	8828	8069	7137	9193	10238	7654	6923	9539
1919	16657	27737	31717	21226	17475	14479	10562	8266	13620	17836	23181	28997
1920	40454	39343	36292	29439	25417	12936	8690	22008	52918	54991	52570	48423
						V. CHOLERA.						
1915	49	70	16	35	430	2260	6599	10061	9010	2762	859	426
1916	17	5	37	2	1	1	20	178	218	58	22	—
1917	5	2	—	1	82	9	11	9	8	—	—	—
1918	10	18	43	69	394	1660	16694	16170	4121	1813	219	78
1919	1	—	—	—	2	1	142	178	339	236	590	746
1920	258	423	1142	706	500	876	3359	10292	3835	573	129	13

TABLE No. 3.

Typhus.

Incidence in 1912-1920 according to Governments.

Governments	1912	1913	1914	1915	1916	1917	1918	1919	1920
Arkhangel	45	8	13	33	424	508	444[1]	608[1]	1040
Astrakan	109	230	328	702	370	179	11967	5052	14163[2]
Vitebsk	815	609	855	532	1629	1377	1087	20053	34346
Vladimir	205	28	22	—	51	32	1098[3]	62325[3]	43012[3]
Vologda	438	369	229	293	156	142	616[4]	12377[4]	23779[4]
Viatka	3146	2462	2249	2052	2059	716	2571	29053	77909
Voronège	2830	3620	3087	2332	3154	3075	1895	132513	44806
Don	292	368	433	498	552	458	—	—	50562
Ekaterinoslav	2349	2438	1665	7182	12298	3263	—	—	48069
Kasan	1448	1510	1006	843	1468	967	1800	30169	105342
Kalouga	748	1025	586	1716	1129	1225	3802	54997	40683
Kiev	2432	2043	1897	3789	2913	1557	—	—	8199
Kostroma	108	107	24	63	26	61	374	11835	21640
Koursk	2131	1715	848	1763	1664	1257	2853	129185	152630
Minsk	2639	3104	2322	1112	1729	1673	—	—	—
Moghilev	3000	2572	1244	1778	1517	919	1470	36780	92722
Moscow (gov.)	689	418	185	988	355	320	3584	106702	36198
Moscow (city)	686	721	626	885	3800	1443	7217	84300	24492
Nijni-Novgorod	1405	815	357	264	226	133	1098	39059	60436
Novgorod	527	103	79	60	73	97	1164[5]	24443[6]	18406[5]
Olonetz	119	45	61	20	11	20	60	539	2670
Orenbourg	266	156	161	—	2307	271	1396	14535	32483[6]
Orel	5476	6158	5021	3376	1626	2607	2296	151530	137611[7]
Penza	1000	1101	782	886	1624	1462	6826	84891	9306
Perm	5684	5983	557	2407	2147	1758	460	19506	101658[8]
Petrograd (gov.)	220	99	47	154	153	91	5031	25387	11001
Petrograd (city)	293	135	207	377	241	161	10976	36357	17443
Poltava	3850	3885	2109	1430	1489	2053	—	—	95489[9]
Pskov	213	193	161	48	75	282	321	5905	30263
Riasan	2505	3791	3729	2592	2442	3963	10438	112448	54923
Samara	1107	1105	2233	1632	1687	125	573[10]	95396[10]	155088[10]
Saratov	1212	2769	2409	2615	6934	6294	4963	151645	130985
Simbirsk	875	1117	1484	1098	1141	1162	2950	65682	82911
Smolensk	2262	3537	1480	957	1954	920	4375	42733	41151
Tauride	993	698	691	1060	1154	481	—	—	—
Tambov	8149	12759	9637	9419	8512	8763	22206	222458	146926
Twer	447	391	127	224	82	169	1559	60330	37744
Toula	2787	4734	2403	970	717	658	6716	99233	63241
Oufa	626	858	2539	520	1799	310	4331	3431	49714
Kharkov	4320	4532	3141	4169	5024	4919	9032	107366	123306
Kherson	4273	4072	3704	5764	2345	2105	—	—	20368
Tchernigov	1816	2760	1181	1312	1685	876	—	—	35740
Jaroslav	201	211	54	—	307	102	960	34261	30891
Total	74736	85354	61973	67916	81049	58954	138509	2152873	2593746

[1] In the unoccupied part only.

		1918	1919	1920
[2] Including the government of	Tzaritzine	—	—	12705
[3] » »	Ivanovo-Vosnessensk	309	10120	9041
[4] » »	Dvina du Nord	214	1995	6915
[5] » »	Tcherepovetz	247	4584	9468
[6] » »	Tcheliabinsk	—	—	15826
[7] » »	Briansk	—	—	39482
[8] » »	Ekaterinbourg	—	17049	85517
[9] » »	Krementchoug	—	—	2070
[10] » »	Marksstadt	20	5000	7171

TABLE No. 4.

Relapsing Fever.

Incidence in 1912-1920 according to Governments.

