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 II.

CHOLERA - PLAGUE - ENTERIC FEVER - DYSENTERY
INFECTIOUS DISEASES IN CHILDREN
OTHER INFECTIONS - FAMINE AND DEPOPULATION.

N° 5

GENEVA
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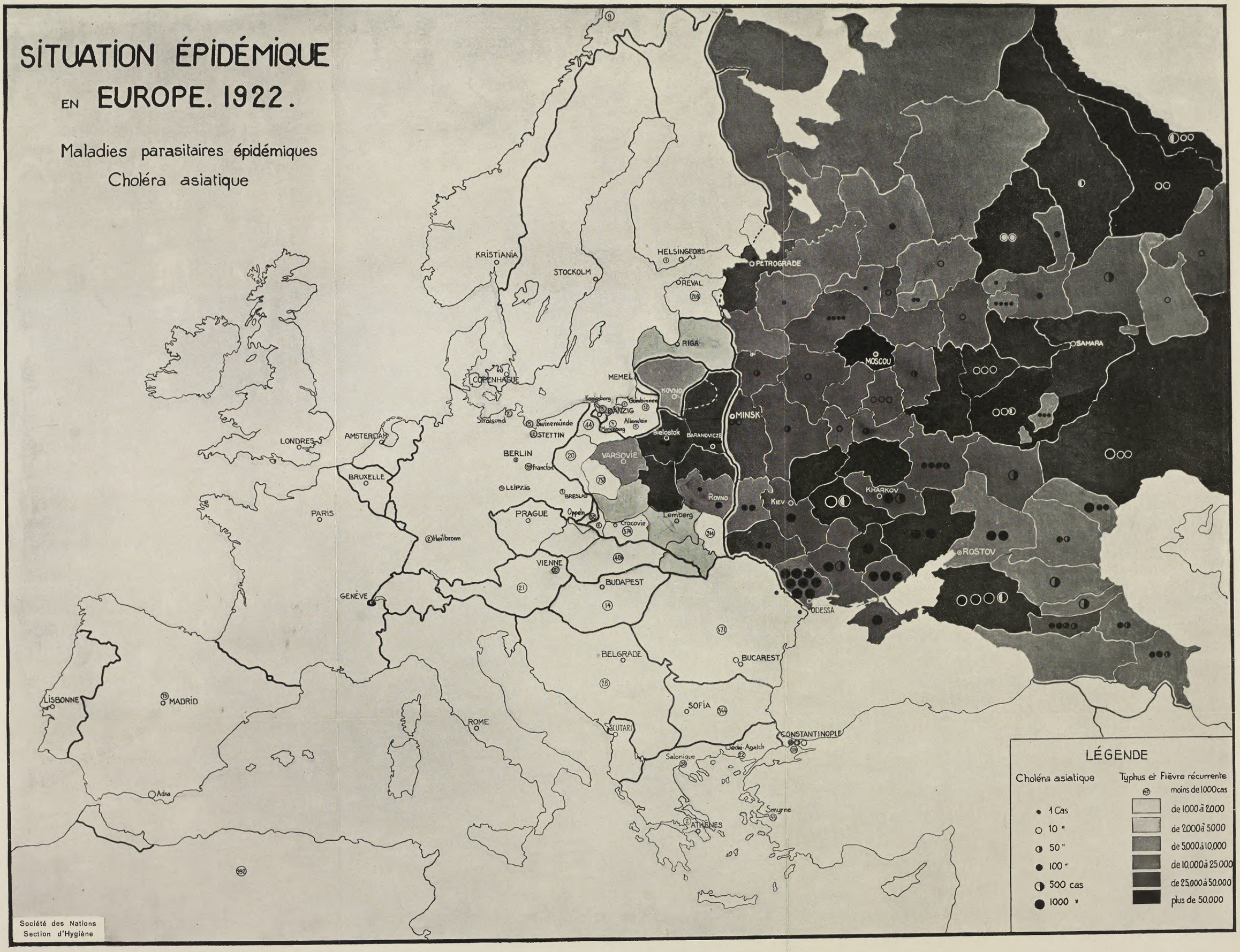
SITUATION ÉPIDÉMIQUE EN EUROPE. 1922.

Maladies parasitaires épidémiques

Choléra asiatique



Société des Nations
Section d'Hygiène

L'incidence du typhus et de la fièvre récurrente dans la Fédération russe et les Etats limitrophes à l'ouest de la Russie, établie d'après les renseignements reçus par la Section d'hygiène du 1er janvier au 29 août 1922, est reproduite sur cette carte par les teintes dégradées. La répartition de ces mêmes maladies dans les pays occidentaux est représentée par les chiffres encerclés. Les autres cercles représentent l'incidence du choléra au cours de la même période.

The shadings on this map represent the incidence of typhus and relapsing fever in 1922 in the Russian Federation and in the States bordering Russia on the west according to information received by the Health Section from January 1st to August 29th, 1922. The circles containing figures indicate the distribution of these diseases in Western countries. The remaining circles represent the incidence of cholera during the same period.

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Report to the Health Committee of the League of Nations

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PART II.

I. CHOLERA.

Russia has been visited by cholera during every pandemic of the disease. Since 1823 up to the present time, that is to say for a hundred years, we have only had 45 years in which we were completely free from cholera. If to these are added the five years in which only one or two isolated cases were noted, we have exactly one half-century of infection and one half-century free from the disease. The total number of cases reaches 5½ millions in round figures, with 2,200,000 deaths, giving an average case mortality rate of 40 %. These figures are far from being accurate, especially as regards the period which precedes the formation of the Zemstvo, but in any case they are more exact than those which we possess for most other diseases. Cholera has the advantage of always attracting general attention and calling forth special measures of a more or less energetic character, one of which is more careful registration. This is especially the case in the twentieth century, including recent years. Although we proposed to employ large coefficients of error in the case of typhus and relapsing fever, it seemed to us, as also to many epidemiologists, that the official figures for cholera could be accepted as nearly accurate, with an error probably not higher than 10 %, sometimes with a falling and sometimes with a rising tendency. Apart, moreover, from these factors, the omissions to register are more or less compensated in some districts by the fact that non-specific cases of acute gastro-enteritis are registered as cholera cases. This zeal for registration may be partly attributed to the fact that notification of cholera in any district leads to the granting of every sort of credit and subsidy, and it is consequently possible to make improvements in the anti-epidemic organisation and the public health service. We propose therefore to accept the official figures as they are, with the exception of those for areas where cholera raged side by side with civil war, and for famine-stricken areas, where the appalling gravity of

the principal evil often causes other evils, however serious, to remain unnoticed; yet even here the amount of error must be much less considerable than in the case of other diseases, including typhus.

One striking fact which appears from Table VI[1] is that in the twentieth century cholera took up its definite residence in our country in what we may almost call an endemic state. During 79 years of the nineteenth century (1823-1901) there were 31 years of cholera and 48 free from cholera, but in the 21 years of this century (1901-1922) two years only (1903 and 1906) were free from cholera, and one (1912) was almost free (9 cases with 3 deaths); the remaining 18 years were all more or less affected by the epidemic. During the years immediately before the war, 1912-1914, conditions were relatively favourable. During the war, in 1915, grave fears were entertained during the great retreat[2], but the later part of that year, and to a greater extent the two following years, passed calmly in this respect. To what must we attribute these vagaries of the disease ? It is difficult to discover the cause with any degree of certainty; the campaign of vaccination energetically carried out in the army, isolation, etc., offer partial explanation, but we are still bound to admit that, in addition to the indisputable influence of prophylactic measures, there are certain epidemiological factors which require elucidation. We will return to this subject after we have briefly described the progress of cholera since the year 1918.

The first cases were registered on April 22nd at Astrakhan and then at Saratov and at Penza; in May, the epidemic began slowly to spread throughout the governments of which these towns are the capitals; in June, the governments of Voronege, Simbirsk, Kazan, Viatka and Riazan were attacked. In July and in August the epidemic reached its climax (16,694 and 16,170 cases), having spread to 30 governments (see relative tables in the first part of the report), and then it began rapidly to diminish. The total number of cases in this year reached 41,115, including 8,470 in Petrograd, which is first on the list. Moscow suffered much less and had only 1,191 cases. After Petrograd came the governments which are situated on the Volga and some others in the agricultural centre, which has suffered seriously from all the epidemics without exception and which, as we have seen above, afforded a rich harvest for typhus and relapsing fever[3]. As we have already remarked in our historical survey, this epidemic gave rise to a whole series of anti-epidemic measures, beginning with attempts to reorganise the system of registration (which had almost entirely disappeared), the vaccination campaign in the army, etc. Very great difficulties were encountered in the carrying out of the proposed measures, particularly on account of the civil war. This last circumstance, which entailed the almost complete interruption of all communications with the districts surrounding the Russian Socialist Federated Soviet Republic, which was then very reduced in size, leads to the assumption that the data for this year, as also for the following year, must doubtless be very incomplete, but at the same time it is impossible and useless to attempt to establish the true figures, as we have tried to do for typhus and relapsing fever. The epidemic was, on the whole, and especially when compared with the others we have described, of a very mild character. The amount of error, then, cannot be considerable, and from a practical point of view it is without importance. Cholera decreased with the approach of winter and did not make any fresh appearances in 1919, except in the government of Penza, which was somewhat seriously affected and which furnished

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[1] " Cases and deaths registered as due to cholera in Russia from 1823-1920 " (L. Tarassévitch: *Epidemics in Russia since 1914*, Part I). *Epidemiological Intelligence*, No. 2, March 1922, page 39.

[2] The governments which were situated in the vicinity of the Western and South-Western Fronts were most severely affected: the government of Minsk, 6,054 cases; of Volhynia, 6,436; of Mogilev, 4,075; of Kiev, 2,868; of Tchernigov, 2,066, and of Tambov, 1,191. In 1916, with the exception of isolated cases in Russia, there were small foci in the Caucasus and in Bessarabia.

[3] For details concerning the progress of cholera in 1918, see the *Bulletin of the People's Health Commissariat* 1919, No. 5-6, pages 20-25.

more than a quarter of the total number of cases for the whole of the Republic — 1,184 out of 4,132 cases. In 1920, it was again on the increase, showing 17,824 cases (excluding the Ukraine, Northern Caucasus and Siberia).

One of the regions most affected was that surrounding Rostov (4,030 cases) and the governments of Kursk (3,418), Kharkov (2,257), Kherson (1,899), Voronege (1,575) and Orel (1,170). Petrograd, on the other hand, was completely spared (6 cases only). The total (17,824) is not very high, especially when it is remembered that the registration service was working better this year than in the years 1919 and 1918, and that the figures are more complete. In 1921, the rise continued, and there were 176,885 cases among the civil population and 5,837 for the army, giving a total of 182,722 — nearly ten times greater than in 1920. Deductions, however, must be made from this proportion because in 1921 we have data not only for the Russian Socialist Federated Soviet Republic, but also for all the allied Republics; nevertheless, the amount of error cannot be very considerable. In any case, there can be no doubt that the epidemic of 1921 reached far more serious proportions than that of 1920. This time cholera made its first appearance in January in the government of the Don and at Rostov, that is to say, in the same region in which it was most prevalent during the preceding year. In April we find it in the Ukraine, in Northern Caucasus (Kuban) and along the various railway lines; in May the town of Voronege and its whole government was seriously attacked; from the month of June it greatly increased in the districts where it made its first appearance and it also spread along the banks of the Volga, particularly to the governments of Samara, Saratov and Astrakhan, as is shown in the attached full and detailed table of the monthly geographical distribution of cholera in 1921.

Cholera reached its climax in July, in which month nearly one-half of the total number of cases for the whole year were registered (85,751 out of 182,722). In August this figure decreased by more than one-half and in November and December we come back to relatively low figures: 254 and 305. In November, more than one-half the cases occurred in the government of Ufa and in December almost all (299 out of 305) in the Ukraine.

The greatest intensity was first reached in the region of the lower Volga, but from July onwards cholera spread mainly in the direction of the east, where it reached its greatest development in the government of Ufa and in the Republics of Kirghiz and Bashkir (17,735, 12,890 and 12,443 cases respectively). This progress of the disease is fully explained by the movements of refugees leaving the famine areas and proceeding in the direction of Siberia in search of food; large numbers of these refugees died on the way and spread the germs of the various diseases which they had brought with them from the lands of death and desolation which they had just left. Among these germs were cholera vibrios, since cholera was raging at this time in the famine area itself. It will be noticed in the same table representing the monthly and geographical distribution of cholera in 1921 that the number of cases on the railway lines was very considerable (20,017).

Such has been the general progress of cholera during the last four years. It may be well to add to this report some information which we have been able to collect concerning, in the main, districts which were not included in the statistical tables. We will only quote a few examples referring to the foci of which we possess more or less accurate data. This will suffice to give an approximate idea of the state of affairs. We will begin with the town and government of Ekaterinoslav, which are not shown in the statistical tables before 1921. We have no data for 1918, but documents relating to the following years have been fairly carefully collected.[1] Thus, in 1919, cholera lasted four months

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[1] Grigoriev : *Cholera at Ekaterinoslav in 1919 and 1920*, with tables, diagrams and charts; Ekaterinoslav, 1921. Kazanski ; *Cholera in the Government of Ekaterinoslav in 1920;* the same, 1921; Manuscripts.

(June to September), 90.8 % of the cases occurring in June and July; the epidemic disappeared almost as quickly as it had appeared. In 1920 it assumed a milder character, but lasted longer (six months) and displayed a more even progress. On both occasions the majority of the cases occurred at first among travellers and soldiers, who brought the disease with them. The epidemic then attacked the inhabitants of the town, who furnished three-fourths and more of the total number of cases.

A fairly considerable number of cases is noticeable among the staff of the hospitals, a fact which indicates that the hospitals were not working efficiently. This last consideration also explains why a number of patients remained in their homes, particularly in 1919, when the proportion was 128 out of 598. In 1920, this proportion changed and out of 259 cases only 3 were treated at home. In the majority of cases a bacteriological examination was possible (in 68.4 % in 1919 and 86.8 % in 1920): this gave positive results in the ratio of 72.4 and 45.7 % respectively. The mortality in 1919 reached 54.7 % among patients, the bacteriological examination of whom had given a negative result, and 93.2 % among those who had given a positive result. In 1920, the severity of the disease considerably decreased and, taking the two sets of cases as above, the mortality reached 46 % in the first category and 48.5 % in the second. This difference may partly be explained by the decreased virulence of the vibrio in this year, by the fact that hospital arrangements and the treatment of patients in 1919 (during which year Ekaterinoslav changed hands several times) were more defective, and finally — the explanation which appears to us to be most probable — by the fact that the registration arrangements were being far less effectively carried out in 1919 than in 1920: the milder cases were passed over more or less unnoticed and only the more serious cases were registered. Among prophylactic measures, Grigoriev lays special stress upon health propaganda energetically carried out and particularly on vaccination with divaccine, although the civil population did not show much eagerness for vaccination. We have already spoken about the hospital arrangements for the patients. As regards other measures, Grigoriev does little more than briefly indicate what the local medical body desired and proposed, but he makes no clear statement as to how these desiderata and proposals were carried out.

In the government of Ekaterinoslav, cholera attained a lesser development than in the town. In 1919, there were only 435 cases, although the population of the government is much greater than that of the town; the district of Ekaterinoslav was the one most severely affected (280 cases). This indicates the situation of the main focus for the whole government. It must be noted that it was not possible to prove a water-borne origin of the cholera epidemic in any place, and that the epidemic was propagated everywhere by direct contact and by carriers. Prophylactic measures were harder to carry out in the rural districts and were in fact carried out to a lesser extent than in the main town. In the rural districts they may be said to have been practically non-existent, but the most interesting aspect of this example is that, in spite of the extremely difficult condition in which the population was situated, and circumstances entirely favourable to the spread of the epidemic, cholera only developed to a very limited extent, especially when compared with typhus and with relapsing fever, which accounted in these same districts for tens of thousands of cases. We must therefore seek for the explanation of this slight development and rapid cessation of the epidemic, not merely in the action taken, but in certain epidemiological conditions connected most probably, in the first place, with the properties of the vibrio itself.

In Odessa[1] in 1920 there were 421 cases of cholera in the town and 231 in the government; and in addition 570 suspected cases in Odessa and 61 in the rural districts. Very few anti-epidemic measures were taken and as, at the same time, the epidemic, as at Ekaterinoslav, was of a mild character, there is a

[1] Aichenwald. "Statistics of Infectious Diseases in the Government of Odessa in 1920." *Contemporary Medicine*, 1921, pages 95-100.

presumption that the same conditions prevailed at Odessa. At Kharkov,[1] and in its Government, there were only certain isolated cases in 1918 and 1919. From 1920, Kharkov has been included in the general statistics, at first with a very limited number of cases and then, in 1921, with a far larger number (1,680, of whom 587 were travellers and 1043 inhabitants of Kharkov); the conditions in general being practically the same as those in the above-mentioned cases.

The general conclusion which may be drawn from these examples is that we have no real reasons for admitting the existence during this period of virulent cholera foci, either in the districts which were in more or less continual and regular communication with Moscow or in those which had been isolated from the capital for a more or less prolonged period of time. The progress of the epidemic was practically the same everywhere.

Just a few words more concerning cholera at Rostov and at Moscow.

As regards Rostov,[2] it may be noted that this town and its district come as one of the first on the list in the severity of their cholera epidemics from 1830 until 1872; after that they hand over this gloomy precedence to the regions situated along the Lower Volga. During the war this district was spared (14 cases in the course of three years). In 1918, there were 282 cases at Rostov itself (there are no data for the district), and in 1919 there were 390 cases. In 1920, the epidemic commenced to develop and in the Don Government there were notified 1,951 cases, of which 1,282 cases were in Rostov. This is, however, a very small number of cases when previous epidemics are borne in mind; the same explanation may be offered here as was advanced in the case of Odessa, Ekaterinoslav, etc. In this case there was a distinct predominance of the epidemic among the military, while the civil element remained relatively untouched. Another interesting fact is that the epidemic occurred in two periods, the first from March until May, reaching its climax in April, and the second and more severe from July to October, reaching its height in August. The mortality, with an average of 43.6 %, was subject to great variation at different periods. It was very high at first, and subsequently it decreased progressively, a fact which suggests that the virulence diminished progressively and rapidly. Thus we have:

Month	Mortality
March	72 %
April	59.5 %
May	54 %
June	44 %
July	41 %
August	40 %
September	35 %
October	15 %

In Moscow[3] we have in 1918, 1,004 cases; in 1919, 79 cases; in 1920, 83 cases; and in 1921, 312 cases. The duration of the epidemic, which varied slightly according to the years, was on an average 27 weeks. The cholera was imported each year by refugees, by "mechotchniki" (sack carriers) and by the military; it did not spread to any extent, and was propagated entirely by contact. Relying mainly upon the statistical data, the author remarks that: "It must be admitted that there were

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[1] Igoumnov. « Report on Sanitary Conditions in Kharkov and its Government." Manuscript.

[2] Minervine. "Epidemiology of Cholera in 1920," *Rostov: Epidemiological Reports*, 1921, pages 223-238. This report also contains contributions on the Clinical Aspect of Cholera, the Properties of the Vibrio, etc.

[3] D. E. Ivanov. « Cholera in Moscow in 1918, 1919 and 1920." *Moscow Medical Journal*, 1921, No. 2-3, page 86. The same. "Cholera in Moscow in 1921," No. 4-5, pages 108-110.

conditions which were unfavourable to its development and which protected the population." He also calls attention to the fact that of all diseases cholera is the one which is registered with the greatest care and precision, although, as he adds, procedure is not always entirely satisfactory, owing to lack of means and competent staff.

In the government of Moscow[1] there were:

Year	No. of localities infected	No. of cases	Deaths
1918	180	740	120
1919	3	46	16
1920	25	172	69
	208	958	205

Here, too, it will be seen that the development of the disease is slight and at the same time the mortality is quite low and less by more than half than that in the south of Russia. The disease continues to be spread by contact. One special peculiarity which must be noted is the appearance of several foci in the winter, especially at Orechovo-Zouïevo. The author particularly points out that a very energetic health campaign was undertaken and that this may have had the effect of encouraging people to apply careful individual prophylactic measures.

These examples will be sufficient, we think, to complete our survey of the general progress of the epidemic of cholera. We shall now have to consider the action which was attempted or carried out; its effects; and the hypothetical explanations which may be advanced to account for the slight development of cholera at a time when all conditions appeared to be in its favour, and when all the world was fearing it and was expecting it to come in a form resembling the pandemics of the two forms of typhus spread by lice.

We may draw attention here to the fact that, while in the case of these two diseases and of a certain number of others, our predictions and prognostications have proved, unfortunately, to be almost mathematically correct, we were fortunately mistaken, as were many of our colleagues, in our predictions regarding cholera. We feared an outbreak and were prepared, as far as possible, to meet it, but up to the present it has only touched us very lightly, if we compare the number of cases of cholera with those of typhus, of relapsing fever, of malaria, etc. To what cause are we to attribute this consoling fact — at a time when consoling facts are so rare ?

The measures employed to counteract cholera fall under the broad headings of: health propaganda, the most precise and rapid registration possible, vaccination, hospitalisation and isolation of confirmed or suspected cases, attempts to improve the water supply and sewage, disinfection, etc. The execution of the majority of these measures encountered, and still encounters, difficulties which are sometimes insuperable (as already pointed out under the heading of typhus), and their application has therefore, speaking generally, been imperfect and unequal at different times in different places. The health campaign was pursued almost everywhere with considerable energy; lectures and exhibitions were arranged, pamphlets were published, special health and hygiene propaganda weeks were arranged, etc. Except in the districts where civil war was raging and now in districts which are famine areas, registration was more carefully and more precisely carried out in the case of cholera than in the case of any other disease. For this reason, as we have already remarked, the statistics for the incidence of cholera cases may be regarded as practically correct. Vaccination was carried out with great care

[1] G. Diakov. "Cholera Epidemics in the Government of Moscow, 1918-1920," *Moscow Medical Journal*, 1921, No. 2-3, pages 88-93.

in the army, which was vaccinated and re-vaccinated several times, but, except in a few places, it was only rarely applied among the civil population, and the part it played among this section of the community was in fact negligible. The fact that the army, although it had been thoroughly vaccinated, nevertheless showed a certain number of cases of cholera, has caused some renewal of doubts in regard to the efficacy of vaccination. But if the facts are examined closely it will be seen that these doubts are unfounded, and, on the contrary, arguments will be discovered which plead in favour of vaccination. To begin with, the mortality among the vaccinated is less than half that of those who have not been vaccinated. For instance, at Rostov the figures are 20.6 % and 43.5 % respectively, according to Minervine *loc. cit.* and practically the same according to other observers. Igoumnov reports that at Kharkov, out of 12 patients who had previously been vaccinated, no fatal cases occurred; and so on. The incidence of cholera among those vaccinated is also indisputably less, as Professor Stutzer noted in the summer of 1921 at Voronege, when he compared the incidence among the civil population and in the army, or as is shown in the Kiev cholera focus (January 1922), where out of 170 soldiers affected there were 38 who had been vaccinated and 119 who had not been vaccinated. If it be remembered that the number of vaccinated men in the army is equal to and possibly more than 95 % of its whole strength, it will be seen on calculation that the incidence amongst those who have been vaccinated was almost 50 times less than amongst those who had not been vaccinated. We consider that there is no need to dwell further upon this point, which has been satisfactorily established and is not shaken by a few sceptics, such as Friedberger in Germany (*Zeitschrift für Immunitätsforschung*, 1920), and a few of our colleagues. The favourable opinion which we have formed during the war in common with most other physicians is supported by the very convincing documents which Cantacuzène has included in his work on "Vaccination against cholera in Roumania" (*Metchnikov Jubilee*, pages 624-655), and is bound to be upheld, and it should encourage us to work as much as possible for an increased application of this measure, which, for us in Russia, under present conditions, is often the only measure which is possible in practice. Vaccination has recently been subjected to attack on several occasions on the ground that it only serves to increase the number of carriers, and for that reason is harmful. It cannot be denied that, wherever investigations have been made in regard to the number of carriers in recent years, the number has been found to be relatively very high (5, 10, 15 and even more per cent.); it has been observed that the number ordinarily increased with the duration of the epidemic, as is shown in the following table, borrowed from Minervine *loc. cit.*; and that among these carriers there is quite a large proportion of vaccinated. But the inference which should be drawn is, in our opinion, quite a different one: in surroundings where the risks of infection are very great, those who have been vaccinated ingest the vibrios in precisely the same way as do others, but as they have been rendered immune, they remain carriers instead of becoming diseased. This must indisputably be considered as being a considerable advantage. Therefore this last objection falls to the ground.

	Number of carriers in relation to the number of cholera cases (at Rostov)	Number of carriers in relation to the number of cholera cases where diagnosis has been bacteriologically confirmed
May	8 per cent	13 per cent
June	3.4 »	6.5 »
July	3.16 »	7.5 »
August	3.8 »	12 »
September	16.0 »	30.7 »
October	50.0 »	72 »

Treatment in hospital and isolation have been carried out in various degrees in different places and at different times, as can be seen from the data given above in regard to Ekaterinoslav.

It has only been possible to apply other methods in exceptional cases. The water at Petrograd, for instance, was chlorinated and this was also partly done at Nijni and at Twer. This may furnish a partial explanation of a fact (which seems paradoxical, if preceding epidemics are borne in mind) *i.e.*, that in 1921, the number of cases notified in Petrograd was eight times smaller than in Moscow (37 and 312 cases respectively); still, it must not be forgotten that Petrograd, situated as it is at one extreme end of present-day Russia, is only visited by very few travellers, and that for this reason it receives fewer germs than Moscow. Special efforts in the form of "Disinfection Weeks" and "Water Weeks" only produced results in certain places. In the principal focus of cholera, in the towns along the Volga, for instance, these efforts were bound to fail, for the sanitary conditions in these towns have always been bad, and in recent years such water services, drainage, etc., as existed have fallen out of repair or in some cases have been completely destroyed. There were no means of renewing or repairing the plant, because our industry had been destroyed and all intercourse with foreign countries was prevented by the blockade. All efforts in this direction produced little or no result. It must therefore be admitted that it was only possible to act effectively in the army and in certain towns (Moscow, Petrograd, etc.), and that in many cases we were powerless. Where effective action could be taken — in the army by vaccination, in some small outbreaks in hospitals by isolation etc. — it was certainly possible to limit, and sometimes even to prevent, an epidemic outbreak. The really remarkable fact is that this epidemic did not spread very much, even in the places where nothing or next to nothing could be done, and where the conditions, according to all evidence obtainable, were most favourable to the spread of cholera. Our epidemiologists have spent considerable time and energy in attempting to explain these facts, but they are still far from arriving at any final solution. The opinion which is most widely held is that cholera in the twentieth century, and particularly from 1907 onwards, has become endemic in Russia, owing to the bad sanitary conditions in certain regions (towns on the Lower Volga, on the Don, etc.); that the cholera vibrio, failing to find the conditions necessary for its normal development, must have undergone a kind of degeneration, a sort of change in its biological properties and lost a great deal of its virulence. Though it may recuperate from time to time, it never reaches the degree of virulence possessed by the vibrio freshly imported from India, and it rapidly loses virulence; this is why the epidemic outbreaks are so mild and of such short duration. At the same time, the vibrio may become partly acclimatised to Russian conditions and this may be the explanation of the winter outbreaks of cholera, which are so often observed. Our Institute, which receives strains of cholera vibrio from all parts of the country, in order that it may verify them and select those which are most suitable for the preparation of vaccines, has not noted any very remarkable morphological or cultural changes, but changes which affect its virulence may well take place without affecting its morphological character; our hypothesis therefore remains open to acceptance, but it needs to be proved by experiments far more searching than any which have hitherto been carried out. Side by side with this change in the properties of the vibrio, we must assume, and in fact have assumed, the existence of a process of natural immunisation amongst the population. Apart from similar experience in respect of other diseases, our theory can be supported by reference to certain recent research.

For instance, Drs. Mironov and Beliavtsev[1] have conducted experiments under the direction of

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[1] Mironov and Beliavtsev. " Researches carried out with a view to determining the Immunity of the Population of Krasnodar" (as Ekaterinodar has recently been called). Report on the work carried out in Prof. Savtchenko's Laboratory. *Kuban Scientific and Medical Bulletin*, 1921, No. 2-4, pages 75-78.

Savtchenko, who was engaged in seeking an answer to the very question which we have asked (how to explain the mild development of cholera in what seemed to be highly favourable conditions), with a view to determining the existence or non-existence of immunity amongst the inhabitants of Krasnodar. Having examined the sera of 1,247 persons, by means of the Pfeiffer reaction (in vitro, following the modified process suggested by Bordet in 1894), they obtained some very interesting results; in 814 cases the reaction was positive and in 433 cases it was negative — which shows that 65.3 per cent. were immunised and 34.7 per cent. were not immunised. Examining the different groups, they discovered that, among vaccinated subjects the percentage of immunity was 56.2 and the percentage of non-immunity was 43.8, while in the case of non-vaccinated subjects in 1920, the figures were respectively 87.2 and 12.8 per cent. From this they draw the following conclusions:

1. That in Krasnodar, generally speaking, two-thirds of the population appear to possess a certain immunity;

2. That among the non-vaccinated the proportion of immunised is slightly more than half, while among the vaccinated it reaches almost nine-tenths of the total.

This furnishes yet another proof — were it necessary— of the efficacy of vaccination, and explains how it is that certain vaccinated subjects are nevertheless attacked by the disease. We should also add that the bacteriolytic properties of the serum of the vaccinated are more pronounced than those of the serum of non-vaccinated. Finally, the bacteriolytic properties of the serum of the population of Krasnodar are considerably more pronounced than those of recent arrivals. All these considerations are arguments in favour of the existence of natural immunisation. How may this be explained ? An explanation has been provided by the research carried out by Glusman in Prof. Korschun's laboratory at Kharkov (no account has yet been published, but Prof. Korschun has kindly furnished us with information concerning the principal results obtained). The examination of serological reactions in carriers demonstrated the presence of antibodies similar to those acquired by an attack of the disease or after prophylactic inoculation; it leads Glusman to the conclusion that carriers must be considered as patients suffering from abortive forms of the disease-forms which nevertheless leave a certain degree of immunity. It should be noticed that these facts are well supported by the work of Besredka on the vaccination *per os* against typhoid, paratyphoid, and dysentery. (Records of the Pasteur Institute in 1919-1921). When these examples, facts and theories, to which we have briefly alluded, are viewed together, they will be found to lend each other mutual support. Lowered virulence often creates abortive forms (carriers), and these abortive forms produce a relative immunity, so that the epidemic, if it breaks out at all, rapidly disappears of its own accord, through the progressive decrease in its virulence and through natural immunisation. This is a formal statement of the most plausible theory that can at present be formed. We may also mention another theory, which is, so to speak, a secondary one: the type of diet of a large part of the population has undergone a radical change, and this in its turn has caused changes of a pathological nature, especially as regards gastro-intestinal disorders and affections of the liver (see Schervinsky, etc., quoted above)[1]. Among such changes we will draw attention only to the almost complete disappearance of constipation, the decrease in the frequency of liver complaints, the often increased acidity of the gastric juice, etc. All this may well bring about a set of conditions which are relatively unfavourable to the cholera vibrio; the same rôle may be played by the modifications which take place in the intestinal flora, which must necessarily undergo a change when conditions are so radically modified, and so on. Whatever may

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[1] See the Part I of the Report: *Epidemiological Intelligence* 1922, No. 2, p. 22.

be the final fate of all these theories, it is impossible at the present time to furnish any more accurate explanation. At least it can be said that this is the direction in which we must seek the solution of the problem presented by the epidemiology of cholera in recent years. These circumstances have so far caused in the case of cholera a progress far milder than we had been able to expect. But will the same thing occur in 1922? It is difficult to answer this important question with any degree of certainty. There are various grave indications which may well give rise to serious fears: the existence of small foci during the whole of the winter and their ever-increasing tendency to spread in all directions from the principal focus — the famine area, where the epidemiological situation is all too obscure by reason of the general disorganisation caused by the famine. But even if these fears are not justified, this will only afford us partial consolation. The famine is such that a colossal mortality, far higher than that of the preceding years, is certain and inevitable, as is also the spread of the various epidemics for which the famine has created such extraordinarily favourable conditions, by diminishing and often completely destroying all means of resistance, natural as well as artificial. A large number of the inhabitants of the famine areas are, one might almost say, irrevocably condemned to death. Can the form their death will take be of any importance to these poor wretches? They would perhaps even prefer to die from cholera than from famine; they would certainly suffer less and they would find it a more natural death. Neither doctors nor medical science can save them nor help them in their present state. They must be supplied in the first place with foodstuffs and the other elementary necessities of life (fuel, clothes etc.); only afterwards can we speak of effective medical assistance. Otherwise, doctors sent to these regions of death and of desolation would only themselves fall useless victims. What must be done to accomplish this immense task and how must it be done? The answer to so serious and tragic a question lies outside the scope of our Report; it is not merely a work of humanity and science, but it is also intimately connected with political, economic and social questions, which we cannot consider here. Nor do we desire to attempt a description of the disasters and horrors which dominate life east of the Volga and many other districts which have also been attacked, the number and extent of which cannot fail to increase; our pen would be powerless to portray them, and, moreover, the reports of members of the various foreign missions — above all, those of Fridtjof Nansen — have made the situation in Russia sufficiently known to the whole world.

Turning again to purely medical questions, we must point out, in the general interests of Russia and of Europe, that everything possible ought to be done, and this at the earliest moment, to prevent the dissemination of the epidemics, above all of cholera and of plague, and that there is no more time to be lost. [1]

II. PLAGUE.

Happily, plague has so far spared us. There have been epidemic foci on the borders of Russia, in Manchuria, on the Afghanistan frontier, and in the Caucasus; but as all the facts relating to these foci are doubtless much better known to the Health Organisation of the League of Nations, and, therefore, to the medical world in Europe, than to ourselves, they need not detain us here.

In the interior of the country there have been only a few cases, no more than usual, in the Kirghiz

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[1] The medical literature dealing with cholera has latterly been far less ample than that dealing with typhus, both the practical and theoretical reasons for the difference being quite comprehensible.

Steppes. These, as has long been usual, have been confined to their places of origin. There have also been certain instances of panic. Thus, during the epidemic of Spanish influenza, pneumonic plague was frequently suspected and reported even in Moscow, and to a much greater extent elsewhere. On each occasion these alarming rumours were quickly refuted by expert enquiry. During the years that followed, foci of plague were reported in the governments of Samara and Voronege, but these panics were short-lived, though they entailed the despatch of special missions. The last panic was in September 1921, when the rumour spread, particularly in Odessa, that an epidemic had broken out on the ships navigating the Black Sea, and that it had already produced 400 cases. There was great excitement, and it was even proposed to set up at Odessa a special Centre and Scientific Institute to combat the plague. Happily, the report of these 400 cases was soon reduced to one case, and the panic ceased.

From our point of view, these rumours seemed mistaken from the very first. Such an epidemic could not pass unnoticed in Europe — wireless and newspapers would certainly bring us news of it; moreover, it was doubtful whether the crews of all the ships on the Black Sea amounted to as much as 400 men.

Finally, in January 1922 we received a telegram from Dr. Nikanorov, Chief of the Plague Laboratory at the Bacteriological Institute at Saratov, notifying 23 suspected cases in the Kirghiz Steppes.

Nikanorov set out to investigate these rumours and to take necessary steps. Even if the rumours are confirmed, the matter should not cause excessive apprehension. The appearance, particularly in winter, of small foci of plague in the Kirghiz Steppes is almost a regular occurrence. Up to the present these foci have always been localised, thanks to their remote situation and the slowness of communications due to the bad condition of the roads and other communications and the manner of life in these regions; the medical organisation established in these Steppes with the special object of combating plague has also contributed to this isolation. We must hope that this time affairs will take the same course. If plague began to spread under present conditions, the damage would undoubtedly be enormous, and might revive memories of the Black Death of the fourteenth century. So far, however, such fears seem to us unjustified, particularly as it is possible, even under present conditions, to keep control of a small restricted focus. [1]

We think it desirable to add a summary of the data collected by the Sanitary and Epidemiological Department (Dr. Bloch) concerning plague during the last few years.

1. *Plague in Manchuria and in the Far Eastern Republic.*

The epidemic appeared in Manchuria at the end of 1920, and began to spread from March 1921 into the D.V.R. (Far Eastern Republic) at Nikolsk-Ussuriisk, Vladivostok, etc.

In August, 5 cases were noted along the line of the railway (in the D.V.R.). Between September 15th and October 19th there were 11 cases and 8 deaths in the village of Mulino.

2. *In Turkestan.*

In June 1921 there were isolated cases on the Persian frontier; 15 cases and 15 deaths were notified.

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[1] For the organisation of prophylactic measures, etc., see the decisions of the Fifth Bacteriological and Epidemiological Congress (Moscow, May 25th to 31st, 1921). Special stress has been laid: (1) on the necessity of forming a scientific centre for the control of plague at the Scientific Institute of Public Health, to direct and co-ordinate the campaign against each focus as it occurs, and to keep in constant touch with local institutes and laboratories; and (2) on the necessity of forming an International Commission for the same purpose in Manchuria, where the situation inspires most apprehension.

3. *In the Kirghiz Steppes.*

1914-1916: no data.

November 1917 to January 1918: in the 2nd district, 87 cases of pneumonic plague, with a mortality of 94.25 %.

January 1918: in the Dossanga region (Astrakhan railway), 60 deaths; Kaisatskaya area, 30 deaths.

June-July: Kamish Samara Steppe (90 versts from Novo-Kazanka), 8 deaths.

September: Kur-Kule, 23 cases, 21 deaths.

1919. Spring. Naryn district, 14 cases, 12 deaths.

June: Slonikino-Government of Uralsk 685 versts from the railway, 4 cases of bubonic plague clinically established, no bacteriological examination. (See the report of Drs. Bedrikovski and Birguer, and the communication by Diatroptov to the Bacteriological Congress of April 28-30, 1919: *Bulletin of the People's Health Commissariat*, 1919, Nos. 7 and 8. For the Batum plague outbreak: Pr. Shirokogorov, "Plague Epidemic at Batoum," *Bulletin of University of Batoum*, 1921, No. 1.)

The report was completed when we received news which made the situation seem a little more serious but without giving rise to excessive apprehension. On February 22nd, 1922, Dr. Nikanorov, having returned from his mission, made a verbal report to the Sera and Vaccines Commission,[1] of which we propose to give a short summary, as the question is of such great importance.

The report relates to the focus mentioned above: which is situated at Karamïa, 8 versts from Talovka[2] (56 versts from Alexandrov Gay). The first cases of bubonic plague appeared at the end of August 1921, but remained unnoticed, owing to the fact that famine and cholera were raging at the same time in those places, and were producing a heavy mortality.

Up to December 19th the inhabitants of the Kirghiz region, who are accustomed to plague and know its symptoms, noted 23 cases (16 deaths, 6 recoveries and 1 case found convalescent by Nikanorov on February 8th). The enquiry made by Nikanorov established that in 18 cases the plague was bubonic, in 3 cases pneumonic, in 1 case mixed and in 1 case cutaneous. On the same day, he noted 2 more suspected cases in the same families. All of these 25 cases occurred in 3 families consisting, of 27 persons (11+9+7); the population of the village was 150. Nikanorov attributes this restriction to the fact that the inhabitants, knowing the symptoms of plague, took the necessary steps at the beginning for the isolation of these three families. They entrusted the care of the patients to two old men, who ultimately succumbed to pneumonic plague; their place was taken by a young woman, who was also taken ill during Nikanorov's stay. The appearance of this focus, he says, is to be attributed to an epizootic among the field rodents which took place in August and produced a high mortality, particularly in the fields belonging to these three families. The fact that plague remained thus restricted for more than five months justifies us, without doubt, in continuing to hope that the danger will not spread.

Unhappily, there are certain circumstances which inspire apprehension. The medical organisation which had formerly existed in the Kirghiz Steppes was completely destroyed by the civil war which raged in these regions, and it is therefore more difficult now to obtain reliable information with

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[1] The Sera and Vaccines Commission, whose purpose is to control and supervise, from the scientific point of view, the production of sera and vaccines, and to organise vaccination campaigns, was formed in 1915 by the Medical Organisation of the Union of Zemstvo. Disbanded in 1917-1918, it was again set up by the People's Health Commissariat as an organ of the Health and Epidemiological Department, composed of experts and representatives of that department. The Commission elects its own Bureau and President. (Tarrassevitch).

[2] There have previously been plague foci in this place in 1900 and 1913.

regard to events in the interior of the Steppes, and there are fewer preparations for combating the foci in their early stages. At the same time, the famine has changed conditions of life by producing movements of large numbers of people such as had never been experienced before in these parts; the drifting population come in search of food or are engaged in the trade in salt from the salt lakes, and they may contribute to the dissemination of the disease. There is another danger. The inhabitants of the Kirghiz have eaten all their cattle and have only one hope for the coming spring, *i.e.* to live on rodents when they come out of their holes about the end of March. In case of an epizootic outbreak among these rodents, it is easy to realise that the danger of an epidemic will become very grave. The Sera and Vaccines Commission took a very serious view of these facts and considerations, and forthwith drew up a scheme of immediate action in the existing focus, to be applied also as soon as possible on the borders of the Steppes. This scheme was submitted to the Commissary of Public Health, who accepted it and ordered the immediate application of the steps recommended — the establishment of medical supervision, particularly at the junctions between the main roads and railways; the utmost speed in communicating information[1]; the suspension of railway traffic if necessary; isolation; disinfection; transfer of a special laboratory to Alexandrov Gay, etc.

III. ENTERIC FEVER, DYSENTERY, ETC.

Having considered in a somewhat detailed manner the epidemics which, for the moment, are of the greatest importance to us as well as to Europe, we will pass under rapid review others which, often quite wrongly, inspire no great fear; for this very reason, there is sometimes an almost entire absence of even the most elementary data regarding them. We will begin with infections of gastro-intestinal origin, which have kept almost level with cholera during the last few years, and which are, in relation to those which follow, more carefully registered.

A rapid glance at the graph, which shows the progress of the five epidemics during the last 32 years (1890-1921), is sufficient to demonstrate what an important position typhoid fever and dysentery occupy in our epidemiology. No statistics exist concerning the paratyphoid group; they are registered sometimes under the heading of typhoid fever, sometimes under that of undetermined typhus [2], and sometimes as gastro-intestinal infections, etc.

It will be seen from the tables (Part I of the Report) and the graph that typhoid fever and dysentery follow an almost identical curve. It will be noted that they increase in 1892 (famine), that they decrease during the years which followed, and that there was a new rising wave from the

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[1] Great stress has been laid upon this point owing to the fact that nearly five months elapsed after the appearance of the focus in question before its existence became known to the local medical organisation and to the Health Commissariat — a quite abnormal state of affairs, which is inexcusable and must not occur again.