Governments	1912	1913	1914	1915	1916	1917	1918	1919	1920
Arkhangel	2	4	1	—	—	126	—	133 [1]	483 [1]
Astrakan	870	392	320	165	104	57	1394	144	6752 [2]
Vitebsk	13	16	1	34	211	157	181	2059	13952
Vladimir	31	29	7	—	39	28	494 [3]	3393 [3]	5198 [3]
Vologda	44	28	19	12	47	79	293 [4]	1044 [4]	1257 [4]
Viatka	659	269	378	193	189	180	—	13800	69422
Voronège	150	26	11	285	58	73	363	2210	12049
Don	2420	1767	781	204	233	244	—	—	8557
Ekaterinoslav	1811	3664	1268	752	99	1287	—	—	39867
Kasan	549	812	673	945	279	57	266	4915	17211
Kalouga	331	120	587	443	51	117	429	3641	9794
Kiev	4318	1183	1399	470	424	1047	—	—	9490
Kostroma	23	51	13	30	53	19	86	746	2490
Koursk	134	312	120	93	66	93	413	6947	37408
Minsk	225	45	42	100	545	548	—	—	—
Moghilev	205	114	101	244	130	154	166	6774	27998
Moscow (gov.)	199	289	110	133	320	258	1444	11644	8225
Moscow (city)	373	221	253	198	3154	2346	3312	6754	5437
Nijni-Novgorod	634	806	114	209	42	120	339	4047	8037
Novgorod	47	24	12	17	7	5	77 [5]	544 [5]	3360 [5]
Olonetz	2	2	1	1	2	2	3	85	596
Orenbourg	36	175	47	—	229	98	301	14665	26061 [6]
Orel	409	634	451	228	232	348	605	16418	71714 [7]
Penza	166	100	14	1229	128	133	673	6928	18332
Perm	5770	1514	550	66	206	53	112	11046 [8]	43023 [8]
Petrograd (gov.)	24	4	6	38	59	80	162	798	1023
Petrograd (city)	79	102	50	162	2422	2746	825	1616	2017
Poltava	695	1306	499	191	61	210	—	—	29512 [9]
Pskov	8	13	5	3	5	12	10	677 [1]	2935 [1]
Riasan	101	92	86	532	76	120	1165	4533	13517
Samara	3114	1342	778	837	788	216	94 [10]	16452 [10]	35094 [10]
Saratov	1017	1904	306	614	311	146	618	21090	31212
Simbirsk	1008	730	229	115	62	185	244	152	5523
Smolensk	117	66	37	148	127	63	418	1562	7787
Tauride	2286	425	152	143	137	58	—	—	—
Tambov	196	221	166	169	126	229	955	21565	99635
Twer	48	36	28	138	37	43	224	2829	5411
Toula	98	335	122	203	73	123	302	4637	16953
Oufa	89	22	26	7	62	42	428	8159	11263
Kharkov	739	2786	1017	741	537	1071	—	—	51527
Kherson	1800	2819	2841	2282	503	4129	—	—	18980
Tchernigov	116	165	160	171	163	33	—	—	10099
Jaroslav	95	48	21	—	104	322	265	3317	3798
Total	29411	25113	13802	12545	12499	17457	16662	205394	792988

[1] In the unoccupied part only.

		1918	1919	1920
[2] Including the government of	Tzaritzine en 1918	—	—	6639
[3] » »	Ivanovo-Vosnessensk	128	931	1446
[4] » »	Dvina du Nord	39	182	599
[5] » »	Tcherepovetz	1	143	719
[6] » »	Tcheliabinsk	—	—	18138
[7] » »	Briansk	—	—	23300
[8] » »	Ekaterinbourg	—	10834	40109
[9] » »	Krementchoug	—	—	5210
[10] » »	Marksstadt	1	449	467

TABLE No. 5.

Smallpox.

Incidence in 1912-1920 according to Governments.

Governments	1912	1913	1914	1915	1916	1917	1918	1919	1920
Arkhangel	326	172	203	175	476	568	123 [1]	491 [1]	240 [1]
Astrakan	622	482	264	1626	3337	522	130 [2]	46 [2]	541 [2]
Vitebsk	498	270	572	999	427	835	950	3560	414
Vladimir	1299	917	699	—	276	772	6592 [3]	9341 [3]	2107 [3]
Vologda	1472	1516	627	1378	1402	4581	5708 [4]	3186 [4]	2331 [4]
Viatka	2404	1665	972	2043	4317	1766	1685	1865	3388
Voronège	1367	4202	6793	4227	2681	1735	153	1143	4104
Don	705	1421	3538	602	1806	1126	—	—	1295
Ekaterinoslav	2330	3926	4659	7094	1548	778	—	—	276
Kasan	1305	1273	1746	2253	1357	1218	1922	2965	2316
Kalouga	375	465	731	1005	955	216	1063	2976	1353
Kiev	1843	1088	960	3798	2167	1103	—	—	646
Kostroma	940	990	1184	854	576	1000	2422	4188	2116
Koursk	1205	1201	2902	3311	1839	426	1153	5621	8323
Minsk	1295	798	518	1451	2352	1099	—	—	—
Moghilev	628	197	572	1321	281	157	653	9332	6666
Moscow (gov.)	600	432	788	1049	1391	1349	2270	11725	816
Moscow (city)	245	593	502	507	1447	1152	1256	4961	767
Nijni-Novgorod	3008	811	639	1022	509	1114	2268	2869	680
Novgorod	747	558	410	867	1148	448	1473 [5]	12667 [5]	2975 [5]
Olonetz	173	—	8	53	263	431	1174	2232	644
Orel	1640	1652	2724	2954	1617	1116	643	7433	6366 [7]
Orenbourg	1448	815	801	—	1405	491	185	532	1584 [6]
Penza	961	263	341	902	914	394	454	4493	9168
Perm	7683	4970	3803	1113	2386	1511	—	231 [7]	2969 [8]
Petrograd (gov.)	541	346	982	980	666	404	3458	6256	1166
Petrograd (city)	811	406	2349	3561	1128	860	1263	5658	969
Poltava	940	904	1731	7150	4316	1904	—	—	1155 [9]
Pskov	820	542	266	784	111	248	1357	1823	1372
Riasan	605	425	594	1691	1529	1291	2179	3756	1996
Samara	1403	1658	1696	1566	2968	425	210	4600	1852 [10]
Saratow	1170	749	996	1340	5041	2162	285	3267	1705
Simbirsk	3030	1952	1059	2548	2322	744	1444	3438	967
Smolensk	374	455	461	1538	1168	238	3472	4085	1517
Tauride	2175	1223	820	2399	3793	1793	—	—	—
Tambov	3018	2232	4534	4436	4552	3312	4499	6421	3745
Twer	803	848	832	1092	442	198	1729	14987	4860
Toula	905	1392	1235	1382	621	374	1039	6037	1002
Oufa	2974	1781	1007	950	2107	960	420	680	1748
Kharkov	2210	3952	4616	5929	5953	2568	—	—	1152
Kherson	1580	961	2163	3338	1458	931	—	—	206
Tchernigov	848	835	771	2289	2119	593	—	—	337
Jaroslav	495	75	95	—	574	559	1224	13212	4251
Total	59821	51413	63163	83617	77745	45472	54856	166077	92185

[1] In the unoccupied part only.

		1918	1919	1920
[2] Including the government of	Tzaritzine	—	—	526
[3] » »	Ivanovo-Vosnessensk	2433	3254	1492
[4] » »	Dvina du Nord	3693	766	1121
[5] » »	Tcherepovetz	1028	3964	1782
[6] » »	Briansk	—	—	1647
[7] » »	Ekaterinbourg	—	199	2703
[8] » »	Krementchoug	—	—	317
[9] » »	Marksstadt	24	274	333
[10] » »	Tcheliabinsk	—	—	29

TABLE No. 6.