[2] This is a heading under which are placed the cases where the diagnosis has not proved exactly whether they are typhoid fever, typhus or some other of the infections which accompany a typhoidal state. The proportion of these cases is fairly large. In Odessa and its government, in 1920, we find, out of 10,132 cases of typhoid fever, 7,969 cases of undetermined typhus. It is worth while drawing attention to the fact that the Medical Scientific Council, at its meeting of February 17th, 1920, unanimously expressed itself in favour of the introduction of the latest French system for the classification of diseases, a step which would facilitate the exchange of data and epidemiological intelligence regarding the incidence of diseases and mortality.

year 1904 onwards (partly due to the improvement of the statistical service); the sudden, remarkable and considerable decrease from 1915 onwards will also be noticed. We have already paid special attention to this point in Part I, Chapter 2, and we have shown that this amelioration during the war must be considered as being if not totally fictitious, at least largely so. Its explanation lies in the fact that our medical organisation was becoming increasingly disorganised, as a result, first of all, of the decrease in the number of doctors, then of military service, and, finally, of the general disorganisation from 1917 onwards. For this reason, the portions of the curves which refer to the period 1915 to 1918 are indicated by dotted lines, but there can be no doubt that the years 1915 to 1917 are much better than the following years, as is shown by the curves themselves, which, although they continue to be based on very incomplete data, still keep rising, especially from 1918 onwards, while in 1920 they exceed the level reached in 1892. During the years 1918 to 1921 we have the following figures for typhoid fever and dysentery:—

	1918	1919	1920	1921
Typhoid Fever	109,264	252,066	424,481	406,389
Dysentery	59,750 (?)	137,169 (?)	324,389	220,093

These figures are certainly very incomplete, but it is much more difficult to estimate in this case the coefficient of error and the real incidence than in the case of typhus and relapsing fever, which are followed and registered with much greater care, and have shown far closer uniformity both in respect of their distribution and intensity.

On referring to Table 8 (Part of I the Report), it will be seen that typhoid fever has had, and continues to have, favourite areas, which always remain the same: the governments of Voronege, Kursk, Mogilev, Orel, Perm, Saratov, Samara, Tambov, Kharkov, Kherson, etc.; in several of these governments the incidence in the period 1919 to 1921 appears to be less than before the war, but in reality it is certainly greater: the apparent decrease is to be explained by an unsatisfactory registration and by changes in territory and population, brought about by administrative changes; some of the old governments are now divided up in such a way that direct comparison with former data becomes difficult. The considerable decrease in typhoid fever in Petrograd, which was always one of the most important endemic centres, is an exceptional and remarkable fact which is extremely noticeable. The population of Petrograd, it is true, is now three or four times less than before, but as the incidence of typhoïd fever in recent years has been forty or fifty times less than formerly, other explanations must be sought. These, for the time being, we will refrain from attempting to discover, since we have only theories to work upon, which we are trying to verify[1] and our work is not yet complete.

In any case we are bound to draw the two following conclusions: (1) typhoid fever and the dysentery group are at higher levels than before the war; (2) their increase in comparison with that of typhus and relapsing fever is only very slight.

In support of the first fact, the reason for which is not far to seek under present conditions (deterioration of water supplies and canalisation, lack of supervision of the food for sale, general dirt, etc.), we may advance not only statistical data, but the opinions of all the bacteriologists and epidemiologists of whom we have made enquiries, especially as regards the autumn of 1920, and in part also 1921 (see

[1] It is a curious fact, difficult to explain, that here in Moscow we are far less adequately informed of what is happening in Petrograd, even from the scientific point of view, than in respect of far more distant towns, such as Kharkov, Odessa, Rostov, and all attempts at perfecting our information remain up to the present fruitless.

below the section dealing with our Enquiry, etc.), as well as our own personal observations, which are not very numerous, because we are not engaged in practice, but which are, nevertheless, characteristic; the case, for instance, of a family of seven in Moscow, father, mother and five grown-up children, all of whom, except the father, had typhoid fever within the period October-November 1921. Our colleagues in practice tell us that cases of this description are by no means exceptional. It is more difficult to understand why, in the above-mentioned conditions, these infections do not develop more. This cannot be attributed to prophylactic measures, for in the case of typhoid fever there is only vaccination [1], and in the case of the dysentery group there are no possible prophylactics. We shall have to look for explanations of a purely serological and epidemiological kind. Typhoid fever and dysentery have always existed in this country, showing an incidence according to official statistics (without any coefficient of error) which exceeded an average of 25 per 10,000. A considerable fraction of the population, therefore, must, from this very fact, be rendered thoroughly immune for the rest of their lives. Another fraction — the amount of which it is impossible to determine — must have been rendered immune by the fact that they have been carriers. We have always been of the opinion and insisted, in the light of theoretical considerations and data obtained from experiment and observation, that a certain immunity must be acquired in this way. This can now be asserted almost definitely, following upon the very interesting and important researches which have been carried out by Besredka on the subject of immunisation per os precisely against typhoid fever, the paratyphoid group, dysentery and cholera, and following upon the investigations which have been carried out in the Savtchenko and the Korschun laboratories (see, above, the Chapter on Cholera). Finally, the vaccination and re-vaccination carried out in the Army since 1915 must have partly contributed to similar results. It is possible, in addition to these considerations, which are founded upon positive facts, to seek for and to admit others, which remain, for the present, hypothetical [2], but this is not the place and time to deal with them.

The average mortality from typhoid fever is about 10%. Its clinical progress offers numerous special symptoms: a marked tendency to relapse, very pronounced nervous phenomena, and often true meningitis, the slow development of antibodies, etc. [3]. We have no data, even approximate, in regard to the spread of the paratyphoid group. During the last few months information has reached us as to the existence of paratyphoid B in the Ukraine and the Caucasus, but no definite details. On the other hand, several reports have been received concerning complications caused in relapsing fever by a new paratyphoid-bacillus (see below: New Infections).

Practically, the same lack of data and the same uncertainty exist in the case of the dysentery group; we possess certain statistical data, it is true, but to what precise forms they refer it is impossible to say. In Petrograd there was an epidemic mainly due to the Flexner type; in the north of the Caucasus many cases (Zlatogorov) were noted in the summer of 1921, in which only streptococci, practically in almost pure culture, were found in the fæces; there have also been verbal reports on the subject of foci of dysentery infection caused by bacillus paracoli, etc., so that we must not take the heading "dysentery" as referring to an etiological, but rather a clinical entity, and it would be more correct to speak of the dysentery group, than of dysentery.

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[1] If, even in France it is recognised in respect to certain districts, as admitted by L. Vaillant in the *Records of the Pasteur Institute*, 1922, 2, p. 151, that "for the fight against epidemic foci of typhoid fever the only effective weapon is vaccination" — what can one say in the case of Russia, except to generalise this theory? It seems to us so self-evident that there is no need to dwell upon it.

[2] Possible changes in microbes, the role of the intestinal flora, the very interesting investigations of d'Herelle on the bacteriophage, might possibly also be cited.

[3] Sigal. *Contemporary Medicine*, Odessa, 1921, December, pages 101-103.
Veronina. *Archives of Clinical and Experimental Medicine*, 1922, No. 2, etc.

A few words on the subject of vaccination may be added to conclude this chapter, which has been so poor in data, particularly in data which have been verified and investigated with precision [1].

This vaccination is zealously carried out in the army, and very little, if at all, among the civil population. The extension of the practice, in however slight a degree, would only be possible, under present conditions, where the new Besredka method could be put into practice on an extensive scale. It should be noted that, after having employed tetra-vaccine for several years, we have been obliged to propose replacing it by di-vaccine (anti-typho-cholera vaccine), for the following reasons:—

(1) Absence of data as to the existence of paratyphoid fevers A and B in the epidemic state;

(2) Certain information to the effect that the vaccine *(a)*, in the case of paratyphoid fever, is less efficient or perhaps not efficient at all.

(3) Above all, the difficulties encountered by our bacteriological institutes in the speedy preparation of these vaccines in sufficiently large quantities [2].

The preparation of tetra-vaccine requires more time, more glass,—which was sometimes entirely lacking in our laboratories—and, finally, as has been shown in practice at our testing establishment, tetra-vaccine is more often contaminated and unfit for use.

When working under such extremely difficult conditions we must consider ourselves fortunate if we succeed in doing what is most necessary or indeed essential. For this reason, the Congress of Bacteriologists accepted our proposal, and recognised that the use of di-vaccine must remain obligatory for the army, the medical staff and certain categories of the population; and that the use of anti-paratyphoid vaccines is only optional, and only becomes obligatory when the existence of corresponding epidemics is bacteriologically proved.

IV. INFLUENZA AND INFECTIONS OF THE RESPIRATORY TRACT.

Influenza has always been very widespread in Russia (see Table 1 Part I of the Report). Its frequency may partly be explained by the fact that under this heading is registered not only epidemic influenza, but many similar maladies, the differential diagnosis of which is not always easy. In 1916 and 1917, there was practically no registration of influenza, but it was renewed in the autumn of 1918 during the epidemic of the so-called "Spanish influenza." For the last four

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[1] The continual presence of these diseases and familiarity and habitual contact with them are already creating a certain indifference to them, so that, more and more, what little time, energy, competence and means remain are being expended on epidemics, such as typhus, relapsing fever, cholera, and certain new infections.

[2] Our thirty-three institutes and laboratories engaged in the preparation of vaccines should produce, according to the plans of the Central Service and Vaccine Commission, 11,000 litres of vaccine per month, but they have not always reached this figure.

months of 1918 we have, for the Russian Social Federated Soviet Republic of that time, the following figures :

September	133,412
October	549,849
November	329,722
December	110,187
	1,123,170

For the whole of the year we have only 1,238,973, that is 169.7 per 10,000, considerably less than before; in reality it must certainly be more, but how much more it is impossible to decide. The epidemic attracted general attention and caused considerable fear, partly under the influence of alarming rumours brought from Europe, and partly through confusion, in many cases, with pneumonic plague. It has given rise to quite a literature of its own.[1] But after the rather rapid decrease of the epidemic it was quickly forgotten, as all attention was drawn to other more important and serious subjects. In 1919 there was no registration of influenza. For the year 1920 we have the lowest figure since 1900; but no conclusion can be drawn from this; the statistics for this year are fragmentary and irregular. Infections of the respiratory tract are only registered in certain places, but their frequency was considerable, and this is partly explained by the insufficiency, and sometimes the entire absence, of heating, clothing, etc. To quote an example, during the second half of 1919, in Petrograd, pneumonia (fibrinous and catarrhal) was the principal cause of death: 3,206 deaths out of a total of 25,464, or 12.6 % of the whole mortality. During this period influenza was only responsible for 676 deaths or 2.4%). The average mortality caused by the pneumonic group for the years 1911-1913 (for the second half of each year) was equal to 24.9 per 10,000, and in 1919 it reached the figure of 91.6 per 10,000, that is almost four times as great. Thus, it seems indisputable that the mortality and incidence of infections of the respiratory organs increased considerably.

V. INFECTIOUS DISEASES IN CHILDREN.

The low incidence of such infectious diseases as measles, scarlet fever and diphtheria, appear like an oasis amid the sad and sombre setting of our epidemics. The statistics concerned with these diseases are also, it is true, very incomplete, and the figures have to be more or less modified in the various localities. But apart from these figures, we have the experience and opinion of doctors who are unanimous in proclaiming the relative rarity of these particular diseases. In the second half of 1921, an increase in the number of cases of measles, scarlet fever and diphtheria in various localities becomes noticeable; but up to the present we have, fortunately, experienced nothing similar to the widespread epidemics which appear at the beginning of our report. Attention must, however, be drawn to the

[1] *Vratchebnoie Delo*, Special Number devoted to the pandemic of "Spanish influenza," March 22nd, 1919, Kharkov; a series of articles in other journals which were then still being published and several pamphlets, Reports of Learned Societies, etc. Theories concerning the part played by the Pfeiffer bacillus have been very varied and very widely discussed in our country as elsewhere. None have as yet been definitely accepted, but the number of bacteriologists who deny the part played by the Pfeiffer bacillus has greatly increased.

fact that a quite considerable increase in the seriousness of these cases is often noticeable. Moreover, in famine-stricken localities, measles, in addition to other symptoms (fever slight, general condition grave, eruption mild) is often complicated by noma. We consider this fact to be attributable to the famine.

While with the Metchnikoff expedition on the Kalmuk Steppes (1911), we were struck by the frequency of noma in the case of Kalmuk children suffering from measles. On enquiry into the implications of this phenomenon, we discovered that the Kalmuks have the peculiar and incomprehensible custom of depriving persons suffering from acute fevers of all nourishment as long as the fever lasts, and only giving them water. This lack of nourishment causes, in the case of adults, an extraordinary debility and emaciation. This is a factor predisposing children suffering from measles to noma.

At the present time similar manifestations are observable on a larger scale. The extreme seriousness of scarlet fever has been reported from Tambov etc.; up to the present, however, incidence of epidemic diseases in children is somewhat less than normal, except in famine-stricken areas. This is one of those enigmas which are so frequently met with at present. It might be supposed that there is a sort of antagonism between certain infections, so that a high development of some of them causes a corresponding decrease in others. For instance, typhus and relapsing fever may possibly lower the virulence of scarlet fever and measles. But by what means ?

It is interesting to note that typhus during the last few years has been responsible for a large number of cases among children but in a slight form. This is quite in accordance with the relationship which has long been established between the gravity of typhus and the patient's age.

According to the data of Fedorov for Petrograd and Vinokurov for Odessa,[1] out of 47,333 cases of typhus in Petrograd, 6,291 were children up to 15 years of age, that is 13.3 per cent., and at Odessa 15.8 per cent.; 6,386 out of 40,296. Up to the age of one year cases are extremely rare, but thereafter their frequency increases considerably.

Nevertheless, when it is borne in mind that the number of children of the said age constitutes 38 per cent. of the population, it will be seen that the relative incidence in infantile morbidity is more than twice as small as that of adults.

The following table, which relates to Odessa and to the period January 1919 to June 1920, will help in forming some conception of the mortality:

Age.	Number of Cases.	Deaths.	Percentage.
0–1	46	10	21.73
1–4	523	21	4.01
5–9	2,064	31	1.50
10–14	3,753	44	1.18

Here it will be seen that, except during the first year, the disease is undoubtedly of a mild character. The adult mortality of the same period was equal to 17.79 per cent.

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[1] Fedorov. Statistics concerning typhus in Petrograd during the period 1918-1919 (in the *Agenda of the Conference, February 16th to 19th, 1920.)*

Vinokurov. Statistics of the incidence and mortality in children from typhus in Odessa during the period 1919-1920. *Odessa Reports*, 1921.

As no solid basis has yet been accepted for the hypothesis of the antagonism of epidemics, some other explanation must be sought for. We have already drawn attention to the periodicity manifested in the progress of epidemics. During the last years before the war, the epidemics in children showed considerable increase (see Table I, Part I of the Report), which should normally have been followed by a decreae but the decreases, manifested at present is too prolonged in comparison with the preceding periods for this explanation alone to suffice. Finally, the care bestowed on the children during the last few years might be cited in explanation. As long as the "Save the Children League," which was founded as a result of the efforts of the late M. Korolenko, was in existence — that is to say until November 1920 — (we were a member of its Council and the President of its Medical Committee), we could follow and observe the activities of this excellent private organisation and obtain information regarding the working of the official organisations. Their efforts and the undoubted results which they obtained are worthy of the highest recognition. But these efforts, which aimed at minimising for the children, as far as possible, the unfortunate consequences of the present crisis, are not sufficient to explain the relative rarity of infantile epidemics. It is a question which requires examination, and, above all, a beginning should be made by establishing precise facts — namely, the progress and the distributionof these epidemics.

VI. MALARIA.

Malaria is one of the most widespread diseases in Russia. It has always been incompletely registered, and at present registration can scarcely be said to exist. The following summary gives all the information which we have been able to collect from very incomplete data supplied from a small number of regions:

Regions.	1918.	1919.	1920.
Astrakhan	16,359	—	18,570
Viatka	21,783	11,174	27,871
Koursk	32,269	39,814	28,934
Nijni-Novgorod	14,047	12,186	20,125
Novgorod	1,724	543	183
Riazan	16,940	15,713	2,823
Samara	—	45,999	37,616
Saratov	—	43,574	41,852
Smolensk	2,275	1,467	1,190
Tambov	67,457	41,400	40,224
Tver	1,052	822	2,614
Oufa	—	6,606	12,970
Jaroslav	—	4,251	6,136
Total	173,906	223,541	241,098

We only give these figures to show how completely insufficient they are. If we turn from the figures to the opinions of all the doctors, we find a unanimous opinion that malaria has developed very greatly during the years in question; serious forms (tropica) are met with much more frequently than formerly; it is not exceptional to find them even at Moscow. The epidemic has spread outside its usual limits almost as far as the Polar Circle. In the government of Archangel, on the Northern Dvina, Professor

Ivanov, who spent a month's holiday there in 1921, expecting to be able to study syphilis, and perhaps, leprosy, found nothing during his stay but malaria cases. The war, with its movements of troops and of the population, facilitated the spread of all germs, and the summer being warmer than usual allowed the anopheles and plasmodes to develop and do their work. Reports from Turkestan show a great quantity of violent forms. The patients are often picked up in a comatose condition, and die within the first 24 to 48 hours. The position in regard to prophylactic measures is even worse than in regard to registration; in the whole range of prophylactic measures known to science, only one is applicable in our circumstances: that is quinine, and there has been an almost complete dearth of this medicine since the second half of 1921. A few consignments have been received or purchased, but they are quite insufficient for such large requirements.

VII. TUBERCULOSIS.

The experience gained during the war has shown on a large scale the preponderating influence of under-feeding on the development and progress of tuberculosis, which developed and became more serious in all the blockaded zone, and which, on the other hand, decreased in the Western countries. [1]

The same results were bound to take place in our country when war, followed by civil war and blockade, brought about an economic crisis of a gravity which might be described as exceptional, if not unique, in the history of the civilised world. Further factors must also be taken into consideration: overcrowding in insanitary, badly-heated and dirty dwellings, moral exhaustion, etc. In our reports and communications to learned societies, congresses, etc., we have more than once drawn attention to this factor. We based our comments on theoretic considerations on the observations made in Europe which we have just quoted, and on personal observations, which were not very numerous but were very characteristic; and these showed an increased virulence in tuberculosis, which had previously been in a mild or latent form. The majority of our colleagues were of the same opinion. Some had doubts because the statistics of death from tuberculosis (in certain towns such as Moscow, Petrograd, etc. where deaths are registered in a more or less satisfactory manner) do not show any marked increase, and even in certain cases register a slight decrease, in tuberculosis. At the last conference on tuberculosis held at Petrograd, Novosselski gives the following figures:

Mortality per 100,000 in Petrograd.

Average for periods of 5 years before the war.		Annual average during the war and revolution.	
1879–1883	544	1913	336
1884–1888	516	1914	342
1889–1893	466	1915	361
1894–1898	401	1916	312
1899–1903	390	1917	360
1904–1908	380	1918	370
1909–1913	376	1919	403
		1920	510
		1921	369

[1] S. A. Miller, New York, *Medical Journal*, August 9th, 1919; *Monthly Bulletin Department of Health*, New York City, 1918; quoted from *Annali d'Igiene*, 1920, 3-4.

When it is considered that the general death-rate reached a figure which surpassed all the statistics registered for the last three centuries, it will readily be understood that the first impression given by figures of this kind must be misleading. Famine, typhus and all the other epidemics carry off tuberculous as well as non-tuberculous patients, and very often the tuberculous are the first to suffer. The victims of tuberculosis itself are thus fewer in number, in spite of its increased prevalence and gravity.

What steps are being taken to combat the disease? There are none, and for the present there can be none. In 1919 and in 1920 attempts were made to open many sanatoria and climatic clinics, etc. In the second half of 1920 the increase of famine and the economic crisis practically put an end to all these efforts. In order to stop the progress of tuberculosis it is first of all essential to combat the famine and the general misery, and it is only then that steps of a medical nature can have any effect.

VIII. SYPHILIS AND VENEREAL DISEASES.

There are no statistics in this field and no exact data, but all doctors and specialists are agreed that these diseases are extremely widespread. There have been repeated cases noted of extra-genital syphilis, family syphilis and syphilis in children, but when we ask (and we always submit our questionnaire on infectious and epidemic diseases to all doctors without exception who come to Moscow and visit us for one reason or another) what the approximate percentage of these diseases may be, we only receive very vague replies. Optimists place the figure at 10%; pessimists place it as high as 50%, which is doubtless exaggerated, etc.

There is little doubt concerning the increase of syphilis and venereal disease, but this is all that can be asserted. The situation is aggravated by the decrease in the number of doctors in general and of specialists in particular,[1] by the lack of medicaments in general, and of "606" and "914" in particular. While it is very difficult even under normal and ordinary conditions to carry on an efficient campaign gainst syphilis and venereal disease, it becomes quite impossible in times of such far-reaching social upheavals, and this is a very distressing factor which is likely to affect the future of the race.

IX. OTHER INFECTIONS; NEW INFECTIONS.

Infectious jaundice was observed in the epidemic state at Rostov in 1920, and Ekaterinburg,[2] and several other places. Nowhere has it reached serious proportions, and mortality from it has everywhere been very slight.

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[1] This decrease has been brought about by the heavy death-rate in the medical profession partly also through their having left the country; and as regards specialists, by the fact that since 1914 all doctors are mobilised immediately they terminate their University studies, and sometimes before completing the normal course. Therefore, the training of specialists has almost completely ceased as from eight years ago, and it is only since 1920 that a certain measure of attention has at last been given to this question.

[2] Barykine and Guertzik, Rostov, *Epidemiological Reports*, 1921; Peretz, *Medical, Clinical and Experimental Archives*, 1922, 2-3.

In several cases the same spirochetes have been found as elsewhere and a series of observations have been collected which tend to prove the part played by rats in the transmission of the spirochetes. These spirochetes have produced only mild forms of the disease in guinea-pigs.

Encephalitis Lethargica made its appearance in 1920 in the Ukraine, and in this region more than 100 cases have been observed and described.[1] In November and December of the same year it was noticed in Moscow. This disease has been made the subject of a number of very interesting studies. It caused a certain amount of alarm at first, but this was soon allayed owing to the fact that this encephalitis nowhere assumed the character of a true epidemic. At the beginning there was a tendency to label various affections of very varied character as encephalitis, and this caused the impression that it was spreading very rapidly, but before long it came to be diagnosed more satisfactorily and the number of cases immediately decreased.

Suppurations and Septicæmia are now very frequent. They occur quite often following upon very slight and superficial lesions, and sometimes without any apparent cause. The most ordinary suppurations frequently assume a lingering character and display a very distinct tendency to spread and to invade the lymphatic glands. The furoncles often develop into anthrax,[2] etc. These facts, have been reported to us by many surgeons, as, for instance, by Professors Burdenov, Martynov, and Reïn, by doctors, and by private individuals who often enquired what could be the explanation of similar manifestations which are frequently observed. We have on several occasions received letters from the provinces pointing out that every little scratch suppurates ceaselessly; this has never been the case before. What does it mean? What can be done? etc. The explanation is very simple: under-feeding (some of our correspondents make particular mention of the scarcity of fats); and dirt, which is practically unavoidable owing to scarcity of soap, underclothing, and so on. Pyæmic and septicæmic complications frequently occur in the course of various infections.

Palpebral granulations (Trachoma), which is very common east of the Volga, has also appeared in recent months in Moscow, and the Organising Committee of the forthcoming Congress of Bacteriologists and Epidemiologists has decided to place this question upon the agenda, together with the general problem of parasitic diseases of the skin and scalp (scabies, tinea), the frequent occurrence of which is also causing attention.

Certain indications, particularly the observations of Dr. Zeiss, Director of the German Red Cross Laboratory in Moscow, tend to show an increase in cases of helminthiasis.

In short, with the exception of epidemic diseases in children, it is difficult to find any sort of infectious form which is not more widely distributed and more prevalent than it was in pre-war years. It is the same with domestic animals; there have been frequent cases of glanders and anthrax; there was an extensive outbreak of cattle plague in the East and in the South in 1920 and in 1921, and so on.

Side by side with this extension of ordinary diseases new infections have made their appearance, sometimes in the form of complications arising during the progress of another infection, sometimes independently.

Quite recently Voronina has described, in the Savtchenko Laboratory at Krasnodar, a regular epidemic on a small scale[3] which is very serious, and is caused by a microbe belonging in all probability to the group of septicæmia microbes in animals. Martinovsky was able later to verify three similar

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[1] See *Vratchebnoie Delo* (Kharkov), *Medical Journal, Clinical Medicine* (Moscow). *Rostov Epidemiological Reports*, etc.

[2] Oppel. "Under-feeding from the Surgical Point of View" (*Medical, Clinical, and Experimental Archives*, 1922).

[3] Voronina. "Typhoid Affection caused by a new Microbe" (*Medical, Clinical and Experimental Archives*, 1922, No. 1.)

cases in Moscow. In Petrograd, Professors Kulesha and Ivashentzev[1] have described a complication of relapsing fever observed amongst the refugees from the famine-stricken areas.

This complication, making the prognosis much more serious (mortality from relapsing fever fluctuates in Petrograd between 5% to 12%, while mortality from cases with complications reaches 60%), is caused by a microbe belonging to the paratyphoid group, but differing in many respects from Bacilli A and B, so that Kulesha and Ivashentzev were entitled to name it N. Paratypho-bacillus and the disease "N paratypho-bacillose." The facts reported by all these authors are fairly numerous. The exact definition of the nature of these particular microbes must still be the subject of prolonged research. At any rate, it still remains to be decided what actual agency is at work in these cases, the number of which is bound to increase once attention has been drawn to them. Are we dealing with hetero-infections or with auto-infections caused by representatives of the normal flora of the human body acquiring virulence as a result of the weakening of an organism suffering from under-feeding and all kinds of material and moral misfortunes?

The field for observation and medical study which is opening out at present is as vast as the extent of our present misfortunes. We can at the present moment only give a very hasty and summary description of it.

X. SCURVY.

Scurvy has always existed in Russia. Since the year 1890 we have the following figures (which must certainly be incomplete):

Year	Total number of cases	Number of cases per 10,000 population
1890	82,630	7.1
1891	80,492	6.9
1892	196,970	16.6
1893	101,602	8.5
1894	67,345	5.6
1895	59,300	4.8
1896	68,330	5.5
1897	61,352	4.8
1898	72,376	5.6
1899	154,119	11.8
1900	58,389	4.4
1901	53,646	4.0
1902	100,992	7.3
1903	60,048	4.3
1904	36,362	2.6
1905	30,600	2.1

[1] Reports made to the Conference of the Scientific Institution of Public Health March 6th, 1922, which will be published in the next number of the *Medical Journal.*

Year	Total number of cases	Number of cases per 10,000 population
1906	31,687	2.2
1907	78,830	5.3
1908	44,832	2.9
1909	41,869	2.7
1910	58,799	3.7
1911	65,206	4.1
1912	103,804	6.3
1913	39,260	2.4
1914	20,725	1.9

Two conclusions must be drawn from these figures that there is an increase during periods of famine and bad harvests, and a distinct and progressive improvement since the beginning of the twentieth century.

If we take the war period, Russia in Europe shows in 1914 15,623 cases, and in 1915 22,640. The government of Arkhangel comes first on the list with 2,634 and 3,176 cases. Then follow the government of Perm and the city of Petrograd. There are no data for the years 1916, 1917, 1918 and 1919; the only noteworthy fact is that in the summer of 1917 scurvy was raging on all the fronts.

In 1920 and 1921 there is a very distinct recrudescence for European Russia alone, excluding the Ukraine. Our figures are:

In 1920 – 74,809
In 1921 – 73,458

When the diminished extent of Russia in Europe is considered, together with the absence of data relating to the Ukraine, and the incomplete and intermittent character of the data relating to other places, it must be concluded that scurvy in these years is certainly as prevalent as in 1892. At any rate, if comparison is made between the disease rate for the years 1914 and 1915 on the one hand and 1920 and 1921 on the other, within the limits of the regions concerning which we possess more or less accurate data, a considerable increase is apparent. Thus:

	1914-1915.	1920-1921.
1. Industrial region of Moscow (8 governments)	1,952–1,702	16,345–14,844
2. Agricultural centre (7 governments)	783– 880	14,620–10,163
3. Region of the Middle Volga (7 governments)	1,032–2,848	5,864–22,153
4. Region of the Lower Volga (6 governments)	1,243–2,436	6,960– 6,407
5. Ural region (4 governments)	1,949–3,614	20,189–12,646
The northern region alone with its three governments shows a slight decrease	3,074–4,479	3,137–2,847

XI. EPIDEMIC CHARACTER OF NON-INFECTIOUS DISEASES.

Apart from epidemics properly so called and infections, the present crisis — which should be considered a biological as well as a political and economic crisis, by reason of the disturbances which it has caused in the whole domain of human physiology and pathology — lends an epidemic character to many diseases, morbid conditions and abnormal phenomena in general. We shall make brief mention of a few. We note the exceptional frequency of heart disease; oedema (without albumen in the urine); polyuria, often amounting to incontinence; ulceration of the stomach and the duodenum, to which many surgeons call attention; sometimes perforating ulcers in the large intestine (due to the consumption of oats or badly prepared millet); hernia, amenorrhœa, sexual debility, and frequent affections of the nervous system. Alienists note a considerable increase in mental disease, particularly in forms of degeneracy. In short, affections produced or assisted by insufficient feeding, by an over-worked condition, or by other circumstances unfavourable to life, are encountered at every turn. We prefer to pass over in silence all aberrations of a moral character. However frequent and however serious these may be, they are nevertheless outside the scope of our report; but we may quote one epidemic *sui generis* which was for a time very serious, though it would seem to be on the decrease — namely, an epidemic of abortion. Suicide has also become very frequent.

XII. FAMINE.

The gravity of our epidemic situation, the number of its victims, and the suffering it occasions are as nothing to the horrors of the famine and the extent of the evil which it has already caused, which it is still causing and will continue to cause. It is beyond our power to describe these horrors. The civilised world has received information concerning them from the reports and communications of Fridtjof Nansen and the members of the various foreign missions who are at present working in Russia to help us as much as possible. It will require the pen of a Dante, of a Byron, or of a Tolstoi to add anything more or to produce any impression adequate to the situation. We have no quantitative data. For these reasons we are forced to deal briefly with this epidemic, which is the most deadly and most terrible of all. We must content ourselves with pointing out that the extent of the evil is far greater than has been stated up to the present. It is true that the whole of the regions east of the Volga have been stricken, but famine centres are also scattered all over the country, except in the north and in the west. Several districts of the governments of Voronege, Kharkov, the Don, the Crimea, and especially the four southern governments (Odessa, Nikolaiev, Ekaterinoslav, Zaporoze, formerly so flourishing), where famine began to rage at a later period than in the east, have now reached the same degree of misfortune. In the Crimea too, to judge from our colleagues' recent letters, the price of a pound of bread has reached 140,000 roubles (at Simferopol) and even 250,000! (at Sebastopol),[1] that is to say,

[1] This was at the beginning of March 1922.

twice as much as in Moscow. The situation is rendered still worse by the fact that the quantity of paper money and the opportunities for earning it are incomparably less than in Moscow. The mortality is increasing from day to day. In the four above-mentioned governments, according to the reports of Drs. V. Kogan and B. Favre, who visited them with the representative of the Nansen Mission, the number of the sufferers from famine is:

	Inhabitants	Stricken by famine on March 7th.	Percentage	In the month of May it must have risen to
Government of Zaporoze	1,125,366	810,117	80 %	90 %
» Nikolaiev	1,412,478	573,944	40 %	55 % to 60 %
» Odessa	1,346,256	350,000	20 %	30 % to 40 %
» Ekaterinoslav	1,707,790	520,925	33 %	40 % to 50 %

Almost all the horrors experienced east of the Volga have already made their appearance; use of dead bodies for food, cannibalism, and death everywhere; some die at home, in a kind of indifference and torpor; others fly in an attempt to escape and perish on the way. The reports presented at the last meeting of the Medico-Psychological Society by the alienists who had come from Saratov, Samara, and the South showed on good evidence that all the horrors mentioned above are rampant. One proof will be sufficient: at Samara the entire lunatic asylum has been given over to eaters of dead bodies and cannibals. Mention is made of a new kind of profiteering (profiteering in general is also a very widespread epidemic *sui generis*), namely, profiteering in human flesh, etc. The famine does not seem to be satisfied with its own victims, but it favours the outbreak of all kinds of epidemic and disease. It is the famine which explains, for instance, the recrudescence of typhus and of relapsing fever, and it is the famine which will favour the spread of cholera and all other diseases. It will, moreover, exercise a very baneful influence on posterity; we shall have our "Famine Children" just as Paris had its "Siege Children", but in far greater quantities. The famine dominates over all epidemiological prognosis, and for this reason we have devoted these few lines to its consideration.

XIII. SUMMARY OF OUR ENQUIRY.

The opinions and the warnings of conscientious and competent specialists are always interesting. But they acquire a particular importance when exact and well-substantiated data are lacking, and when, in spite of this, it is absolutely necessary to obtain information concerning the state of affairs in one branch of knowledge or another. For this reason we approached our colleagues, as we stated in Chapter I of Part I of this report, and we will attempt here to present a summary of their replies.[1] We have unfortunately no space to give them all *in extenso*.

Odessa.

Professor Zabolotny: The statistics for infectious diseases require correction: practitioners in the towns do not ordinarily inform the registration office; in the country, not only isolated cases but also

[1] The questions we asked have been given in Chapter I of the Part I of this report. It will serve no purpose to repeat them.

whole centres of disease remain unregistered owing to the absence of any medical man. According to the opinion of several district doctors, the official figures dealing with typhus should be multiplied by 5 or even by 10.

Cholera at Odessa and Kiev spread exclusively by contact, which may explain its restricted development. Vaccination also doubtless contributed towards this result.

The outlook in regard to cholera, typhus and relapsing fever seems favourable, considering the previous epidemics and in view of the fact that a large part of the population has been rendered immune. The threat of plague is more serious, on account of the dissemination of plague centres throughout the world, the great increase of rats in the towns and the resumption of navigation (January 1922).

Dr. Stchastny, Director of the Bacteriological Institute of Odessa (letter dated December 12th, 1921).— Cholera has spread but little this year, a fact which is explained by the drought, the almost complete absence of fruit and vegetables, by vaccination, etc. The outlook for the future must be considered as unfavourable. Sanitary conditions are extremely bad; there are a great number of carriers (up to 20% in some cases), etc., and there is, therefore, reason to fear a considerable outbreak in the future. The statistics for cholera are fairly accurate — the margin of error is probably not more than 10%. On the other hand, these statistics are most incomplete in regard to typhus, and the coefficient of error for 1919 must be at least 10—in 1920 it might be estimated at 5, and in 1921 at 2. Recently both forms of typhus have begun to increase again. The number of lice is enormous. The dissemination is effected mainly by persons who venture to travel on the railways. Prisons and children's hostels are also large centres of infection in view of their insanitary state, overcrowding, etc. The epidemic will therefore doubtless continue to grow. Little attention is paid to typhoid fever, and it is not sufficiently registered. It is spreading and is of an unusually serious character. Owing to the complete disorganisation of the water supply there is reason to fear an outbreak of all kinds of gastro-intestinal maladies in the near future.

In some regions there is an increase of scarlet fever. There is no plague. If it appeared at Odessa, a few energetic measures would be sufficient to stamp it out.

Kiev.

The letters sent us from Kiev have gone astray (which frequently happens).

From conversations with doctors arriving from Kiev we are able to state that health conditions there are no better than in Odessa, although there has been no real famine at Kiev itself, and the harvest in the district has been excellent. At Kiev, cholera, typhus, etc., show no abatement. The nature and extent of the epidemics there in the future depend, in the opinion of the doctors, on the number of refugees who may arrive there and the diseases which they may bring with them.

Ekaterinoslav.

Professor Padlevsky, Director of the Bacteriological Institute (letters dated December 29th, 1921):

The cholera statistics must be regarded as incomplete; the error in the 1919 figures is about 50%, as the region was then in a state of chaos as a result of the continual changes of regime. The figures for 1920 and 1921 are almost accurate. In 1921 cholera only increased slightly, in spite of conditions which appeared favourable to its development; the disorganisation of the water service, the large number of carriers, of bad feeding conditions, which caused migrations of large numbers of people and the arrival of numerous refugees, etc. The most likely explanation is the natural immunisation

of the population. Owing to the immunity acquired against typhus, there is no reason to fear any excessive development of that disease, but recently it has begun to increase again, though it is still behind relapsing fever. This must be explained by the famine, the effects of which have begun to be felt. The coefficient of error for the preceding years must be nearly 100%. Recently typhoid fever has begun to rage. At Ekaterinoslav it water-borne character was quite clear.

Apart from his letter, Prof. Padlevsky sent us the reports of Gregoriev and Kasansky already quoted above.

For the years 1919 to 1921 we have the manuscript report of Kasansky (medical officer). In 1919 there was civil war. The year began without epidemics, but the armies, especially the Makhno army, which was entirely infested by typhus and relapsing fever, transmitted these epidemics to the population. The epidemic developed considerably and reached its maximum in February 1920. The figures were 29,405 for typhus and 17,686 for relapsing fever. In that year and the following years no real effort was made to combat these epidemics; no baths, no disinfection and no de-lousing. Isolation is very incomplete. Only 9,552 patients have been treated in hospital out of 74,793 registered patients. The epidemic abated when the armies left the region and when the population had been rendered partly immune. In the second part of 1921 typhoid fever became prevalent, and in some place dysentery. Children's diseases did not assume any very great proportions. Speaking generally, the figures are very incomplete.

The reports from Kogan and Favre, [1] to which we have already referred, contain data which throw light on the condition in the whole region situated between Odessa and Ekaterinoslav. We extract the most characteristic details:

At Odessa, in January 1921, the number of deaths was double that of the births, whereas in December of the same year, mortality become 16 times greater than natality. In 1922 we have:—

	Births	Deaths
January	180	2,208
February	187	2,716

The mortality, therefore, is as great as in Petrograd in 1919. This enormous increase must be attributed to exhaustion through under-feeding.

In the government of Odessa (which has 1,346,256 inhabitants) the following are the figures of the various diseases:—

Measles	9,898	Scarlet fever	8,187
Smallpox	4,645	Influenza	22,642
Typhus	12,341	Relapsing fever	31,868
Typhoid fever	17,698	Dysentery	3,607
Scurvy	1,367	Anthrax	266
Glanders	Several cases		

The sanitary conditions in Odessa and in the government of Odessa are very unsatisfactory.

In the government of Nikolaiev, the situation is about the same. Typhus in 1920 showed 69,080 cases and in 1921, 55,501 (the population being 1,412,478); according to the official statistics, therefore, 90‰ of the population have had typhus in two years. The mortality exceeds the birth-rate, though

[1] Manuscript received at the end of March 1922.

to a less extent than in Odessa. The seriousness of the infections increases. Measles, for example, often accompanied by noma, causes a mortality of 22.8 per cent.

At Kherson, where the situation is particularly bad, the mortality among the adult infectious hospital cases is 13.3 %, among children 26.6 %, among the starving population 40 %.

In the government of Zaporoze (which has, 1,284,597 inhabitants) the situation is still worse because the famine is more accentuated there. The average ration of food does not possess a value of more than 644 calories per day, and the quality of the food available is of the poorest. It consists mainly of substitutes which are difficult to digest. The mortality and the morbidity are extremely high. Sanitary conditions everywhere are very bad; medical and other assistance are practically non-existent. The government of Ekaterinoslav enjoys somewhat better conditions than that of Zaporoze, but the relative advantage cannot last long; sooner or later the same state of affairs will occur.

Kharkov.

Dr. Igumnov (report on the sanitary conditions; manuscript dated December 1921).— The birth rate and the death rate of the government of Kharkov fell progressively from 50 °/₀₀ and 31.6 °/₀₀ to 42.9 °/₀₀ and 21.8 °/₀₀ during the twenty years before the war. The population increased by an annual average of 18 °/₀₀. In 1920 the figures were 29,597 births and 37,820 deaths.

The annual excess of deaths over births was 5.8 °/₀₀ and in some places 7 and 9 °/₀₀. At Kharkov itself in 1920 it was 22.6 °/₀₀. Typhus, smallpox and dysentery reached a higher figure in 1920 than the figures registered since the beginning of the century, but registration is very incomplete, particularly as the population in view of the condition of the means of communication and the state of the hospitals, are disinclined to seek medical assistance. If we consider on the one hand that the territory and population of the government of Kharkov have decreased by one-third (2.1 million instead of 3) as a result of the new administrative divisions, and on the other hand, if we consider the omissions to register cases, then the figures which are already so enormous are still more significant. Thus:

	For the period 1897 to 1917				1920
	Maximum figure		Minimum figure		
Typhus	8,508	(1909)	1,175	(1897)	134,278
Relapsing fever . .	2,479	(1909)	67	(1901)	54,371
Typhoid fever. . .	25,877	(1909)	4,895	(1901)	36,303

The official figure for the incidence of typhus was 6½ % in one year and more than 12 % in four years (1918-1921). The railways have mainly contributed to the dissemination of typhus. Typhoid fever has also greatly increased. It is of interest to note that men are most often attacked by typhus, (at Kharkov the proportions were 125 men to 100 women), whereas the opposite is the case in regard to typhoid fever (65 men to 100 women).

Only the number of cases of infectious diseases in children is diminishing, probably because in years before the war it had very considerably developed.

Tuberculosis is developing greatly. The dispensaries at Kharkov registered 3,875 new cases during the first seven months of 1921. In the children's hospitals at Isume there were 97 tuberculous cases out of 600 children. Venereal, mental and other diseases are also on the increase. Abortion is very common, even in the rural district. The causes of this unfortunate state of affairs are the same everywhere: general conditions (food, living accommodation, dirt), and the excessively bad sanitary

conditions. Letters and information received from other parts of the Ukraine (governments of Poltava, Tchernigov, etc.) reveal a similar state of affairs.

According to the latest official data, the following are the figures registered in the Ukraine:

	Exanthematic Typhus	Relapsing Fever	Undetermined Typhus
January . .	19,012	26,687	—
(railways) .	2,149	1,268	5,200
February. .	16,952	14,271	—
(railways). .	2,653	1,291	2,100

The data for the month of February are not complete. If we consider the places where our information is more or less complete, it will be seen that it is still too early to speak of the decrease of typhus. In the region of Odessa the figures for typhus were 2,130 in January and 3,956 in February, and in Kharkov 361 and 842. In the Don region the figures were 2,305 and 2,506. Cholera was inactive during the winter in the Don basin, but is now spreading steadily over the whole country.

Crimea.

Sebastopol. — Dr. Lieberman, Director of the Bacteriological Institute (information received in November 1921). — The main epidemics are typhus and relapsing fever. After the occupation of the Crimea there was a certain amount of scurvy among the inhabitants. There were only a few cases of cholera. Typhoid fever developed considerably. The coefficient of error for typhus must be taken as equal to 3 or 4.