Cholera.

Cases and Deaths registered as due to Cholera in Russia from 1823-1920.

Years	Number of governments and provinces infected	Cases	Deaths
1823	1	392	205
1829	4	3590	865
1830	34	68091	37595
1831	51	466457	197069
1832	5	1177	653
1833	26	14428	533
1834	?	isolated cases	isolated cases
1837	?	» »	» »
1838	?	» »	» »
1847	36	180846	77719
1848	50	1742439	690150
1849	27	15223	6722
1850	2	54	21
1852	11	10428	3701
1853	50	249788	100083
1854	34	28052	13743
1855	36	331025	131327
1856	17	11587	4661
1857	11	1811	814
1858	11	3649	1630
1859	13	4931	2293
1860	?	isolated cases	isolated cases
1861	?	» »	» »
1865	11	13397	4177
1866	49	208853	72386
1867	10	6245	2298
1868	3	310	147
1869	11	1276	659
1870	32	21664	9386
1871	49	322711	124831
1872	46	310607	113196
1873	21	9943	4421
1892	77	620051	300324
1893	70	106600	42250
1894	60	65140	31326
1895	12	30811	12066
1896	1	46	19
1902	4	2167	1393
1904	13	9226	6850
1905	8	598	286
1907	50	12703	6424
1908	69	30705	15542
1909	50	22858	10677
1910	72	230232	109560
1911	29	3416	1646
1912	2	9	3
1913	7	324	149
1914	15	1800	761
1915	53	34582	859
1916	17	559	—
1917	10	134	—
1918	37	41289	12927*
1919	33	3998	—
1920	53	22106	—

* Incomplete.

TABLE No. 7.

Cholera in 1912-1920.

Incidence according to Governments.

Governments	1912	1913	1914	1915	1916	1917	1918	1919	1920
Arkhangel	—	—	—	31	—	—	—	—	—
Astrakan	5	—	—	154	1	—	3916	12	161[1]
Vitebsk	—	—	—	442	—	—	454	1	141
Vladimir	—	—	—	—	—	—	357[2]	7[2]	121[2]
Vologda	—	—	—	3	—	—	171[3]	62	—
Voronège	—	—	—	660	—	—	2616	127	1575
Viatka	—	—	—	—	—	—	2	136	—
Don	—	—	—	424	3	—	—	—	4035
Ekaterinoslav	—	27	—	2724	23	—	—	—	855
Kasan	—	—	—	85	—	—	659	52	88
Kalouga	—	—	—	432	—	—	178	1	35
Kiev	—	2	75	2196	1	3	—	—	83
Kostroma	—	—	—	4	—	—	371	32	2
Koursk	—	—	—	701	—	—	2647	17	3418
Minsk	—	—	—	6054	—	—	—	—	—
Moghilev	—	—	—	—	—	—	218	5	2
Moscow (gov.)	—	—	—	42	—	—	728	47	199
Moscow (city)	—	—	2	—	—	—	1191	91	95
Nijni-Novgorod	—	—	—	228	—	—	1139	104	24
Novgorod	—	—	1	97	—	83	207[4]	48	—
Olonetz	—	—	—	—	—	—	83	3	—
Orenbourg	—	—	—	—	—	7	612	5	142[5]
Orel	—	10	13	416	1	—	922	8	1170[6]
Penza	—	—	20	484	—	—	400	1184[7]	6
Perm	—	—	—	—	—	—	28	46	—
Petrograd (gov.)	—	—	—	—	—	—	4665	175	5
Petrograd (city)	—	—	—	415	—	—	8470	918	6
Poltava	—	17	5	815	—	7	—	—	292[8]
Pskov	—	—	37	438	1	—	57	—	—
Riasan	—	—	—	345	—	—	1049	3	420
Samara	—	—	—	501	—	—	1035[9]	394[9]	32[9]
Saratov	—	—	—	795	1	—	4428	425	234
Simbirsk	—	—	3	744	—	—	486	137	14
Smolensk	—	—	—	877	—	—	281	2	—
Tauride	—	21	—	157	—	—	—	—	—
Tambov	—	—	—	1151	—	—	1430	61	95
Twer	—	—	—	166	—	4	473	—	14
Toula	—	—	—	343	—	—	347	6	329
Oufa	—	—	—	—	—	—	341	1	—
Kharkov	—	—	11	847	—	—	—	—	2257
Kherson	4	205	—	628	46	4	—	—	1899
Tchernigov	—	—	3	1716	—	—	—	—	53
Jaroslav	—	—	—	—	—	—	1194	22	22
Total	9	482	170	25115	77	108	41155	4132	17824

		1918	1919	1920
[1]	Including the government of Tzaritzine	—	—	21
[2]	» » Ivanovo-Vosnessensk	165	5	49
[3]	» Dvina du Nord	1	—	—
[4]	» » Tcherepovetz	25	—	—
[5]	» » Tcheliabinsk	—	—	77
[6]	» » Briansk	—	—	701
[7]	» » Ekaterinbourg	—	17	—
[8]	» » Krementchoug	—	—	28
[9]	» » Marksstadt	39	52	3

TABLE No. 8.

Enteric Fever in 1912-1920.

Incidence according to Governments.