The outlook for the future is not very alarming in regard to these epidemics, because the communications between the Crimea and the rest of Russia are very limited. There have been a few cases of papataci at Sebastopol.

Information received from Dr. Zevanovski *(Simferopol)*, Kriloff *(Theodosia)*, Kayser *(Old Crimea)*, is of a similar character, and at Simferopol there has been more cholera than at Sebastopol. Lately, the principal trouble has been famine, which is rapidly spreading and is beginning to produce its usual results.

From the latest letters it would seem that the situation in the Crimea must be regarded as similar to that east of the Volga.

Rostov (and the Don region).

Professor Barykine (Director of the Bacteriological Institute). — The coefficient of error fo typhus is at least 3. For cholera it cannot be more than 25 %. It can be assumed that 25 to 30 % of the population have had typhus. The mortality from typhus has been from 8 % to 10 % and from cholera from 40 % to 50 %.

In the future, typhus and relapsing fever will probably diminish on account of the immunisation of a great part of the population, of the cessation of civil war and the decreased migration of the population; recently these diseases have increased owing to the arrival of refugees from the famine-stricken areas. Cholera, on the other hand, is to be feared. If it remains at a somewhat low level it is thanks to natural

immunisation, carriers, abortive forms, etc.). The cholera curve presents particularly interesting features; it has two maximum points, the highest of which was in the spring and the lowest in autumn. Cholera has become endemic at Rostov and the surrounding region.

The number of cases in the paratypho-bacillic group is considerable. Typhoid fever was frequent, but of a mild form. Dysentery is not very frequent. The Shiga type is rare. Flexner, Y and paracoli predominate. There are cases of gastro-enteritis with streptococci in almost pure culture which gives a specific reaction with serum prepared from the patients. There is much malaria. Serious forms with coma, are frequent. In 1918 to 1920 there was an epidemic of infectious jaundice, of which there were many thousand cases; form mild; spirochetes producing only mild effects on guinea-pigs.

There was an enormous amount of venereal disease. Tuberculosis is on the increase and assuming a more serious form. There were a few cases of children's diseases and a few dozen cases of encephalitis lethargica and meningitis.

Professor Zlatogorov, in November 1920, after the return of a mission to Northern Caucasus: (up to the present there is no information from Southern Caucasus)—The coefficient of error for typhus, which is not more than 100% for Petrograd, must be estimated at 300 % for the province, and for the Caucasus even higher. As a result of natural immunisation, typhus and relapsing fever will doubtless diminish, but typhoid fever and the paratyphoid fevers will increase, the latter as a result of feeding on meat from animals slaughtered without any sanitary supervision. At present very numerous cases are due to propagation from contact.

Cholera has shown no great development probably due to a kind of degeneration of the vibrio. For the same reason there is no ground for fear for the future.

Dysentery often develops after gastric and intestinal disorders, through which the paracoli acquire considerable virulence. Dysentery may therefore be said to be indigenous. Its development is moderate.

Malaria is most highly developed; it exists in many of the tropical forms. Sometimes there are mixed infections, malaria paracoli, with a very high mortality. Tuberculosis is now more frequent than ever. Venereal diseases still more so; entire villages are infected.

In the mountains there are fewer diseases because of the greater difficulty of communications.

Dr. Griasnov, Director of the Bacteriological Institute of Stavropol (November 1921) : The coefficient of error is at least equal to two or three. Everywhere in the country districts there were many sick and hardly any doctors.

In the future, epidemics of typhus and relapsing fever must decrease through immunisation. Cholera will probably not have any serious expansion because the vibrio has probably degenerated. The absence of rivers in the region of Stavropol makes the localisation of cholera easier.

Few cases of infectious diseases in children.

Venereal diseases are very widespread. Tuberculosis is on the increase: insufficient nourishment, dirt, etc.

There are not many cases of malaria, thanks to the altitude at which Stavropol is situated.

Astrakhan.

Information received from the Dean[1] of the Faculty of Medicine.—The coefficient of error is 4 at least. There is no information with regard to the number of sick in the hospitals. The doctors do not trouble to register patients treated at home, and the majority of the sick prefer to remain in

[1] The surname is illegible in the original manuscript of the Report.

their own houses owing to the very defective arrangements of the hospitals. Cholera, which was imported from Baku, after an alarming expansion (with a mortality of 60 %) (vibrios have been found in the Volga), has rapidly fallen. The reasons for this are not known. Typhus will probably decrease owing to the cessation of the civil war, the small number of refugees and the immunisation of at least 20 % of the population.

Saratov.

Professor Bogomoletz (letter of May 22nd, 1922).—Registration is very incomplete, only half the cases at most have been registered. For the present, typhoid fever dominates, but there is reason to suppose that typhus and relapsing fever will again develop considerably. Conditions are rendered worse by the famine, and prophylaxis can be said to be practically non-existent. The refugees are in very bad condition; the sanitary state of Saratov is very unsatisfactory. The outlook for the future is bad, in view of the famine. (Letters subsequently received more than confirm this forecast.)

Ufa.

Dr. Krijanovsky, Director of the Bacteriological Institute (letter of May 27th, 1922).—Cholera has been brought from Samara by the railways; conditions in the town were favourable for the spread of the disease and the town was without any means of defence.

Cholera has caused the majority of cases among the sufferers from the famine, among the Tartars and the Bashkirs. The official figure, 20,000 cases, must be regarded as much lower than the real figure, seeing that the whole country is infected and that medical assistance is practically non-existent. According to Krijanovsky, this figure must be doubled. If cholera does not develop still further, it is probably due to the quality of the water, which is very hard and exercises, as has been demon strated, a clearly bactericide action. The development of bacteriological factors is closely connected with the famine. If the famine were to cease, there would only be sporadic cases; if it continues, the epidemics will continue also.

Dr. Guikkel, Medical Officer of the Ufa region.—Up to 1918 there were only a few hundred cases of typhus each year. During the war the Union of the Zemstvo succeeded in reducing the typhus centres created by the prisoners. From 1918 onwards, however, the civil war and the arrival of refugees completely changed the situation; after the armies of Koltchak had passed through the country, an epidemic broke out which, in one year (July 1919-June 1920), produced 93,135 cases; in the following year the epidemic fell to 70,651 cases. Relapsing fever during the same periods produced respectively 18,007 and 11,280 cases. Here, as elsewhere, it raged mainly among the soldiers. Conditions in general, as well as sanitary conditions, were extremely bad — the latter the more so by reason of the repeated passages of the belligerent armies, as a result of which the sanitary organisation was completely destroyed. Nearly all the doctors were mobilised or fled. It was impossible to estimate the coefficient of error with any precision. At Ufa more than half the patients were registered, but in the country the proportion was much smaller, owing to the absence of doctors. According to certain information, there are places where the whole population was ill. In any case it can be reckoned, generally speaking, that 10 % at least of the population have had typhus. The mortality from typhus in the towns has risen to 20%; in the country it is not more than 10%. The mortality from relapsing fever is much less, but in any case it is higher than it was before the war.

The cholera epidemic of 1921 surpassed previous epidemics, even that of 1892. The lack of registration of cholera cases is compensated by the fact that a great number of cases of enteritis have

been notified as cholera cases. For this reason the official figure, 17,560 cases, can be accepted without deductions. The vaccination campaign was carried out with energy, and out of 93,000 inhabitants in Ufa, 30,000 were vaccinated, which had undoubtedly a favourable influence. In the Ufa government 43,000 persons were vaccinated. It should be noted that, thanks probably to the health campaign, the population was well disposed towards vaccination; they only refused to be vaccinated in the villages where famine raged. "Death is inevitable," they said; "it is better to die of cholera than famine."

Other diseases do not exceed the usual average; some of them are even below the average. The outlook is unfavourable owing to the famine.

Tashkent.

Professor KLODNITSKY (letter of December 1921) points out the frequency and seriousness of malaria cases, of threats of cholera and plague (which we spoke of in the corresponding chapters), and the dangers caused by refugees who bring typhus and relapsing fever with them.

Irkutsk.

Professor TCHERVENTSOV (Letter of November 12th, 1921).—After expressing his views on the epidemiology of plague in Siberia (with which he has been concerned for the last ten years) and on the steps necessary to prevent its extension in Siberia—an event which he considers as unlikely, but fraught with extreme danger if it in fact took place—Prof. Tcherventsov remarks that the epidemics at Irkutsk and the surrounding region (typhus, cholera, etc.) come from the West with the refugees. There have been no cases of infection coming from the East.

During the first ten months of 1921 there were registered in the Irkutsk government 5,658 cases of typhus, with a mortality of 7 % (the latter only being registered for the first three months); there were 1,392 cases of typhoid fever, with a mortality of 5 ½%; 1,333 cases of relapsing fever, with a mortality of 2 ½ %; 1,366 cases of smallpox, with a mortality of 18 %; 3,687 cases of dysentery; 1,398 cases of scurvy; few children infected. It will be observed that, apart from smallpox, all the other infections are less virulent than in European Russia.

Omsk.

Dr. GRETCHISTCHEV (letter of March 1st, 1922).—He sends us the data of the Siberian Department of Statistics collected by Dr. Kalachnikov. In 1920, when the civil war had ended, there were registered:

Typhus	412,243 cases	Total: 874,255.
Relapsing fever	311,777 »	
Typhoid fever	101,087 »	
Typhus (undetermined).	49,748 »	

This represents 79.9%, instead of 2.7% in 1913 (total: 22,749 cases). The towns suffered most of all.

Incidence of infectious diseases ratio per 10,000 of population;

	Typhus.	Relapsing Fever.	Typhoid Fever.	Typhus (undetermined).	Total.
Total, Siberia	367.6	290.0	100.5	40.8	799.0
In the large towns	1,186.2	1,187.6	115.0	125.6	2,631.9

In particular:

Omsk	1,187.7	675.8	292.1	137.3	2,290.0
Novo-Nikolaievsk	1,350.8	1,817.7	55.3	487.2	3,707.0
Krasnoiarsk	3,300.7	4,705.7	77.6	26.3	7,810.1
Tomsk	506.8	170.3	33.9	121.2	832.7
Irkutsk	637.7	472.9	21.7	0.1	1,131.6

The mortality was:

	In the towns:	In the governments:
Typhus	10.2	6.7
Relapsing fever	6.4	4.0
Typhoid fever	9.5	6.2

We also see that in the towns the lowest registered incidence for typhus was 5 % and the highest 33 % (!) in one year.

In 1921 the epidemics fell and the figures were:

Typhus	57,494
Relapsing fever	73,917
Typhoid fever	31,018
Typhus (undetermined)	17,732

Since the month of October a serious rise occurred, caused by the refugees from European Russia more than 100,000 of whom came by rail alone in four months, without counting the others. November and December alone were responsible for one-third of the annual incidence. The conditions of migration were very unsatisfactory, as can be seen from the number of cases registered of illness on the trains.

In the second half of 1921 the number of cases registered on the railways were:

	July	August	September	October	November	December
Typhus	64	35	120	180	997	2,580
Relapsing fever	124	128	216	146	1,639	3,366
Typhoid	122	288	162	171	808	527
Typhus (undetermined)	131	121	371	122	605	1,049
Total:	440	572	839	625	4,045	7,525

In five months (July 1st to December 1st) 1,073 corpses were taken off the trains.

Cholera appeared at Petropavlosk on February 6th of this year, and in one week there were 46 cases with 41 deaths. In December 1921 there was a less serious outbreak at Petropavlosk, 12 cases, which came, as has been discovered, from a nurse carrier, who had had cholera in the summer.

We can make a shorter statement with regard to Central Russia, concerning which we have more information and with which we have dealt in the preceding chapters. The letters and communications from Drs. Avramov, Dean of the Faculty of Medicine at Nijni; Tcharnotzky, Director of the Bacte-

riological Institute at Tambov; Stoutzer, Professor at Voroneze; Dournovo, Professor at Kostroma; Patzevitch, Dean of the Faculty of Smolensk, agree with one another except in details. The substance of their reports is in all cases the same. The rates of disease and mortality are very high in all places, the sanitary conditions are extremely bad. In some places, such as Voronège, there is already a famine. The coefficient of error is in all cases considerable, varying from 2 % to 5 % (Dournovo). The outlook is in general unfavourable.

We must note in particular a very favourable death rate from typhus in the government of Smolensk, 3.4 % in 1919, 2.3 % in 1920.[1] Moreover, in the West, in White Russia, typhus nearly always appears in a mild form. On the other hand, at Tambov, Tcharnotzky reports an increase in the virulence of relapsing fever with a mortality reaching 10 %, and also an extreme virulence in scarlet fever. The serious character of measles in many places is also mentioned. In submitting this short summary, containing the conclusions and considerations supplied by our colleagues, which completes our statement and supports our conclusions and considerations, we take the opportunity of thanking them once again for having sent us this information.

XIV.— MORTALITY AND DEPOPULATION.

The question of the death-rate and depopulation is closely connected with that of epidemics; for this reason, we must consider it in some detail and endeavour to trace its broad outlines.

If we refer to the results of the census taken on August 28th, 1920, we may see[2] that out of 58 governments, the population of which before the war must have amounted to about 102,793,000 (and even 106,222,000 according to the estimate of the Central Statistical Committee), the number of inhabitants has fallen to 90,708,969, which is equivalent to a decrease of at least 12,084,000, i.e., 12 %! This decrease, indeed, amounts almost to 16,000,000 if we accept the figures of the Central Statistical Committee. This is an enormous figure even if we deduct emigration abroad (two to three millions according to the statistical estimates), Army effectives, etc. Mikhailovsky gives as the reason of this decrease the fall of the birth-rate and the increase in the death-rate. He estimates the birth-rate for 1920 at 25 $^{0}/_{00}$ and the death-rate at 38 $^{0}/_{00}$. But the estimates for the whole of Russia are necessarily only approximate and in order to obtain a more accurate idea, we must consult the data for places where the statistics afford us more or less accurate information.

Let us take as examples two capitals and certain provincial towns.

The population of Petrograd, which, in 1913, amounted to 2,319,000 inhabitants, fell in 1920 to 706,000, and the decrease continues. Petrograd has therefore lost about 70% of its population, and, indeed, even more, if we take into consideration the fact that the populations of the capitals increased very considerably during the war. Moscow also shows a very marked fall, though a smaller one: 1,028,000 instead of 1,857,000. We must remember that there has been no immigration and a considerable amount of emigration. The flight from the towns to the country in search of more

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[1] Isabolinsky, "Typhus in the Government of Smolen in 1919-1920." *Medical bulletin of the Western Front*, May 1921, p. 13-15.

[2] *The work of the Demographic Bureau of the Russian Central Statistical Organisation*, T. I. Livrais. 3. 4. 1921 Moscow (Introduction by Dr. Mikhailovsky, p. 4.)

favourable conditions of existence assumed very considerable proportions, but at the same time there are pathological reasons which we must now examine.

The birth-rate of Petrograd [1] fell from 25 °/₀₀ in 1914 to 15 °/₀₀ in 1919 and 1920, *i.e.*, 40 % in all. The death-rate, which in 1909 and 1913 reached an average of 23.2 °/₀₀, in 1914 21.5 °/₀₀, in 1915 22.8 °/₀₀, in 1916 23.2 °/₀, began to increase rapidly from 1917 onwards.

In 1917 28 °/₀₀, in 1918 43 °/₀₀; in 1919, 80 °/₀₀ ! In the first months of 1920, 90 °/₀₀ ! The death-rate coefficient is, as Novosselsky points out, the largest ever known in demography, not only in the case of Russia but in that of the whole world; it exceeds the death-rate of even the most deadly epidemics (cholera, plague, famine, etc.).

The depopulation, which began in 1915, developed as follows :

1915. . . .	0.3 °/₀₀
1916. . . .	4.1 °/₀₀
1917. . . .	9.2 °/₀₀
1918. . . .	28.2 °/₀₀
1919. . . .	66.2 °/₀₀

A decrease, therefore, of almost 7 % in one year ! Novosselsky gives as the chief causes—cold, famine and the physical debility due to these causes, *i.e.*, the reduction of vital resistance. To this must be added the epidemics and infectious diseases in general which are fostered by these causes, He gives a very significant table showing the proportions in which the death-rate due to infectious diseases, has increased:

Mortality per 10,000 *(last six months of years in question).*

	Average for 1911-13 (July to December)	1919	Taking the figure for 1911-13 as equal to 100, the figures for 1919 would be
Smallpox	0.3	9.2	3,066
Measles	6.6	12.5	189
Scarlet fever	3.6	6.9	192
Whooping-cough . .	2.1	2.8	133
Influenza	1.5	17.6	1,173
Diphtheria	2.2	5.1	231
Typhoid Fever . . .	6.7	3.4	51
Typhus	0.1	27.3	27,300
Relapsing Fever . .	0.01	5.0	50,000
Dysentery	2.5	86.9	3,476
Pneumonia	24.9	91.6	368
Tuberculosis	33.0	44.9	136
Gastro-enteritis . . .	32.5	71.5	220

[1] *Statistics for Petrograd* 1920. Novosselsky, "Natural Movement of the Petrograd population in 1919," pp. 6-37.

If the immediate causes of death are taken into consideration, it will be seen that they are as follows:

Mortality in July to December, 1919.

	Actual Numbers.	Percentage as compared with total number of cases.
Pneumonia (Fibrinous and Catarrhal) .	3,206	12.6 %
Dysentery	3,042	11.9 %
Acute Gastro-enteritis	2,501	9.8 %
Under-feeding	2,237	8.8 %
Tuberculosis	1,571	6.2 %
Violent Death	1,288	5.1 %
Typhus	956	3.8 %
Senility	874	3.4 %
Influenza and "Spanish Influenza" . . .	616	2.4 %
All other causes	9,173	36.0 %
	25,464	100

During the first months of 1920, the death-rate continued to increase, at least as regards some of these categories. From January to April, the number of deaths from typhus amounted to 4,008, and from relapsing fever 1,517. The death-rate for all infectious diseases, which had been 25.6 per 10,000 in 1911 to 1913, amounted to 176.7 in 1919.

Let us now turn to Moscow [1].

The population of Moscow had continually increased of recent years and in 1917 reached the large figure of 2,043,594. Then in three years it decreased by about one-half. Leaving emigration aside, let us turn to natural movement. The births amounted to:

Period.	Average birth-rate per 10,000.
1867–1880	228
1881–1890	226
1891–1900	256
1901–1910	288
1911–1913	289

From 1914 onwards the position was as follows:

Births per 10,000

Year.	(*a*) of the whole population.	(*b*) of Women aged 15-49.
1914	310	1,172
1915	270	915
1916	229	724
1917	196	586
1918	148	451
1919 (1st half)	160	524
1919 (2nd half)	177	540
1920 (1st half)	219	671

[1] W. Mikhailovsky. "The Population of Moscow and its Movement", *Red Moscow in 1917-1921*, pp. 51-84.

The mortality was as follows:

Period	Deaths per 10.000	If the death-rate for the first ten years is taken as 100, it equals for the following periods :
1862–1871	310	100
1872–1881	291	94
1882–1891	269	87
1892–1901	246	79
1902–1909	236	76
1910–1914	231	75
1915	221	71
1916	202	65
1917	212	68
1918	280	74
1919 (1st half)	504	163
1919 (2nd half)	390	126
1919 (total)	451	145
1920 (1st half)	462	149

Thus there was a progressive and continual decrease until 1916, and afterwards a rapid rise, reaching figures which have never been ascertained. If we standardise, so to speak, the death-rate of Petrograd and Moscow: that is to say, if we consider the fact that the lower birth-rate reduces the number of young children, that is, the group of the maximum mortality, these figures, already enormous, become even more terrible.

Passing to the causes of this death-rate, we cannot do better than give the following data, collected by Dr. Tchertov:

Moscow.

Deaths registered as due to infectious diseases.

I. *Actual number of deaths.*

	1) 1878-1887.	2) 1888-1897.	3) 1898-1907.	4) 1908-1914.	5) 1915-1917.	6) 1918-1920.	Totals.
Typhus	3,605	966	419	1,382	559	18,272	25,203
Typhoid Fever	3,036	2,354	1,871	1,369	2,088	1,765	12,403
Relapsing Fever	4,677	344	541	561	249	1,715	8,087
Scarlet fever	3,623	5,009	5,081	5,937	2,527	1,220	23,397
Smallpox	2,872	689	1,036	1,349	1,005	2,337	9,288
Diphtheria	4,506	6,873	5,378	5,303	1,841	838	24,739
Dysentery	3,559	2,809	3,700	5,120	3,826	3,971	22,985
Measles	2,710	3,478	5,220	6,725	3,093	890	22,116
Whooping-cough	2,344	1,611	2,047	2,214	740	409	9,365
Influenza	(?)	760	3,075	2,141	641	2,089	8,706
Cholera	(?)	1,473	1	198	132	646	2,450
Other Diseases	7,260	4,209	5,870	5,361	2,599	2,056	27,335
Totals	38,192	30,575	34,239	37,776	19,300	36,208	196,174

II. *Death-rate per* 10,000 *of population.*

	1) 1878-1887	2) 1888-1897	3) 1898-1907	4) 1908-1914	5) 1915-1917	6) 1918-1920
Typhus	4.6	1.1	0.4	1.2	0.9	44.0
Typhoid Fever	3.9	2.6	1.6	1.2	3.5	4.3
Relapsing Fever	6.0	0.4	0.5	0.5	0.4	4.1
Scarlet fever	4.7	5.4	4.4	5.3	4.2	2.9
Smallpox	3.7	0.7	0.8	1.2	1.7	5.6
Diphtheria	5.8	7.4	4.7	4.8	3.0	2.0
Dysentery	4.6	3.0	3.2	4.6	6.3	9.6
Measles	3.5	3.8	4.5	6.1	5.1	2.1
Whooping-cough	3.0	1.7	1.8	2.0	1.2	1.0
Influenza	—	0.8	2.7	1.9	1.1	5.0
Cholera	—	1.6	—	0.2	0.2	1.6
Other Diseases	9.4	4.6	5.1	4.8	4.3	4.9
Totals	49.2	33.1	29.8	34.0	31.9	87.1

However grave the increase in the death-rate due to infectious diseases, it does not fully explain these figures, and, in order to realise the enormous general death-rate, we must bear in mind factors such as famine and cold, in the first place, and what may be called pandemic increase of diseases of the heart, of the nervous system and of the kidneys, to which we have already referred. And we must remember that they have not only increased, but they have assumed more acute forms. Thus, if we take the death-rate among hospital cases for the whole of Russia, we find the following figures:

Years.	Deaths per 100 cases.
1912	4.7
1913	4.9
1914	4.5
1915	5.3
1916	4.5
1917	4.8
1918	9.7

To take a few more examples: At Samara ("Famine, death-rate, birth-rate and marriages in 1920" — Report of the Samara Statistical Office, 1921, No. 2, pages 72-78), the birth-rate in 1920 (before the present famine) was 31.6 $^0/_{00}$ and the death-rate was 72.3 $^0/_{00}$. The population has decreased by 3 % in one year. The chief of the causes of death is typhus, which claimed as much as 40.5 % and even 53.6 of the total death-rate, *i e.* 1,419 out of 2,638 deaths in December 1919.

At Orel (N. Archipov, "Movement of the population at Orel in 1920"— Report of the Orel Health Department, 1921, No. 1-2, pages 57-63), the birth-rate fell in 1920 from 32.65 $^0/_{00}$ (average for the period 1905-1915) to 15.6 $^0/_{00}$, *i.e.*, by more than half, and at the same time the death-rate more than doubled; it rose from 25.4 $^0/_{00}$ (average for the period 1905-1915) to 53.1 $^0/_{00}$. Acute infections are

responsible for more than half of the deaths (51.6 %); amongst these diseases, typhus again occupies the first place, causing 27.4 % of the total mortality. During the ten years prior to the war, the population increased annually by 6.36 %, and in 1920 it decreased by 3.75 %. There is no need to add further examples. A complete and detailed demographic investigation would undoubtedly be of very great interest, but this is a matter for specialists and will certainly be carried out in the future. Our object was merely to give data regarding the extent of diseases and to show their consequences in a general survey illustrated by a few examples. It is clear from the evidence that the situation has developed in the same way everywhere; the differences are purely quantitative. Depopulation will pursue its course in the future. Until when ? And when will it be possible to effect a change ? This cannot possibly be foreseen or predicted with any certainty. In the regions attacked by the famine, matters are going from bad to worse, and every day we may read in the political Press, news and anticipations which can only be termed frightful; 30-50 % of the population and even more is irrevocably condemned to death. We have no reliable data concerning this, but we regret to have to state that, in our opinion, Russia may consider herself fortunate if she emerges from the present crisis with the loss of only 20-25 % of her population.

XV. CONCLUSIONS AND FORECASTS.

Taken as a whole, the facts and figures set out in the preceding chapters lead us to the following conclusions:—

(1) Epidemic and other diseases, and the mortality due to them, have in late years reached in Russia an extremely high level which may be said to be unprecedented in the history of recent ages as regards the severity, extent and duration of the scourges.

In the first rank we must place the two forms of louse-born typhus fevers (typhus and relapsing fever), intestinal infections (cholera, enteric fever, dysentery etc.) and malaria. Nearly all the other epidemic and infectious diseases, with the exception of infectious diseases in children, show a more or less considerable increase. To this must be added a quasi-epidemic extension of many non-contagious diseases (disorders of the nervous system and the heart, general functional disorders, etc.).

(2) The statistical data being exceedingly incomplete and inaccurate, it is permissible and even necessary, at least in the case of the principal epidemics, to attempt to determine, if only approximately, the co-efficients of error which will bring us nearest to the truth. The attempts which we have made in this direction, and the results which we have reached, have no claim to absolute accuracy, which it is in any case impossible to attain in the present state of affairs; but they come much nearer to it than the official figures [1].

An additional justification of such an attempt is the fact that, if it is not made now, it will be almost impossible in the future to form a reasonably accurate idea upon the subject.

(3) The chief immediate causes of our epidemics and of our depopulation are as follows:

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[1] Thus, while we admit that the actual number of cases of typhus is not 25 but 20 millions (the lower figure accepted by us), our error does not exceed 20% to 25%; whereas, if we accept the official figure of about 7,500,000, the error is 200%, or ten times as great.

(*a*) Poor and insufficient nourishment, amounting at certain times and in certain districts to absolute famine;

(*b*) Dirt due to shortage of soap, linen etc.;

(*c*) Cold in the houses (due to lack of fuel), with all the effects that such cold may produce upon health;

(*d*) Overcrowding in houses, particularly in the towns;

(*e*) Highly unsatisfactory conditions of railway travelling;

(*f*) Shortage of sanitary and medical appliances, deterioration of water supply and drainage etc.

All these phenomena are themselves the direct results of the world-war, of the civil war, of the prolonged blockade, and of the intense revolutionary crisis through which Russia is now passing.

(4) These causes are almost entirely outside the influence of purely medical and sanitary action, which can thus only play the part of a palliative, necessarily insufficient as a weapon against the scourges from which we are suffering, particularly when these scourges have assumed such extraordinary proportions. "Sublata causa tollitur effectus" — all the causes mentioned above must therefore be fought first. Only thus can the medical action achieve its full beneficial results.

(5) Medical men and medical science can do no more at present than try to diminish the number of inevitable victims and to limit the spread of epidemics in districts where conditions are relatively more favourable. Particular stress must be laid on the fact that it is impossible to eradicate the epidemics without first fighting the famine. As long as the famine exists, epidemics will continue, only perhaps changing their form; one epidemic whose devastating force has become exhausted through biological causes (such as natural immunisation of almost all the population) will give place to another, but that s all.

(6) The outlook for the near future is unfortunately far from favourable: to the two forms of typhus (typhus and relapsing fever), which continue to dominate the epidemiological situation, must be added the growing menace of cholera, which is spreading in spite of the season; the extension and increased severity of malaria; and all the other epidemic and other diseases which we have considered. The improvement which began in the second half of 1920 gave place in the summer of 1921 to another rising tide of epidemics caused by the famine.

(7) As our strength and our resources are unhappily insufficient to carry on a rapid and effective campaign against all these afflictions, which fall directly upon ourselves and also indirectly exercise an unfavourable influence on the whole of Europe, it is becoming more and more necessary that Europe should send us aid. How and under what conditions can this aid be rendered ? This is a question which is outside the scope of our report and our competence. In any case, if such aid is not forthcoming, Russia, thanks to her natural resources, will ultimately triumph over her present troubles, though after a much longer time and at the cost of countless lives. And if the crisis is prolonged, its evil effects will inevitably be felt throughout the civilised world.

We shall perhaps be accused of pessimism. But the pessimism lies in the facts and figures, which we cannot alter to satisfy any tendency. In concluding our report, we wish to lay particular stress upon the fact that the misfortunes which afflict us will not lead us into despair and inaction, the inevitable corollary of despair. Though the situation may be, and sometimes is, desperate for isolated individuals, it cannot be so for an entire nation still young and populous, living in an area as immense and as rich in natural resources as Russia. This is proved by our whole history, so fruitful in every kind of misfor-

tune, by the "time of troubles" of 300 years ago — to mention only one example. We are convinced that our poet Nekrassoff was fully justified in writing:

> The Russian people has endured much;
> It will endure all that God may send it;
> It will press forward a broad clear path.
> Alas, both you and I will be dead on that glorious day.

Long and difficult is the road we must go through before we reach this end. Doubtless we shall not live to witness this achievement. But from the goal which is ever before our eyes and from the faith that the mark will be hit one day, we draw the strength and energy to live and work whatever appens, and in spite of all.

Moscow, April 15th, 1922.

XVI. SUPPLEMENT.

The second part of our report, which was completed about April 15th and immediately despatched to Geneva, failed to arrive there; we learned this only three months later. Fortunately we had kept a copy, which we forwarded at once. This unexpected delay, which was quite involuntary, has enabled us to add a further chapter to our report; events move quickly nowadays, and during the three months which have just elapsed we have been able to collect a number of fresh data. A brief summary of these data, of the reports submitted to the various congresses which have been held in the course of the last three months and of the conclusions and resolutions arrived at by these meetings will bring our report up to date, will confirm the views expressed in our reports, conclusions and forecasts, and will enable some suggestions which were merely foreshadowed in our report to be transformed into positive statements.

First of all, we shall consider the work of the European Health Conference, which was held in Warsaw from March 20th to 28th, 1922, and which dealt mainly with the problem of epidemics in Russia; we should also mention Dr. Haigh's [1] interesting reports (pages 18-24) on the situation in Western Russia (Minsk, Smolensk, Vitebsk, etc.) and in the Ukraine, which are based on personal observation and investigation; the report of Professor Muelhens (pages 24-25), who was head of the expedition organised by the German Red Cross in the sorely affected Volga district (Kazan etc.), the summary of the work of the Conference drawn up by Dr. Rajchman (pages 11-13), and the resolutions of the Conference. We find therein, in regard to the epidemic situation, the same characteristic description, the same opinions as to causes, the same forecasts, that we had ourselves arrived at. This concordance added considerably to the value of the report and of the conclusions which we put forward, giving them a character of objectivity and scientific certitude emphasized by the unanimous adoption of the resolutions by the Conference.

In the view of the Warsaw Conference, the epidemic situation was to be assigned in the first to famine, to the chaotic emigration from the famine-stricken areas, to the lamentable sanitary conditions

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[1] League of Nations: *European Health Conference held in Warsaw from March 20th to March 28th, 1922* — Geneva, April 3rd; 43 pages with several maps.

on railways and to the lack of sanitary material and drugs (Haigh, pages 18-19); attention was drawn to the protection afforded by the natural immunisation of a large portion of the population, and to the danger of unjustified optimism — "unjustified optimism can lead only to regret" (Muelhens, page 25); stress was laid on the necessity of assistance from the other nations of the world and on the impossibility of giving effect to a plan for the economic reconstruction of Eastern Europe — and consequently of all Europe — unless effective anti-epidemic measures were taken (Rajchman, page 12). A tribute was paid to the admirable devotion of the medical staff, etc.

At the All-Russian Congress of Bacteriology and Epidemiology held in Moscow from May 3rd to May 8th, at which 518 members were present — 200 of whom had come from all parts of Russia — practically the same conclusions were arrived at and the same resolutions were passed, the latter being, however, more numerous and more detailed; in this case, also, they were adopted unanimously— a fact which affords proof of their obviousness. No objection was raised in regard to our report on Russian epidemics; one member, indeed, maintained that the total number of cases of typhus should be estimated at 15 millions and not 25 millions, but provided no proofs in support of this opinion. In conversations outside the meetings, some of our colleagues who had come from the most affected area expressed more pessimistic views, 30 and even 35 millions being mentioned, but in no case were the limits of the first part of our report overstepped. Considering, moreover, that all our conclusions and forecasts have been justified by the course of epidemics during the last few months, it must be admitted that, notwithstanding the incompleteness of statistical and other intelligence, and in spite of hindrances in the way of systematic scientific work, the data and conclusions arrived at [1], were sufficiently clear and accurate.

Having concluded these preliminary remarks, we shall proceed to a brief review of the latest data concerning the course of epidemics.

Typhus and Relapsing Fever.

Referring to the table setting forth the incidence of the principal infectious diseases during the first five months of the current year, we find, by comparing it with Tables No.2 and 9 (Part I of the report, pages 35, 42 and 43), that the total number of cases of typhus for each month falls considerably short of that recorded for 1920, but greatly exceeds the 1921 figures. In regard to relapsing fever, the discrepancy, generally speaking, appears less pronounced, but the figures relating to this disease are not only higher than those of 1921, but exceed also those of 1920.

	Typhus.			Relapsing fever.		
	1920	1921	1922	1920	1921	1922
January	491,490	89,033	152,594	115,676	100,838	165,876
February. . . .	655,848	95,455	239,335	156,021	96,535	220,550
March	503,356	87,788	298,921	148,837	82,117	246,302
April.	389,586	75,743	176,585	108,644	63,888	132,361
May	288,426	59,450	163,503	87,343	51,301	94,009
Total. . . .	2,330,706	407,469	1,030,938	616,521	394,679	859,098

[1] A number of papers on epidemics have appeared in medical periodicals during the time under consideration. We shall not specify them here since that would make this additional chapter excessively long, and, moreover, all data bearing on the subject are to be found in the five publications issued by the above-mentioned Congress of Bacteriology and Epidemiology, and in particular in the fascicle dealing with the resolutions, and in the summaries of the reports of Antonowski, *Typhus and relapsing fever in Petrograd*

The increase which occurred in 1922 will become still more apparent when the data for April, and particularly for May, have been complete [1]. This increase was entirely due to the famine and its consequences.

Another point to be emphasized is that, whilst relapsing fever predominates during the second half of 1921, from February 1922 onwards typhus holds the first place. The latter disease therefore appears to be of a more stable and virulent character than relapsing fever, notwithstanding the incomparably greater immunisation of the population against typhus. This leads us once again to argue in favour of the existence of peculiarities in the biology of the microbes of the two diseases and in the cycles of their evolution (see Part I, pages 27 and 28).

Moreover, this year the typhus epidemic and in a measure also, the relapsing fever epidemic, have a character of greater tenacity; they decrease more slowly, and their figures so far remain high, notwithstanding the season. This emerges plainly from the foregoing data, but will be made still more evident by the June and July figures relating to Moscow — where the statistical service is working with sufficient accuracy and speed — and by those supplied by our colleagues from the provinces.

The incidence at Moscow was, according to Dr. Ivanov, as follows:

	Typhus	Relapsing fever	Undetermined typhus	Typhoid fever	Dysentery
28/May– 3/June . .	383	367	30	16	20
4–10	474	399	18	23	14
11–17	370	408	19	17	33
18–24	415	450	20	16	42
25/June– 1/July .	262	316	28	7	56
2– 8	279	424	21	11	89
9–15	153	307	18	8	86

Relapsing fever predominates over typhus to a slight extent in Moscow, but, generally speaking, the converse occurs to a marked degree.

In several localities, instead of decreasing, typhus is even now on the increase, as shown by the table of the incidence of infectious diseases in 1922.

Let us consider, for instance, the governments of Kursk, Kuban, Viatka, Ufa, Jaroslav, Crimea, etc., where the tenacity and virulence of the typhus is still further intensified by famine conditions. At Ufa, in particular, the mortality at present attains 30 %. Letters received from Odessa (Professors Buchstab and Stchastny) also point to the persistence and extreme gravity of typhus, especially among doctors. Similar facts are communicated from Vologda (Dr. Kichkine) and Crimea (Dr. Kayser), etc.

All this points to the probability of typhus and relapsing fever lasting as long as the famine.

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in 1921 ; of Bloch, Jakowlev, Grazianov, Levitzki and Soloviev on cholera; of Kogan, Slavine, Guikkel, Rosanow and Klirikow on famine; of Dobreitzer, Diakov, Zelenew, Shingarewa, Zdrodowski on malaria; Pospelov on leprosy; as well as in reports on plague, on the organisation of sanitary activities, and on the vaccination campaign. See also: Tarassevitch, "Recent epidemies; statistics and reality". *Obchestvenny Vratch*, 1922, No. 1. Several articles on the sanitary consequences of the war will appear in No. 2 of the above-mentioned journal, which is now in the press.

[1] It should be noted that the statistical service is working still less satisfactorily this year than in 1921, owing to the inevitable disorganisation caused by the famine, and also to difficulties encountered by all the medical services as a result of the sudden change in the economic policy; some time must necessarily elapse before the work can be adapted to new conditions.

Smallpox. — This year there is a remarkable decrease in smallpox which may be attributed to vaccination. This is a disease — unfortunately unique as regards this special feature — which may be effectively combated by a specific prophylaxis applicable even under the most unfavourable conditions.

Thus, the incidence is reported as follows:

	1919	1920	1921	1922
January	11,315	10,916	16,076	5,733
February	16,266	10,581	17,489	6,964
March	24,219	10,138	14,415	7,011
April	26,324	10,911	13,453	3,133
May	23,873	13,244	10,172	1,284 (incomplete)
	102,001	55,790	71,605	25,047

The increase in 1921 as compared with 1920 has to be explained by improvement of the statistical service, and by the fact that the registration covered this year a far wider area: until 1921, we had to depend, for all diseases, only on data relating to the Russian Socialist Federated Soviet Republic, but since that year, figures relating both to the Russian Socialist Federated Soviet Republic and the Allied Republics have been available.

Plague. — The Karamïa plague focus described in the chapter dealing with plague became extinguished, no new cases having occurred since attention was drawn to it. On July 17th, however, the Epidemiological Service received a telegram from Saratov which stated that several cases suspected to be plague were notified in the Zavetnoie district (north of the Kalmuk steppes, about 80 kilometres from Tzaritzin). The Saratov Bacteriological Institute sent at once a special expedition, headed by Dr. Suvorov, for the purpose of an accurate diagnosis and directing such measures as were deemed necessary. On July 23rd, Dr. Suvorov telegraphed that 24 new cases, of which 17 were fatal, were recorded at Fedosseevka, a village situated about twenty-five kilometres from Zavetnoie. An exact bacteriological diagnosis has not yet been arrived at, but Dr. Suvorov and his colleagues suspect these cases to be bubonic plague. Should the diagnosis prove correct — which seems likely since several other cases had previously occurred in this district, and where marmots are now used for food — it is nevertheless to be hoped that it will be possible to control this focus of infection.

Cholera. — The cholera epidemic during the first five months of 1922[1] has spread considerably, and has shown an alarming progress; the incidence greatly surpasses that recorded in 1920 and even 1921. This fact gives reason to fear a far more serious epidemic than that of last year; similar fears have been expressed of late, in particular at the Sixth Bacteriological Congress. Without being in a position to allay this anxiety — or even wishing to do so, since it offers an incentive to all possible prophylactic measures — we have repeatedly dwelt on the impossibility of making accurate forecasts in the case of cholera — a disease which has systematically stultified all our forecasts since 1904. It is therefore possible, notwithstanding its alarming aspect, that the cholera epidemic will not attain as high a level as it did last year. Fortunately, the reports for June and July would appear to justify this more optimistic view. June is nearly on a par with May 1921 and considerably below June 1921, as i shown by the following table:—

[1] See the table of the incidence of cholera in Eastern Europe in 1922. *Epidemiological Intelligence*, 1922, No. 4, page 8.

	1921		1922	
January	123		382	
February	48		427	
March	41	2,336	1,539	13,493
April	569		2,817	
May	1,555		8,268	
June	32,199		12,221	
July	84,424		16,738	
	118,959		42,492	

It is evident that statistics have been even less accurate during the last few months than in 1921, as has already been stated as regards typhus; the data for the last months are not yet complete, but the differences will still be most marked and beyond all question. In 1921 a rapid and considerable increase was recorded during June and July and a fairly rapid decline beginning in August (See Table 9 in Part I of the report), whereas this year we note a disquieting, systematic and progressive increase extending over the winter and spring, then a remarkably slower progress as compared with the previous year, which enables a forecast of a decline. In some localities, *e.g.* at Rostov, two maxima were noted last year: in May and during the autumn. Will the same occur this year over the whole of Russia? It is impossible to foresee, but we are nevertheless of opinion that this year the cholera epidemic will not rise above — and may possibly remain below — last year's level. It may be well to add a few particulars to this general outline of the situation.

Central Russia was attacked comparatively on a small scale. In the most-stricken governments — *i.e.* those of the Volga, from Samara and the governments of Ufa, Voronege and Kursk, the number of cases does not reach 1,000, the maximum, 373 cases, occurring in the province of Samara; in others it is below 100 and even below 10. The north and west have been almost completely spared; the maximum figures recorded for the town of Vitebsk and the government of Gomel do not exceed 14. Siberia also has suffered but slightly, having had only 359 cases. The epidemic appears to have concentrated in Northern Caucasus (1,034, cases), the Don district (1,619), the Crimea, and in particular in the towns of Kertch (369), and Simferopol (567), but especially in the Ukraine (14,879), where Odessa heads the list with 6,255 cases. This is a remarkable state of things if it be borne in mind that Odessa, thanks to its excellent health situation, has almost always escaped cholera; now it occupies the first place, whilst Petrograd, which formerly suffered so severely, has only reported one case during the whole of this year. An explanation of this is to be found in the fact that the Odessa waterworks, which had hitherto worked unexceptionably, is now almost completely disorganised. In this connection, we cannot fail to concur in the views expressed by Dr. Stchastny, who writes under date of July 3rd that "The first step to be taken with a view to combating the terrible epidemic is to supply coal for operating the waterworks."

At Moscow 180 cases were recorded up to July 25th — 72 of which occurred among persons who had come from the cholera-stricken areas and 108 among the inhabitants of Moscow. In the beginning, the majority of cases occurred among travellers, but now the inhabitants of the city are first on the list. Of these 180 cases, 79 were fatal — a percentage of 44%, of which there were 42 fatal cases amongst newly arrived persons (53%) and 37 fatal cases amongst inhabitants of Moscow (47%).