Governments	1912	1913	1914	1915	1916	1917	1918	1919	1920
Arkhangel	1191	1154	1133	935	634	666	2717	586	780
Astrakan	1002	1271	1124	1024	719	517	1384	333	1407 [1]
Vitebsk	3193	4180	3872	4098	3250	3722	1475	2883	5065
Vladimir	3281	3435	2993	—	263	659	3046 [2]	6251 [2]	12063 [2]
Vologda	2484	3245	2315	1488	423	1440	1120 [3]	3569 [3]	2841 [3]
Voronège	12822	16224	12475	9020	6600	7869	1297	10936	24959
Viatka	5465	5867	5194	4937	1597	366	2286	4349	4500
Don	3197	5191	5889	17625	3773	1428	—	—	7446
Ekaterinoslav	13923	21904	13937	16951	4712	3261	—	—	4599
Kasan	3426	3964	4199	2611	4905	1311	1356	3429	5825
Kalouga	2686	3412	2480	2579	1482	1814	3037	1973	2579
Kiev	10423	12946	13136	12245	5315	5247	—	—	3842
Kostroma	2064	2944	3643	1210	1074	1244	771	2567	3270
Koursk	6789	10565	9098	5200	3374	3853	8634	23979	35081
Minsk	9502	11388	9329	5516	4208	2409	—	—	—
Moghilev	13149	16863	10941	10698	3482	2954	6963	17542	19918
Moscow (gov.)	2402	2824	3240	2440	537	1238	2042	2544	11759
Moscow (city)	2313	2212	2054	1875	1290	2867	1059	1954	4362
Nijni-Novgorod	4201	3525	3247	2382	537	1127	3409	3589	2512
Novgorod	4016	4339	2678	1932	823	973	931 [4]	2805 [4]	2685 [4]
Olonetz	502	712	525	277	146	181	412	472	570
Orenbourg	5361	4083	5114	—	2875	1779	2369	13339	9742 [5]
Orel	8577	10609	11192	8256	3837	6195	7040	22490	23917 [6]
Penza	5365	4800	3932	3371	1826	2325	4565	7879	9888
Perm	14887	14631	15274	8244	4997	1758	274	4257 [7]	9137 [7]
Petrograd (gov.)	4931	4104	2839	1937	1003	441	1338	955	368
Petrograd (city)	16189	13979	10089	9373	4441	1043	1112	432	210
Poltava	6904	7583	6740	4641	2231	3575	—	—	8700 [8]
Pskov	3915	5347	5291	3481	1878	2187	1541	2150	5859
Riasan	4983	5131	3618	5132	2003	2490	5915	4969	5237
Samara	9817	8905	7897	4638	5278	1999	3513 [9]	23483 [9]	20866 [9]
Saratov	8325	8667	9576	10052	6842	7498	3556	17209	17413
Simbirsk	4827	6160	4363	4256	2006	2676	4118	5355	8234
Smolensk	3772	4886	3888	4107	2070	522	4880	3178	4765
Tauride	6701	9021	6687	6192	5196	2271	—	—	32
Tambov	13184	14869	13409	10848	12540	14177	15660	14735	15886
Twer	3127	5848	3556	2166	340	363	1717	3488	6370
Toula	3535	5393	5152	2754	3793	2109	2814	4473	8034
Oufa	7738	5749	4826	3450	4208	3301	5574	3989	6517
Kharkov	10417	15753	11090	11561	6965	7145	—	—	26077
Kherson	13727	20635	17173	12836	4013	2396	—	—	8898
Tchernigov	6276	6964	5771	5749	2705	1867	—	—	5226
Jaroslav	2772	4810	2496	—	746	1576	1339	6386	5650
Total	273161	326092	273475	228086	130937	114839	109264	228328	363089

		1918	1919	1920
[1] Including the government of	Tzaritzine	—	—	1307
[2] » »	Ivanovo-Vosnessensk	682	1480	2668
[3] » »	Dvina du Nord	588	1027	980
[4] » »	Tcherepovetz	366	1501	1726
[5] » »	Tcheliabinsk	—	—	4368
[6] » »	Briansk	—	—	4702
[7] » »	Ekaterinbourg	—	3978	7811
[8] » »	Krementchoug	—	—	2918
[9] » »	Marksstadt	254	3170	2011

TABLE

Weekly Incidence of Infectious Diseases

TYPHUS.

	2-29 January	26 February	26 March	30 April	28 May
1. European Russia	80297	85168	77845	68703	5325[0]
2. Siberia	3919	4943	4913	3208	2923
3. Caucasus	190	209	237	219	179
4. Middle Asia	593	730	757	574	784
5. Railways and Waterways	3660	4060	3741	2854	1980
6. Prisons	374	345	295	185	334
Total for the Soviet Republic and the allied Republics	89033	95455	87788	75743	59450

RELAPSING FEVER.

1. European Russia	89222	83846	70728	56563	44205
2. Siberia	4783	5261	5384	2727	2335
3. Caucasus	328	368	419	360	329
4. Middle Asia	816	725	714	297	839
5. Railways and Waterways	4166	4983	3783	3335	3010
6. Prisons	1523	1352	1690	606	583
Total for the Soviet Republic and the allied Republics	100838	96535	82117	63888	51301

ENTERIC FEVER.

1. European Russia	39041	31185	24716	20601	1429[8]
2. Siberia	1869	1986	2460	1309	1203
3. Caucasus	313	264	276	217	143
4. Middle Asia	164	255	113	10	25[1]
5. Railways and Waterways	2203	1996	1597	1347	947
6. Prisons					
Total for the Soviet Republic and the allied Republics	43590	35686	29162	23484	16842

SMALLPOX.

1. European Russia	15024	16296	13206	12765	9639
2. Siberia	101	92	83	71	75
3. Caucasus	335	433	431	83	—
4. Railways and Waterways	552	640	694	487	457
5. Prisons	4	8	1	—	—
Total	16076	17489	14415	13453	10172

SCARLET FEVER.

1. European Russia	13374	12608	12287	9156	7435
2. Caucasus	178	142	120	99	112
3. Middle Asia	55	108	44	6	16
4. Railways and Waterways	366	505	603	391	405
Total	13973	13363	13054	9652	7968

*CHOLERA.

1. European Russia	108	30	13	119	1038
2. Siberia	—	—	—	—	—
3. Caucasus	5	8	7	354	200
4. Middle Asia	—	—	—	—	—
5. Railways and Waterways	10	10	21	196	317
6. Prisons	—	—	—	—	—
Total	123	48	41	569	1555

* Figures for the civil population only.

No. 9.

in Russia in 1921.

TYPHUS.

25 June	30 July	27 August	1 September	28 October	26 November	31 December		
28685	15981	10272	10363	13358	24980	33276		
2768	821	555	516	1193	4452	5496		
95	36	29	34	38	81	163		
495	281	61	45	—	—	1904		
1207	762	319	494	889	2185	9164		
155	62	58	128	174	206	326		
33405	17933	11294	11580	15652	31904	50329	=	579566

RELAPSING FEVER.