The disease usually takes a fairly virulent form; the average mortality is 40 to 50 % and in some localities it reaches 60 %, 70 % (Dr. Stchastny and Prof. Buchstab), and even 80 %. Since the winter, however, this percentage is on the decrease, as shown by the following mean figures

communicated to the Russian Central Epidemic Commission and verified at the meeting of July 25th:—

Mortality in	November	1921.	100 %
»	» January	1922.	80 %
»	» May	1922.	50 %
»	» June	1922.	40 %

Regarding the causes which favour the spread of the disease, there is scarcely anything to add to what has already been said in the chapter dealing with cholera. The characteristic feature of infection by contact persists; only in a few localities could the water-borne character of the infection be ascertained (Rostov, Novorossisk, etc.). On the other hand, frequent evidence is available of infection due to the insanitary state of the bazaars, to contaminated food (jellies, fish, etc.); to patients in hospital being visited by their relations, who supply them with food (Odessa) etc. The vaccination campaign is being actively carried on in the army, 95 to 98 % of the men being vaccinated, and also in some of the towns, such as Moscow and Odessa, where the number of vaccinated civilians reaches 100,000, and in some cases even 200,000. Definitely satisfactory results have been ascertained, especially where more or less accurate statistics are available. Thus, of 820 cases recorded in the army between January 1st and July 22nd, half were vaccinated and half non-vaccinated men; this places the matter beyond question if it be considered that the number of vaccinated men is 40 to 50 times that of the non-vaccinated. No accurate data are available in regard to the civilian population, but all authoritative opinions and estimates corroborate the above contention. The same applies to mortality, which is much lower among the vaccinated. Thanks to the kindness of Dr. Beeuwkes, head of the medical division of the American Relief Administration, who at our request obtained from Paris a supply of vaccine prepared according to the Besredka method — for which we take the opportunity of thanking him — we have recently been able to start comparative experiments bearing on the two methods of subcutaneous vaccination and vaccination *per os*. It is to be hoped that these experiments will enable an appreciation to be formed as to the practical value of the method, hitherto based on experiments on animals, on Ch. Nicolle's experiments on man, and on some observations bearing on epidemics (Vaillant).

Enteric Fever, Dysentery, etc. — This year these diseases show a slight increase as compared with 1921, the figures relating to enteric fever being as follows:

	1921	1922
January	43,590	44,005
February.	35,686	51,621
March	29,162	46,943
April.	23,484	22,283
	131,922	164,854

There is, moreover, a marked increase and aggravation of the form of the majority of epidemic and infectious diseases in the famine-stricken areas, in regard to which we are as yet without accurate data; in order to form an approximate idea of this recrudescence, we would refer the reader to the table of the incidence of ten principal epidemic diseases during the first five months of the current year, in examining which it should be borne in mind that the figures relating to the three forms of typhus may be regarded as fairly complete. Figures relating to dysentery, smallpox, scarlet fever, and

diphtheria are far from complete, as is evident from the empty spaces in the table. Finally, as regards influenza, malaria and scurvy, the statistical data in our possession amount to nothing more than a mere outline. We shall therefore dwell only on malaria and on venereal diseases, in view of their predominance, and of a few fresh data which have been published recently.

Malaria. — In the chapter dealing with this disease, we emphasized its extension without, however, being able to give even approximate figures in regard to it. Such figures are still not available. Some interesting data were given at the Sixth Bacteriological Congress; all the reports submitted on this occasion (Dobreitzer, Diakov, Zelenev, Schingarewa, Zdrozdowsky) point to the same conclusion: a marked increase in mortality due to malaria and a spread of the disease towards the north far beyond its usual limits. The Congress laid stress, moreover, on the lack of means of action, prophylaxis by quinine being the only course to be relied on at the moment, provided that adequate quantities of this invaluable drug were available. The necessity for improvement in the system of registration of cases of malaria was also emphasized.

A conference on malaria in the Caucasus was held at Tiflis from June 27th to 30th. On his return from this conference, Professor Marzinowski presented, under date of July 18th, a report to the Russian Central Epidemic Commission; the main points of this report will be outlined here. Representatives of the four Transcaucasian Republics were present at the Tiflis Conference. All their reports indicated facts which give evidence of the appearance of fresh centres of infection, of a considerable increase in the virulence of the disease, and in some localities of a real depopulation caused by malaria. In Georgia (Dr. Verseladze's report), 300,000 cases were officially recorded in 1921, as compared with 25,000, the average for the previous years; that is to say a twelve-fold increase. In Saburtalo, one of the suburbs of Tiflis (Dr. Kandelaki's report), out of a population of 6,000 inhabitants, 5,179 cases of malaria, of which 486 were fatal, were recorded in the period extending from September to December 1921. A large proportion of the inhabitants has fled, panic-stricken. The population has fallen during 1922 to about 3,000, and the whole locality is completely ruined. This disastrous situation is due to attempts which were made to increase the harvests by flooding the fields. In Tiflis itself, which formerly escaped with a few isolated cases, 15,634 have already been recorded for 1921.

Professor Schirokogorov (Baku) reports a great number of cases in Azerbaidjan. Out of every hundred patients, 30 are suffering from malaria, and in Baku alone 27,000 cases of this disease have been recorded. Mortality is high, reaching 40 % in the case of children.

Dr. Markarian reports that in Armenia, notwithstanding its high altitude, malaria is rife, especially in the neighbourhood of Erivan, affecting in some districts 50 % and even 92 % of the population. The same may be said of Batum and the adjacent districts (Adjaristan), where the existing anti-malarial organisation has completely broken down for lack of means of action.

Among the railway personnel (employees and their families) the number of cases reached 63 %, as compared with 30 % in 1914. In some stations the percentage was as high as 100 %.

The situation in the army is quite different; radical measures were taken and nearly all the units were withdrawn from the dangerous areas[1] to healthier districts. Quinine was used not only in treatment but also as a preventive measure. The results were soon apparent: the number of cases, which in 1920 was 70 % of the total strength, had dropped to 28.2 in 1921 and to 1 % to 1922, only fresh cases, of course, being reckoned in these figures.

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[1] Out of a unit numbering 2,613 men which was obliged to remain in Evlakh from August 8 thot 12th, only 258 men had escaped infection at the end of that time.

The foregoing facts show that the Tiflis Conference was right in concluding that "the high morbidity and the virulent character of malaria is the cause of a mortality so high that it constitutes a menace to the economic situation of the Southern Caucasus, and must certainly lead to depopulation."

Generally speaking, malaria takes now by degrees the place which was held during the last years by typhus.

Syphilis and Venereal Diseases.—The almost unanimous opinion of our colleagues as to the great extension taken by these diseases has been given in the chapter dealing with them. This opinion has since been confirmed by further information equally pessimistic but nevertheless without statistical data. But in July we had the opportunity of reading an article by Dr. Bronner, head of the Venereal Disease Section of the Health Commissariat, which appeared in a political periodical (*Izvestia*, No. 101, July 21st, 1922) under the heading "Venereal Disease in the West and at Home", in which an entirely opposite view is propounded. On the basis of a comparison between the data relating to the French and German armies during the war, and partly also during the period subsequent to the war and our own previous and present data, he concludes that we are now in a far more favourable position. We shall only deal here with the figures on which Dr. Bronner bases his contention, leaving out of account those relating to the States of Central and Western Europe, in regard to which the medical public of Europe is already sufficiently informed. In one district of the government of Saratov, that of Serdobski, the situation since 1910 has developed on the following lines: it begins with a period of increase, 1910, 7,027; 1911, 7,919; 1912, 8,099; 1913, 8,177, followed by a period of decline; 1914, 7,340; 1915, 4,542; 1917, 4,332; 1918, 4,230. The incidence of venereal diseases in the army, calculated per thousand of strength, was as follows: 1909, 47.9; 1910, 47.4; 1911, 47; 1912, 42.9; 1913, 42.6; 1914-1916, 55.7; 1920, 33.11; 1921, 36.1; first four months of 1922, 13.7. Further, Dr. Bronner gives the results of a general inspection, carried out in 1921, of the garrisons of Moscow, Kiev and Petrograd, by which the following figures were ascertained: Petrograd, 0.5 % of strength affected; Moscow, 1 %; and Kiev (for 6 months), 0.5 % instead of 3 %, the pre-war figure.

The following figures were obtained in the out-patients department of the Miasnitzki Hospital in Moscow: 1913, 16,844; 1914, 17,774; 1915, 14,263; 1916, 12.501; 1917, 7,916; 1918, 5,305; 1919, 4,293; 1920, 4,981; 1921, 6,304.

We shall omit other less-important data relating to various institutions and shall pass on to the question as to whether the above figures suffice to justify Dr. Bronner's contention. The reply must be in the negative. It is not our intention to deny all value to these data, especially those relating to the army. Though they appeared in the political press and though the author himself states that in his article he does not propose to discuss the matter from a scientific point of view, we have thought it necessary to place them side by side with the opinions and appreciations given above. A closer examination of the statistical data will at once reveal the necessity for discussion and explanation. Let us take, for instance, the Serdobski district and the Miasnitzki hospital. First of all we see that the disease shows a decline after the outbreak of the war, which might be due, at least partly, to a decrease of the male population, a great portion of which was mobilised and sent to the front. On the other hand, the gradual disorganisation of the medical services, especially during the revolution, should be taken into account; hospitals and doctors are no longer resorted to to the same extent, since this has become more difficult and less convenient, since no medical stores are available and less attention is devoted to health, etc. Further, the decrease in the population must be taken into account. In regard to Moscow we do not possess data corresponding to those given for the Serdobski district, but we know that in that town the population has decreased about 50 %; therefore the total number of cases should have dropped in proportion, other circumstances remaining equal. We might put forward, in addition, a

number of explanatory assumptions and arguments, but to discuss the matter fully would be beyond the scope of this report, and we wish merely to point out here that we are by no means convinced of the soundness of the argument, and that before definite judgment is passed, the matter should be investigated at least as thoroughly as typhus and relapsing fever, that is to say by collating and discussing all the obtainable data. Pending this, it is more justifiable, in our opinion, to admit a more or less marked increase in syphilis and venereal disease, and this increase, in the long run, will become a serious menace to public health.

Famine, Mortality, Depopulation.—The numerous reports submitted to local Health Conferences in the various governments and to the Bacteriological and Epidemiological Congresses held in the Ukraine (at Kharkov from April 3rd to 10th) and in Russia (at Moscow from May 3rd to 8th) all point to the same conclusion: the extent of the disaster exceeds that attributed to it in information from official sources; the number of sufferers reaches probably 40 millions, and, although help is flowing in from all quarters, it is quite inadequate to the situation, which it only partially relieves; help from abroad is essential and also a free participation of all sanitary and other organisations. The famine is at the moment the main factor in the epidemic situation; the mortality arising from it and from other causes specified in the various chapters of this report is still very high; it is enormous in the most-heavily stricken districts. No complete and accurate general statistics have been available hitherto and we do not propose here to deal with the matter in detail, but shall limit ourselves to adding a few data to those already given in the chapters of the summary of our enquiry dealing with famine and mortality; our object in doing so is to define the situation and place our appreciations and forecasts on a more solid basis, since otherwise they might seem unduly gloomy in the eyes of optimists.

On his return from the Crimea, M. Kalinine, Chairman of the Executive Committee, published in the official newspaper *Izvestia* (July 16th) an article under the heading "Starving Crimea" in which he gives a few figures collected in the course of his journey. The numbers of deaths due to the famine were as follows: in February 14,413; in March, 19,902; in April, 12,753. The inhabitants of the Crimea being 761,600, it follows that for these three months alone the mortality due to the famine reaches 6.1 %. In the most-heavily stricken districts it is higher still reaching 1,100 deaths for a population of 7,875 inhabitants in the district of Baidari, where one village, that of Kazi, numbered 412 deaths out of a population of 1,125, *i.e.*, more than a third; in another village, 218 out of 870, and so on.

There is no doubt, however, that the situation has now greatly improved everywhere thanks to the summer, to the harvest (in the south) and to help which has been given from abroad, but it would nevertheless be a mistake to consider that the famine and its consequences have come to an end. This is the almost unanimous opinion held by private persons and in official circles. In the various conferences and scientific reports, in articles appearing in the political papers, the uncertainty of future prospects is a matter of daily discussion; unfortunately the decrease of the area under seed [1], which is considerable in some places, the almost complete lack of cattle and a number of similar circumstances point to the conclusion that the present improvement cannot be looked on as complete and permanent. All endeavours should therefore be directed to carrying on the struggle as actively as possible, taking advantage of the present respite.

In conclusion we will take a few further instances from the interesting report laid before the Russian Central Epidemic Commission by Dr. Dobreitzer, who took part in the regional Health Conferences

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[1] In the article already mentioned, M. Kalinine, who is in a position to obtain reliable information, states that in the Crimea the area sown is less than one-fifth of the usual area, and that part of the harvest is seriously menaced, etc.

which were held in Kazan on May 28th and in Rostov on June 20th. In the government of Samara, during March, out of a population of 2.5 millions, 2.4 millions were recorded as affected by the famine; and in April, the entire population of 2,500,000 was affected. In February, the mortality had already reached the high figure of 60,000, and in March it rose to 150,000, two-thirds of which were due to the famine and one-third to all other causes together. This comprehensive figure works out at 8.1 % in two months, equal to the mortality in Petrograd for the year 1919, which at the time was considered by Novosselski as the highest recorded hitherto. The situation in the Bashkir Republic is almost as serious. In 1921, out of a population of 1,200,000, 83,840 deaths from famine were recorded, and the reporter is of opinion that this figure should be doubled in order to approximate to the reality. In the German community the population has decreased 50 %, of which half have died and the other half have fled. In the Tchouvache district, out of 812,000 inhabitants, 69,000 died from the effects of the famine, and so on. Many other victims should be added to those who succumbed on the spot: those who fell by the way, and those — in great number — who died after arriving in the districts where they had hoped to find safety, as a result of exhaustion and of various infectious diseases the germs of which they had brought with them and passed on to others, thus spreading death whilst seeking to escape it.

These examples show that our prognostications (see Chapter "Mortality and Depopulation") are unfortunately being realised. Moreover, we are convinced that the publication of our report will be preceded, supported and followed by other documents similar to the one quoted above; their number will continually increase as the relevant studies are pursued.

In concluding this report we are led to repeat the remark made at the beginning: we do not claim to submit a complete and detailed report such as would call for the organised effort of a large number of epidemiologists and statisticians and would require considerable time, and which would even then be far from complete, since the available data show deficiencies which it is impossible to make good in many cases. Our object has been merely to give a general outline, based as far as possible on documentary evidence, which would serve as a starting-point for those desirous of undertaking a more thorough investigation of any of the questions involved and to assist those interested in our epidemic situation to find their way in the maze of inadequate, scattered, and sometimes contradictory information, always difficult to collect, which is at present available for reference. We are well aware of the imperfections and deficiencies of our report, even in its present restricted and limited form; may the difficulty of the task be accepted as an excuse.

July 28th, 1922.

1. Répartition mensuelle et distribution territoriale des cas de choléra enregistrés en 1921.
1. Monthly Incidence and Incidence according to Governments of Registered Cases of Cholera in 1921.

Villes et Gouvernements	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Juin June	Juillet July	Août August	Sept. Sept.	Octob. Oct.	Nov. Nov.	Déc. Dec.	Total	Towns and Governments
	2-29.I	26.II	26.III	30.IV	28.V	25.VI	30.VII	27.VIII	7.IX	29.X	26.XI	31.XII		
I. *Russie d'Europe:*														I. *European Russia:*
Arkhangel (ville)	—	—	—	—	—	—	1	—	—	—	—	—	1	Arkhangelsk (town)
Astrakhan (ville)	—	—	—	—	—	1944	1196	20	—	—	—	—	3160	Astrakhan (town)
» (gouv.)	—	—	—	—	—	1234	1448	9	—	—	—	—	2691	» (gov.)
Briansk (ville)	—	—	—	—	—	2	—	—	—	—	—	—	2	Briansk (town)
» (gouv.)	—	—	—	—	—	4	40	—	—	—	—	—	44	» (gov.)
Vitebsk (ville)	—	—	—	—	—	—	4	9	—	—	—	—	13	Vitebsk (town)
» (gouv.)	—	—	—	—	—	—	2	7	2	—	—	—	11	» (gov.)
Wladimir (ville)	—	—	—	—	—	—	—	1	—	—	—	—	1	Vladimir (town)
» (gouv.)	—	—	—	—	—	9	110	33	—	—	—	—	152	» (gov.)
Vologda (ville)	—	—	—	—	—	—	3	—	—	—	—	—	3	Vologda (town)
» (gouv.)	—	—	—	—	—	—	1	—	13	—	—	—	14	» (gov.)
Voronège (ville)	1	2	3	6	477	2021	344	41	2	—	—	—	2897	Voronege (town)
» (gouv.)	—	—	—	7	110	2844	3521	1224	259	9	—	—	7694	» (gov.)
Viatka (ville)	—	—	—	—	—	—	7	3	—	3	—	—	13	Viatka (town)
» (gouv.)	—	—	—	—	—	—	5	1	—	—	1	—	7	» (gov.)
Gomel (ville)	—	—	—	—	—	3	3	1	—	—	—	—	7	Gomel (town)
» (gouv.)	—	—	—	—	—	—	—	2	—	—	—	—	2	» (gov.)
Rostov (ville)	—	26	7	41	25	748	393	130	100	8	—	7	1485	Rostov (city)
Don (gouv.)	105	—	—	3	12	264	38	—	—	—	—	—	422	Don (gov.)
Ekaterinbourg (ville)	—	—	—	—	—	—	41	38	11	1	—	—	91	Ekaterinburg (town)
» (gouv.)	—	—	—	—	—	—	235	566	476	26	1	—	1304	» (gov.)
Ivanovo-Voznessensk (v.)	—	—	—	—	—	—	—	1	—	—	—	—	1	Ivanovo-Voznessensk (t.)
» (g.)	—	—	—	—	—	24	80	71	9	1	—	—	185	» (g.)
Kalouga (ville)	—	—	—	—	—	—	4	—	—	—	—	—	4	Kaluga (town)
» (gouv.)	—	—	—	—	—	—	12	13	—	—	—	—	25	» (gov.)
Kostroma (ville)	—	—	—	—	—	7	11	4	2	3	—	—	27	Kostroma (town)
» (gouv.)	—	—	—	—	—	4	16	—	—	—	—	—	20	» (gov.)
Koursk (ville)	—	—	—	—	—	21	5	—	—	—	—	—	26	Kursk (town)
» (gouv.)	—	—	—	—	35	870	1507	193	20	—	—	—	2675	» (gov.)
Moscou (ville)	—	—	—	—	—	72	135	49	46	5	5	—	312	Moscow (city)
» (gouv.)	—	—	—	4	37	39	176	48	9	—	—	—	313	» (gov.)
Nijni-Novgorod (ville)	—	—	—	—	—	73	230	49	6	7	—	—	365	Nijni-Novgorod (town)
» (gouv.)	—	—	—	—	—	43	399	111	6	—	—	—	559	» (gov.)
Novgorod (gouv.)	—	—	—	—	—	—	2	1	—	—	—	—	3	Novgorod (gov.)
Orel (ville)	—	—	—	—	—	15	29	5	4	—	—	—	53	Orel (town)
» (gouv.)	—	—	—	—	13	819	1080	65	2	—	—	—	1979	» (gov.)
Penza (ville)	—	—	—	—	—	22	133	76	—	—	—	—	231	Penza (town)
» (gouv.)	—	—	—	—	—	13	111	33	2	2	—	—	161	» (gov.)
Perm (ville)	—	—	—	—	—	5	115	56	28	75	12	—	291	Perm (town)
» (gouv.)	—	—	—	—	—	13	128	56	10	7	—	—	214	» (gov.)