40176	26212	27632	22077	27646	40755	42353		
845	1091	1045	1087	1431	4609	8420		
338	932	400	208	60	—	431		
953	1007	1670	1787	2124	5029	12278		
2906	189	161	202	873	1249	647		
447								
45665	30632	31212	25555	32270	51885	72085	=	683983

ENTERIC FEVER.

12484	16550	17039	38436	35439	23186	12573		
—	713	793	1040	1197	2605	—		
144	211	494	641	426	453	—		
292	375	298	155	62	—	2318		
10721	1120	1489	2858	3116	2935	3580		
	6	25	29	20	2	15		
13992	18975	20138	43159	40260	29181	18486	=	332965

SMALLPOX.

4009	2556	1035	1238	1235	1051	1232		
79	28	3	6	18	20	36		
—	—	—	—	—	—	—		
397	222	189	148	92	113	135		
3	—	2	31	1	—	—		
4788	2806	1229	1423	1352	1888	1403	=	86494

SCARLET FEVER

4158	4471	3277	4022	3939	3088	2969		
123	206	106	101	107	85	65		
4	—	—	2	—	—	—		
379	234	174	—	—	—	—		
4664	4911	3557	4125	4046	3179	3034	=	85526

CHOLERA.

21276	55329	25046	5387	3955	206	7		
174	2372	4316	1976	—	—	—		
2069	5130	2333	596	111	—	—		
949	11469	3553	3212	133	29	2		
7623	9936	3892	1048	70	—	—		
73	175	66	5	19	—	—		
32199	84424	39206	12224	4288	235	9	=	174915

TABLE No. 10.

Typhus.

Incidence of registered Cases in January-November 1921.

Governments	2-29 Jan.	26 Feb.	25 March	30 April	28 May	25 June	30 July	24 August	1 Sept.	29 Oct.	26 Nov.
I. EUROPEAN RUSSIA											
1. Arkhangel	167	214	185	228	185	86	61	19	110	134	651
2. Briansk	945	850	804	552	576	210	53	117	22	31	33
3. Vitebsk	2711	2202	2004	2024	1328	576	413	198	171	201	335
4. Vladimir	969	841	764	896	511	297	156	131	104	113	202
5. Vologda	598	680	600	395	325	174	70	33	47	61	98
6. Voronège	817	1702	2559	1298	847	1184	504	434	421	263	558
7. Viatka	3819	3769	4004	2025	794	401	285	190	283	751	1391
8. Homel	3299	3408	3666	4010	2431	1369	917	410	294	241	—
9. Région du Don	84	149	105	102	98	42	20	6	5	20	20
10. Ekaterinbourg	1527	1564	1398	1211	722	470	237	109	240	418	1807
11. Ivanovo-Voznessensk	184	218	148	121	68	24	18	22	38	98	152
12. Kalouga	729	938	857	1044	791	519	313	170	205	99	201
13. Kostroma	462	656	464	403	212	153	67	65	91	94	209
14. Koursk	3029	3525	3274	3387	2448	1307	1032	600	670	367	307
15. Moscow (gov.)	998	990	959	810	671	304	149	122	137	78	194
Moscow (city)	503	687	506	389	214	143	106	59	78	198	449
16. Nijni-Novgorod	2062	2155	1720	1200	973	364	193	209	232	220	198
17. Novgorod	238	262	221	550	235	51	22	11	8	29	144
18. Olonetz	93	88	129	119	58	15	8	4	2	9	36
19. Orel	1541	1459	1033	1846	1494	379	319	532	110	21	47
20. Penza	2202	2396	2257	1159	1065	428	235	305	429	298	—
21. Perm	1164	1355	837	686	691	339	98	129	319	830	2389
22. Petrograd (gov.)	200	189	146	118	115	51	46	23	21	23	194
Petrograd (city)	693	626	278	178	114	62	44	39	54	154	359
23. Pskov	1087	1382	1003	1140	469	489	330	123	143	92	67
24. Riazan	1638	1888	2092	1639	726	297	426	—	—	—	—
25. Rybinsk	—	—	—	407	368	143	—	—	—	86	325
26. Samara	488	673	992	690	508	362	152	90	92	143	508
27. Saratov	2901	3286	3145	3112	2226	865	486	265	344	479	602
28. Severodvinsk	515	604	583	387	361	186	75	34	23	40	39
29. Simbirsk	2276	1652	985	670	491	357	207	232	201	314	—
30. Smolensk	2927	3716	2853	2917	2017	1213	723	354	349	305	347
31. Tambov	1218	1368	1494	1329	2487	1603	1305	550	539	653	358
32. Tver	2004	1979	1838	1191	993	398	168	—	—	221	453
33. Toula	1117	2169	1164	1272	1073	557	445	249	276	303	359
34. Tumène	232	354	185	100	309	42	56	16	39	99	376
35. Oufa	1039	1767	1219	797	519	428	168	68	73	117	491
36. Tzaritzyn	120	136	111	79	110	48	31	79	95	—	—
37. Tcheliabinsk	112	100	157	110	16	27	30	10	13	664	583
38. Tcherepovetz	535	629	518	309	205	14	8	—	23	16	67
39. Iaroslav	1089	1280	498	381	257	130	59	36	53	74	148
40. Commune des Allemands	429	600	235	797	—	—	—	64	—	—	—
41. Commune de la Carélie	62	63	73	113	54	30	18	9	10	15	30
42. Région des Tchouvachs	330	255	456	299	237	82	59	21	6	56	111
Total for the governments and districts of European Russia	49153	54824	48528	42490	30392	16219	10112	6157	6370	8428	14838
43. Rép. S. des S. de la Rus. Blanche	3069	3586	5846	6100	5126	3535	1797	1298	936	699	—
44. Rép. S. des S. de Crimée	916	1071	1169	971	697	—	151	—	—	—	—
45. Rép. auton. de Tartarie	3848	5406	3763	2711	1685	884	535	374	—	1717	2007
46. Rép. S. des S. de l'Ukraine	23311	20281	18539	16331	14856	—	—	—	—	—	—
Total for European Russia	80297	85168	77845	68603	52756	20638	12595	7829	7306	10844	16845
II. SIBERIA	3919	4943	4913	3208	2923	2768	821	555	516	1193	—
III. CAUCASUS.											
Stavropol	190	209	237	219	179	95	36	29	34	38	81
IV. MIDDLE ASIA.											
Rép. S. des S. de Kirghizie	104	108	101	—	—	—	—	—	—	—	—
» » » de Turkestan	489	622	656	574	—	—	—	—	—	—	—
Total for Middle Asia	593	730	757	574	—	—	—	—	—	—	—
Railways and Waterways	3660	4060	3741	2854	1980	1207	762	319	494	889	2185
Prisons	374	345	295	185	334	155	52	58	128	174	206
Total for the Soviet Republic and Allied Republics	89033	95455	87788	75643	58172	24863	14266	8790	8478	13138	19317

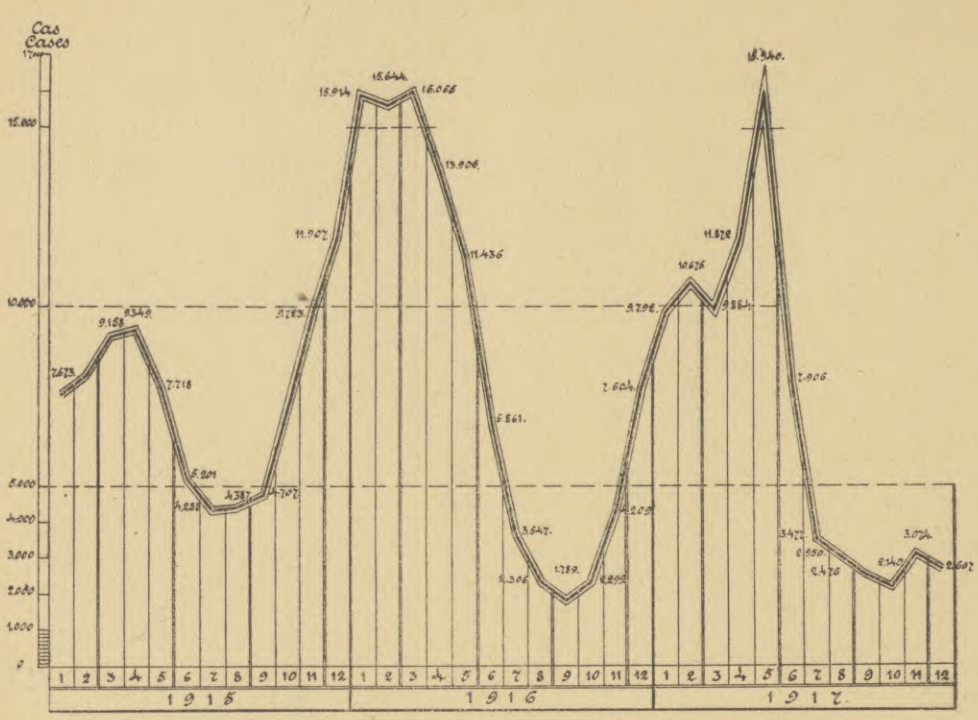
TABLE No. 11.

Relapsing Fever.

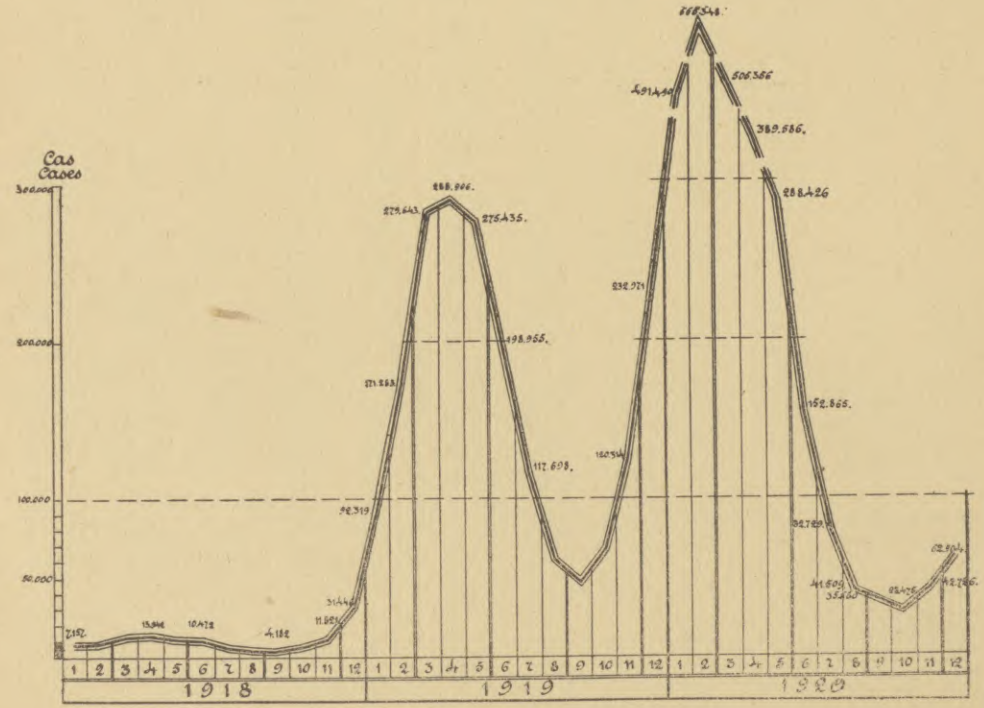
Incidence of registered Cases in January-November 1921.

Governments	2-29 Jan.	26 Feb.	26 March	30 April	28 May	25 June	30 July	24 August	1 Sept.	29 Oct.	26 Nov.
I. EUROPEAN RUSSIA											
1. Arkhangel	418	542	276	207	110	108	76	23	69	52	—
2. Briansk	1496	1381	1456	1044	1015	602	398	296	111	156	213
3 Vitebsk	1911	1487	1083	793	620	875	303	240	353	359	514
4. Vladimir	243	184	154	170	115	118	142	64	93	82	131
5. Vologda	64	84	42	30	12	16	55	50	71	48	—
6. Voronège	1968	3229	2591	2065	1346	2133	1144	1110	1090	793	186
7. Viatka	992	1091	574	514	217	197	162	76	159	234	203
8. Homel	3705	3158	2996	2473	1602	1158	981	650	—	—	—
9. Région du Don	244	260	267	315	318	172	133	132	64	142	156
10. Ekaterinbourg	1907	524	1550	1147	669	779	710	549	858	1579	2262
11. Ivanovo-Voznessensk	38	71	38	18	15	8	12	8	22	153	308
12. Kalouga	507	603	413	438	533	533	480	329	256	165	253
13. Kostroma	109	102	88	76	25	10	19	14	27	47	104
14. Koursk	3394	4111	2431	1763	1625	1137	1273	889	1234	718	785
15. Moscow (gov.)	582	427	276	347	441	389	311	234	319	198	410
Moscow (city)	434	466	322	262	211	215	256	252	239	352	762
16. Nijni-Novgorod	981	565	466	159	128	97	88	68	106	182	254
17. Novgorod	372	146	61	316	33	28	46	5	20	114	120
18. Olonetz	46	17	13	29	14	16	28	1	—	4	11
19. Orel	2182	1820	1036	1486	1374	599	1001	1018	366	148	245
20. Penza	1686	1570	1306	781	484	422	390	463	383	406	—
21. Perm	313	377	204	92	85	89	43	45	136	301	559
22. Petrograd (gov.)	87	45	23	17	9	13	27	4	17	194	235
Petrograd (city)	1250	544	263	91	54	68	46	26	262	609	1091
23. Pskov	366	251	162	239	95	148	122	71	118	41	67
24. Riazan	1362	1260	793	696	—	—	—	—	—	—	—
25. Rybinsk	—	—	—	51	43	70	—	—	—	75	279
26. Samara	366	752	978	749	563	612	389	347	460	685	892
27. Saratov	1886	2327	1638	1263	1063	726	671	725	821	785	388
28. Severodvinsk	87	129	96	59	33	12	11	10	1	13	—
29. Simbirsk	1754	1101	688	470	172	119	95	17	209	320	—
30. Smolensk	2171	2225	1309	1082	952	665	561	309	269	232	457
31. Tambov	4946	3931	3566	3063	1415	2362	2376	2484	915	2352	1902
32. Tver	470	400	347	247	166	137	79	—	—	208	631
33. Toula	814	804	566	590	920	757	910	511	616	524	—
34. Tumène	323	544	140	123	491	—	55	12	102	231	386
35. Oufa	1217	1215	1413	1392	616	671	311	191	408	476	1865
36. Tzaritzyn	230	221	131	160	341	239	132	326	576	—	—
37. Tcheliabinsk	331	405	194	230	18	119	165	13	21	4419	3971
38. Tcherepovetz	156	245	276	93	91	4	18	—	8	8	47
39. Iaroslav	270	272	66	40	15	27	19	—	13	35	145
40. Commune des Allemands	389	128	94	101	—	—	—	20	—	—	—
41. Commune de la Carélie	10	16	10	9	5	—	2	8	4	11	10
42. Région des Tchouvachs	209	226	262	156	109	68	55	42	24	83	227
Total for the governments and districts of European Russia	42285	39128	30658	25140	17672	16518	14095	11632	12820	17534	19681
43. Rép. S. des S. de la Rus. Blanche	1843	1087	6641	4975	4008	3080	2620	1823	1616	1748	—
44. » » » » de Crimée	2294	1932	1070	366	333	—	233	—	—	—	—
45. Rép. auton. de Tartarie	2127	2280	1180	638	466	369	319	201	—	846	1122
46. Rép. S. des S. de l'Ukraine	40673	39419	31178	25262	21093	—	—	—	—	—	—
Total for European Russia	89222	83846	79728	56381	43572	13967	17267	13656	14436	20128	20803
II. SIBERIA	4783	5261	5384	2727	2335	845	1091	1045	1087	1431	—
III. CAUCASUS.											
Stavropol	328	368	419	360	329	338	301	304	194	136	243
IV. MIDDLE ASIA.											
Rép. S. des S. de Kirghizie	165	239	249	5	14	5	—	13	6	60	—
» » » » de Turkestan	651	486	465	292	—	—	—	—	—	—	—
Total for Middle Asia	816	725	714	297	14	5	—	13	6	60	—
Railways and Waterways	4166	4983	3783	3335	3010	2906	1907	1670	1787	2124	4323
Prisons	1523	1352	1090	606	583	447	189	161	202	873	1249
Total for the Soviet Republic and Allied Republics	100838	96663	82117	64022	50334	24508	20755	16849	17712	24752	26618

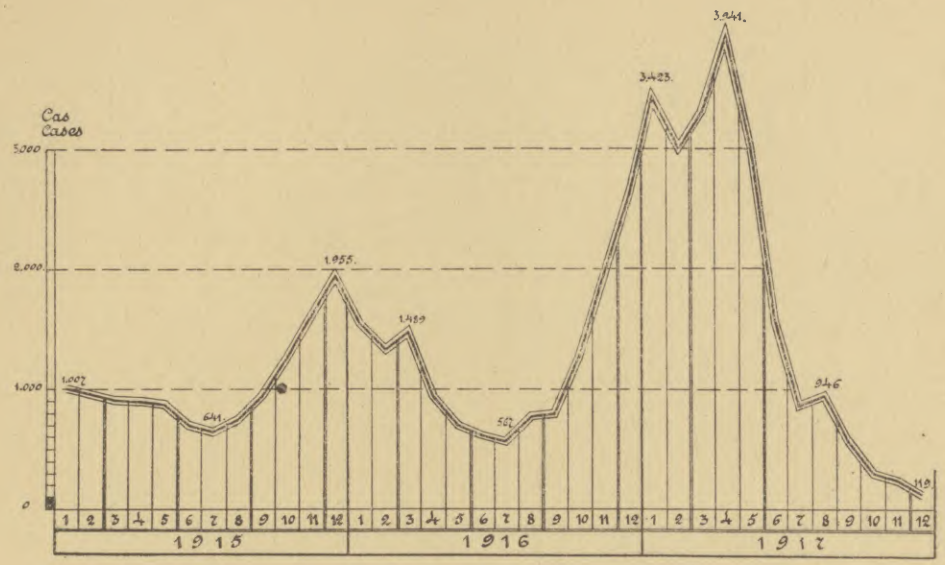
(These data, especially for the later months, are only provisional).



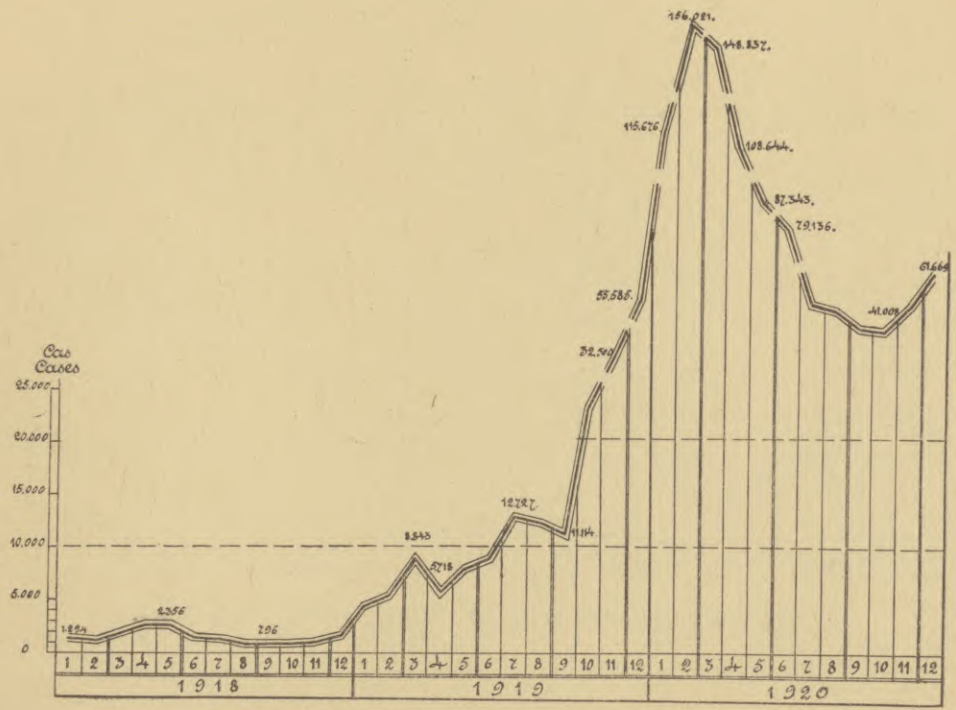
1. **Typhus.** Monthly notifications of cases in Russia in 1915-1917.



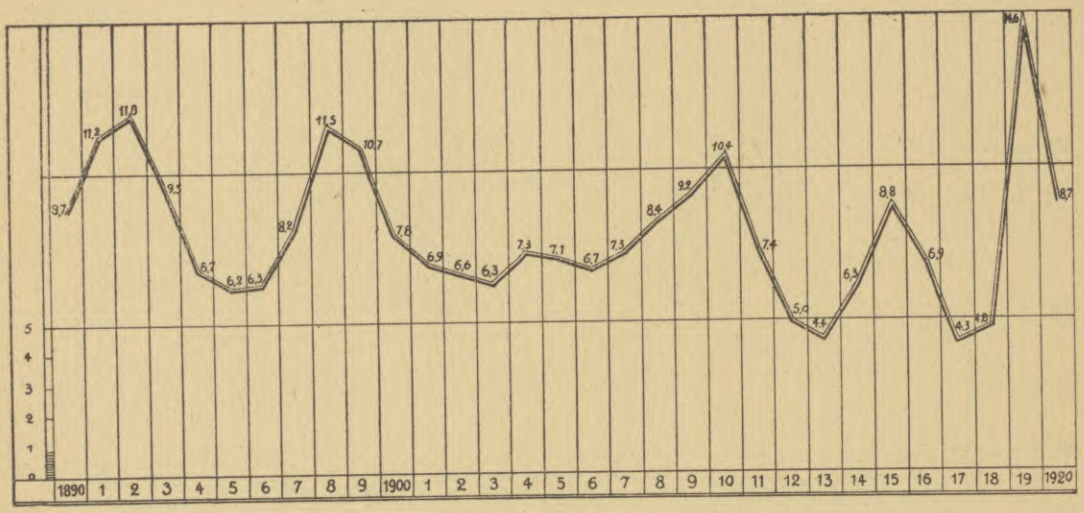
2. **Typhus.** Monthly notifications of cases in Russia in 1918-1920.



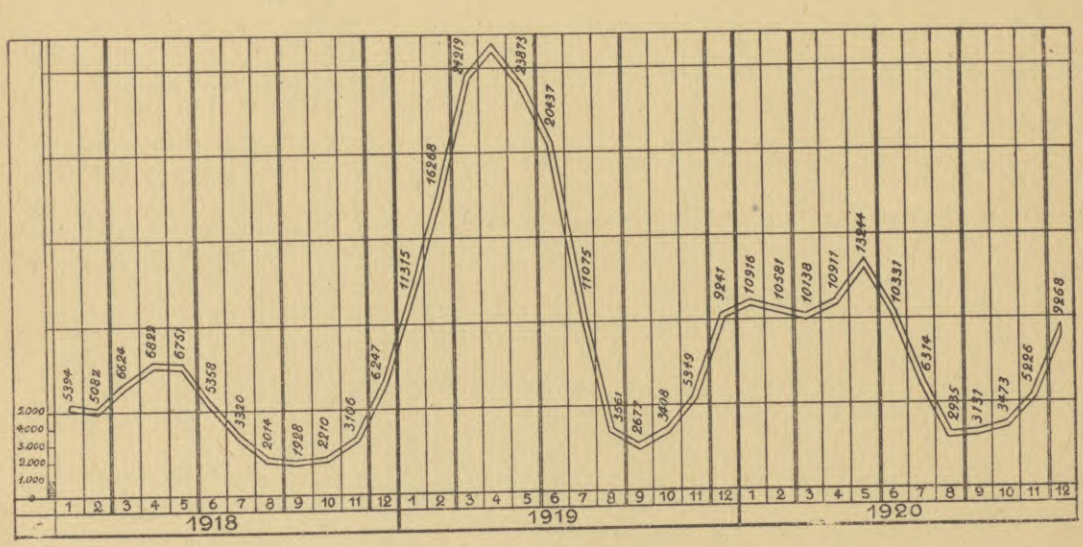
3. Relapsing fever. Monthly notifications of cases in Russia in 1915-1917.



4. Relapsing fever. Monthly notifications of cases in Russia in 1918-1920.



5. Smallpox in Russia in 1890-1920. Number of cases per 10,000 of population.



6. Smallpox in Russia in 1918-1920. Monthly notifications of cases.

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