Petrograd (ville)	—	—	—	—	—	3	2	19	10	—	—	—	34	Petrograd (city)
» (gouv.)	—	—	—	—	—	3	3	2	—	—	—	—	8	» (gov.)
Pskov (gouv.)	—	—	—	—	—	2	—	—	—	—	—	—	2	Pskov (gov.)
Riasan (ville)	—	—	—	—	—	1	7	15	1	—	—	—	24	Riazan (town)
» (gouv.)	—	—	—	—	—	86	239	7	31	—	—	—	363	» (gov.)
Rybinsk (ville)	—	—	—	—	—	2	6	—	1	—	—	—	9	Rybinsk (town)
» (gouv.)	—	—	—	—	—	—	3	2	—	—	—	—	5	» (gov.)
Samara (ville)	—	—	—	—	—	1856	1302	242	106	—	30	—	3536	Samara (town)
» (gouv.)	—	—	—	—	—	232	9280	2003	208	—	—	—	11723	» (gov.)
Saratov (ville)	—	—	—	—	—	1733	1866	118	9	—	—	—	3726	Saratov (town)
» (gouv.)	—	—	—	—	—	691	3798	431	—	—	—	—	4920	» (gov.)
Simbirsk (ville)	—	—	—	—	—	197	649	168	114	6	—	—	1134	Simbirsk (town)
» (gouv.)	—	—	—	—	—	181	1309	277	65	4	—	—	1836	» (gov.)
Smolensk (ville)	—	—	—	—	—	2	3	4	3	1	—	—	13	Smolensk (town)
» (gouv.)	—	—	—	—	—	—	2	6	3	—	—	—	11	» (gov.)
Tambov (ville)	—	—	—	—	—	179	279	176	44	—	—	—	678	Tambov (town)
» (gouv.)	—	—	—	—	—	1282	1015	755	353	—	—	—	3405	» (gov.)
Twer (ville)	—	—	—	—	—	1	1	—	—	—	—	—	2	Twer (town)
» (gouv.)	—	—	—	—	—	4	2	—	—	—	—	—	6	» (gov.)
Toula (ville)	—	—	—	—	—	29	28	4	—	—	—	—	61	Tula (town)
» (gouv.)	—	—	—	—	—	12	171	30	—	—	—	—	213	» (gov.)
Tiumène (ville)	—	—	—	—	—	—	194	48	13	—	—	—	255	Tiumene (town)
» (gouv.)	—	—	—	—	—	—	527	81	8	—	—	—	616	» (gov.)
Oufa (ville)	—	—	—	—	—	44	1513	126	12	—	—	—	1695	Ufa (town)
» (gouv.)	—	—	—	—	—	6	6809	7036	1709	323	157	—	16040	» (gov.)
Tzaritzine (ville)	—	—	—	—	40	72	677	124	41	—	—	—	954	Tzaritzyn (town)
» (gouv.)	—	—	—	—	25	1062	2499	761	6	—	—	—	4353	» (gov.)
Tcheliabinsk (ville)	—	—	—	—	—	48	520	114	67	—	—	—	749	Tcheliabinsk (town)
» (gouv.)	—	—	—	—	—	28	881	97	183	—	—	—	1189	» (gov.)
Tcherepovetz (gouv.)	—	—	—	—	—	—	2	—	—	—	—	—	2	Tcherepovetz (gov.)
Jaroslav (ville)	—	—	—	—	—	6	34	70	41	1	—	—	152	Jaroslav (town)
» (gouv.)	—	—	—	—	—	—	2	—	—	—	—	—	2	» (gov.)
Commune des Allemands	—	—	—	—	—	80	1213	204	14	—	—	—	1521	Marxland
Terr. Marie-Tcheremisses	—	—	—	—	—	20	81	12	—	—	—	—	113	Mari-Tcheremisses terr.
Terr. des Tchouvachs	—	—	—	—	—	11	275	109	42	—	—	—	437	Tchuvash territory
Glazov (ville)	—	—	—	—	—	—	—	2	—	—	—	—	2	Glazov (town)
Territoire des Votiaks	—	—	—	—	—	—	35	—	36	—	—	—	71	Votiak territory
Total pour les gouvernements et territoires de la Russie d'Europe	106	28	10	61	814	18986	46802	15959	4127	482	206	7	87588	Total for the governments and territories of European Russia
Sterlitamak (ville)	—	—	—	—	—	4	1098	26	5	—	—	—	1138	Sterlitamak (town)
Rép. S. des S. des Bachkirs	—	—	—	—	—	—	2436	5551	988	3468	—	—	12443	Bashkir Soviet Republic
Rép. S. des S. de la Russie Blanche	—	—	—	—	—	—	1	—	—	—	—	—	1	White Russian Soviet Republic
Simferopol (ville)	—	—	—	—	—	—	25	2	—	—	—	—	27	Simferopol (town)
Rép. S. des S. de Crimée	—	—	—	2	—	—	17	—	—	—	—	—	19	Crimean Soviet Republic
Kasan (ville)	—	—	—	—	1	175	1058	581	264	—	—	—	2079	Kazan (town)
Rép. auton. de Tartarie	—	—	—	—	—	46	231	—	—	—	—	—	277	Tartars auton. Republic
Ukraine	2	2	3	56	223	2096	4510	3122	17	—	18	292*	10341	Ukraine
Total pour la Russie d'Eur.	108	30	13	119	1038	21307	56178	25241	3401	[3955]	224	299	113913	Total for European Russia

* Données pour deux mois (novembre et décembre).

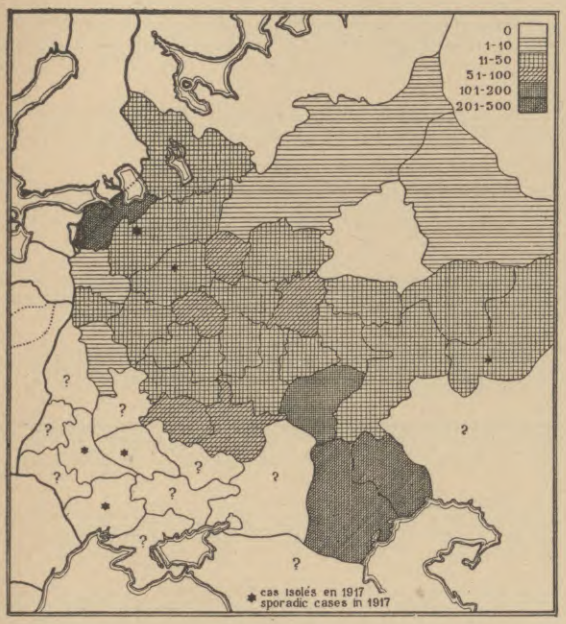
* Figures for two months (November and December).

1. Répartition mensuelle et distribution territoriale des cas de choléra enregistrés en 1921 *(suite)*.
1. Monthly Incidence and Incidence according to Governments of Registered Cases of Cholera in 1921 *(cont.)*.

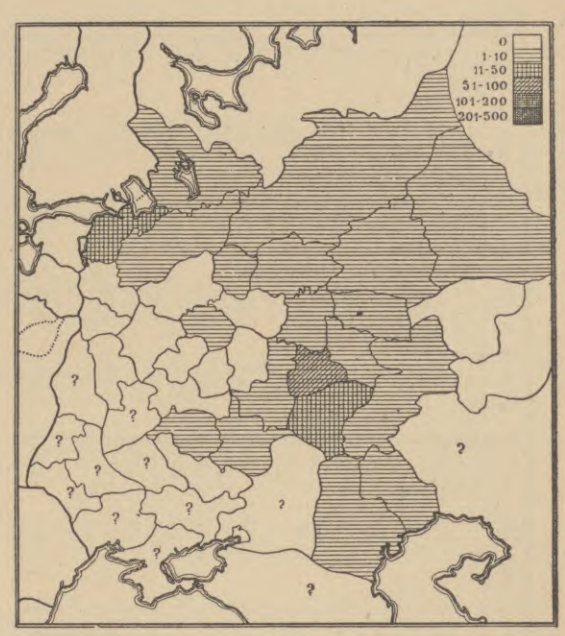
Villes et Gouvernements	Janv. Jan. 2-29.I	Fév. Feb. 26.II	Mars March 26.III	Avril April 30.IV	Mai May 25.V	Juin June 25.VI	Juillet July 30.VII	Août August 27.VIII	Sept. Sept. 7.IX	Octob. Oct. 29.X	Nov. Nov. 26.XI	Déc. Dec. 31.XII	Total	Towns and Governments
II. *Sibérie*	—	—	—	—	—	174	2372	4316	1976	—	—	—	8838	II. *Siberia*
III. *Caucase:*														III. *Caucasus:*
Krasnodar (ville)	4	2	—	27	20	243	218	74	18	12	—	—	618	Krasnodar (town)
Kouban (gouv.)	—	6	4	220	146	1179	1633	679	119	12	—	—	3998	Kuban (gov.)
Stavropol (ville)	—	—	—	3	2	60	317	56	53	—	—	—	491	Stavropol (town)
» (gouv.)	—	—	—	3	22	80	954	444	26	—	—	—	1529	» (gov.)
Tersk (gouv.)	—	—	—	1	8	124	1145	284	8	—	—	—	1570	Tersk (gov.)
Rép. d'Azerbeidjan	—	—	—	—	1	377	657	154	124	2	—	—	1315	Azerbeidjan Republic
Rép. auton. de Daghestan	—	—	—	—	—	—	188	220	92	—	—	—	500	Daghestan auton. Rep.
Vladikavkaz (ville)	1	—	3	—	—	33	65	91	49	1	—	—	243	Vladikavkaz (town)
Rép. auton. d. Montagnards	—	—	—	—	1	21	450	382	107	84	—	—	1045	Auton. Mountain Rep.
Tiflis (ville)	—	—	—	—	—	12	—	—	—	—	—	—	12	Tiflis (town)
Total pour le Caucase	5	8	7	254	200	2129	5627	2384	596	111	—	—	11321	Total for Caucasus
IV. *Asie moyenne:*														IV. *Middle Asia:*
Orenbourg (ville)	—	—	—	—	—	116	2795	686	188	—	—	—	3785	Orenburg (town)
Rép. S. des. S. des Kirghiz	—	—	—	—	—	745	7639	1909	2597	—	—	—	12890	Kirghiz Soviet Republic
Taschkent (ville)	—	—	—	—	—	—	566	623	271	114	12	2	1588	Tashkent (town)
Rép. S. des S. de Turkestan	—	—	—	—	—	88	469	335	156	19	17	—	1084	Turkestan Soviet Rep.
Total pour l'Asie moyenne	—	—	—	—	—	949	11469	3553	3212	133	29	2	19347	Total for Middle Asia
Chemins de fer	10	10	21	196	317	6199	8575	3580	1034	70	1	4	20017	Railways
Voies navigables	—	—	—	—	—	1424	1361	312	14	—	—	—	3111	Waterways
Prisons	—	—	—	—	—	73	175	66	5	19	—	—	338	Prisons
Total pour la République socialiste fédérative des Soviets russes et les Républiques Alliées	123	48	41	569	1555	32255	85757	39452	12238	4288	254	305	176885	Total for the Russian Socialist Federated Soviet Republic and the Allied Republics.

Asiatic Cholera in Russia, 1918-1921.

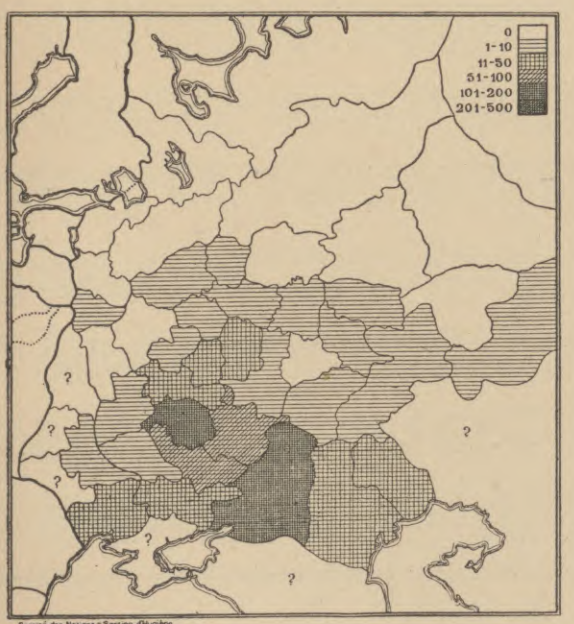
Number of cases notified per 100,000 inhabitants.



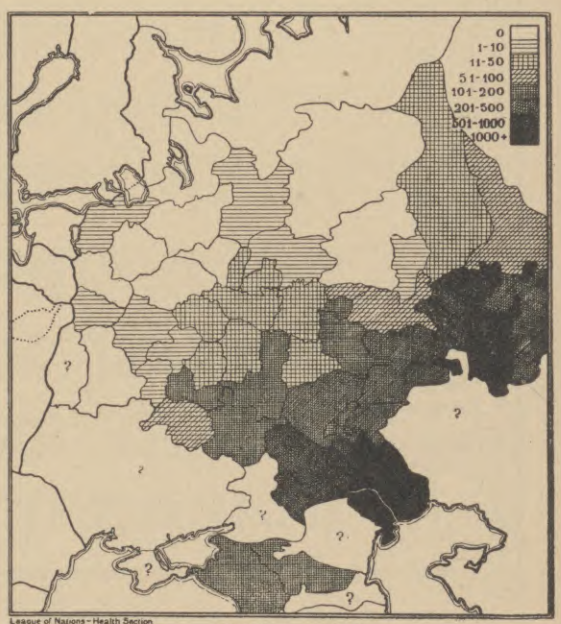
1918



1919



1920



1921 Jan.-Oct.

2. Morbidité infectieuse en Russie en 1922. (Relevés mensuels.)

2. Monthly Notifications of Infectious Diseases in Russia in 1922.

Gouvernements	Typhus exanthématique — Typhus					Fièvre récurrente — Relapsing Fever					Fièvre typhoïde — Enteric Fever					Governments
	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	
	1-28	29 I-25 II	26 II-1 IV	2-29	30-IV-13	1-28	29 I-25 II	26 II-1 IV	2-29	30-IV-13	1-28	29 I-25 II	26 II-1 IV	2-29	30-IV-12	
I. *Russie européenne :*																I. *European Russia :*
1. Arkhangel	247	268	285	193	57	279	218	176	98	23	31	48	57	22	8	1. Arkhangelsk
2. Astrakan	639	683	1045	638	221	566	604	801	402	95	33	35	38	16	10	2. Astrakhan
3. Briansk	402	1258	1745	1596	534	388	2610	2443	1693	629	197	509	491	524	188	3. Briansk
4. Vitebsk	1276	1256	1726	1053	352	1135	1040	1203	524	154	243	159	149	88	51	4. Vitebsk
5. Wladimir	1469	2434	4362	3068	1301	613	324	1273	1031	444	398	318	226	125	82	5. Vladimir
6. Vologda	547	746	1044	939	467	242	204	431	262	217	77	60	61	38	10	6. Vologda
7. Voronège	1717	1848	2562	539	618	3014	3150	3762	636	835	1267	1198	1355	238	327	7. Voronege
8. Viatka	3044	3270	6235	3185	3121	830	669	1300	924	526	137	72	109	124	29	8. Viatka
9. Gomel	1907	2273	584	—	—	1918	1597	193	—	—	695	782	189	—	—	9. Gomel
10. Don	408	531	1295	724	320	662	853	1637	767	410	198	217	246	136	86	10. Don
11. Ekaterinbourg	5383	6211	10092	9494	1885	5052	4977	9307	5926	1170	945	802	823	365	165	11. Ekaterinburg
12. Ivanovo-Voznessensk	530	991	1146	1748	438	318	294	415	256	161	78	48	46	53	18	12. Ivanovo-Voznessensk
13. Kalouga	1529	2087	3229	1593	619	965	1324	1443	727	180	286	233	217	105	59	13. Kaluga
14. Kostroma	834	995	1945	977	348	198	230	468	264	178	133	99	146	92	29	14. Kostroma
15. Kouban	1285	2245	2541	3501	1877	2322	4406	3955	3605	2095	561	1297	974	824	375	15. Kuban
16. Koursk	1622	3382	3910	1912	1301	1661	2506	2908	1776	1284	1470	1648	1494	1056	439	16. Kursk
17. Moscou (gouv.)	2609	3987	3408	2993	1330	2454	2360	1929	1247	618	135	136	114	67	23	17. Moscow (gov.)
» (ville)	2404	3255	4211	2653	1491	2632	2166	2428	1609	750	420	256	169	135	35	» (city)
18. Mourmansk	149	215	109	37	11	393	217	146	37	—	—	—	2	1	—	18. Murmansk
19. Nijni-Novgorod	1816	2327	3242	1776	951	1253	1097	1156	599	298	450	389	366	221	77	19. Nijni-Novgorod
20. Novgorod	394	469	810	515	216	187	111	259	176	71	85	93	111	43	24	20. Novgorod
21. Olonetz	139	77	104	116	34	35	28	14	11	2	8	6	12	6	5	21. Olonetz
22. Orel	945	1496	1872	645	639	1503	1859	2226	825	852	896	951	947	588	222	22. Orel
23. Penza	2057	4012	6158	2925	1784	2947	3931	541	1932	1850	776	564	484	336	366	23. Penza
24. Perm	6070	6043	8420	5166	3547	1807	1785	2232	816	—	219	314	363	263	—	24. Perm
25. Petrograd (gouv)	615	529	736	465	214	279	204	211	136	54	47	21	40	53	17	25. Petrograd (gov.)
» (ville)	1517	1216	1273	871	1042	1098	667	626	68	233	36	18	24	10	3	» (city).
26. Pskov	407	556	768	517	129	302	225	334	172	97	100	98	110	70	34	26. Pskov
27. Riazan	1321	2456	3034	1730	796	704	1305	1085	711	273	420	710	432	285	106	27. Riazan
28. Rybinsk	1216	2153	1059	347	—	774	1251	521	98	—	20	81	24	3	—	28. Rybinsk
29. Samara	4078	3827	6057	2755	1906	5643	3350	7266	2803	2326	1914	653	1696	697	517	29. Samara
30. Saratov	6463	7846	6651	3712	674	4668	5022	2696	2434	300	1337	1039	623	187	28	30. Saratov
31. Dvina septentr.	524	853	992	566	214	77	270	156	68	15	39	56	64	29	9	31. North. Dvina
32. Simbirsk	2385	7262	5529	—	—	1337	4726	5025	—	—	996	1748	1495	—	—	32. Simbirsk
33. Smolensk	1806	2327	3407	2927	1173	1626	1681	1668	1634	578	354	338	228	231	127	33. Smolensk
34. Tambov	2393	2890	4592	2967	1169	5907	5037	6013	722	1475	2185	1793	1976	1001	452	34. Tambov
35. Tver	1195	1366	2427	1467	278	668	702	602	535	285	256	99	83	61	—	35. Twer
36. Toula	1952	2774	3886	2162	751	1515	1486	1370	939	505	392	247	180	88	61	36. Tula
37. Tiumène	1249	1886	2745	1299	930	1129	895	1598	857	609	487	278	544	246	209	37. Tiumene
38. Oufa	867	1373	2326	1019	910	2071	2433	3226	1364	1244	727	1113	772	396	323	38. Ufa
39. Tzaritzine	651	597	838	970	424	1385	1190	1651	1223	547	250	240	407	301	337	39. Tzaritzyn
40. Tcheliabinsk	815	488	443	185	—	2732	1372	1026	353	—	863	58	136	32	—	40. Tcheliabinsk

41. Tcherepovetz	338	326	559	273	—	136	114	146	79	—	59	65	52	26	—	41. Tcherepovetz
42. Jaroslav	865	1204	1991	1621	839	520	329	549	471	232	126	51	29	15	9	42. Jaroslav
43. Commune des Allemands	1979	1737	2334	643	367	251	135	288	87	39	315	209	107	46	23	43. Marxland
44. Carélie	206	1175	412	344	71	179	121	130	140	22	1	20	7	27	2	44. Karelian Rep.
45. Ter. des Votiaks	1880	1837	3409	2933	—	438	492	658	722	—	87	204	72	59	—	45. Votiak Terr.
46. Ter. des Zyrians	33	112	123	50	10	79	31	20	10	10	13	27	14	17	2	46. Zyrian Terr.
47. Ter. des Kalmouks	13	19	13	25	—	37	11	16	8	—	17	13	11	3	—	47. Kalmuk Terr.
48. Ter. de Marie-Tcheremisses	695	962	2374	1058	573	151	306	1032	396	221	110	94	150	23	37	48. Mari-Tcheremisses Terr.
49. Région des Tchouvachs	480	1197	1766	1228	—	514	880	1367	784	—	125	179	145	244	—	49. Tchuvash Terr.
Total pour les Gouv. et Régions	75186	100765	131534	79210	39952	67832	73741	85630	46117	9389	21014	19686	18629	9616	4924	Total for gov. and regions of Eur. Rus.
50. République des Bachkirs	348	50	765	686	379	479	117	1038	969	578	158	27	234	142	174	50. Bashkir Soviet Republic
51. République de la Russie Blanche:	1841	2017	2363	—	—	1987	2237	1517	—	—	205	208	174	—	—	51. White Russia Soviet Republic
52. Rép. de Crimée	—	508	1343	1777	1154	—	308	518	812	514	127	233	212	273	107	52. Crimea Sov. Rep.
53. Rép. de Tartarie	5600	6519	—	—	—	2719	2722	—	—	—	956	710	—	—	—	53. Tartar Republic
54. Ukraine	20921	23606	18685	—	—	28980	38313	16541	—	—	11637	8473	4934	—	—	54. Ukraine
Total pour la Russie d'Europe	103896	133465	154692	81673	37485	101997	117438	105253	47898	23445	34097	29337	24183	10031	5205	Total European Russia
II. *Caucase:*																II. *Caucasus*
1. Stavropol	300	364	654	677	359	514	663	715	991	784	367	399	392	220	244	1. Stavropol
2. Tersk	319	415	302	409	307	627	788	448	604	422	99	182	236	126	84	2. Tersk
3. Rép. des S. des Montagnards	1153	1735	1274	404	153	1071	1458	1826	646	217	220	239	246	140	27	3. Mountain Soviet Republic
4. Rép. de Géorgie	366	—	120	—	—	—	—	—	—	—	—	—	—	—	—	4. Georgian Rep.
5. Daghestan	346	541	657	107	18	841	1145	1373	486	45	23	24	85	1	—	5. Daghestan
6. Kabardinsk	799	172	231	178	—	197	150	162	70	—	36	11	32	6	—	6. Kabardinsk
Total pour le Caucase	3283	3217	3238	1775	837	3250	4794	4524	2797	1468	745	855	991	493	355	Total for Caucasus
III. *Sibérie:*	10910	9551	13283	3687	—	10192	3925	11321	3328	—	3064	2099	2044	479	—	III. *Siberia*
IV. *Asie moyenne:*																IV. *Middle Asia:*
1. Rép. des S. des Kirghises	3669	5699	3848	1834	784	11286	13602	6842	3487	1472	2140	2601	1996	567	—	1. Kirghiz Sov. Rep.
2. République du Turkestan	5266	8791	5305	3034	683	5422	7709	5204	2650	753	741	391	652	278	62	2. Turkestan Republic
Total Asie moyenne	8435	14490	9153	4868	1467	16603	21311	12046	6137	2225	2881	2992	2648	845	62	Total for Middle Asia
Voies navigables	513	732	263	—	—	450	339	202	—	—	53	48	24	—	—	Waterways
Chemins de fer	18666	65502	88365	16365	8852	17677	57532	74438	10211	6280	3126	10030	12358	1110	553	Railways
Prisons	378	426	438	62	—	859	862	1040	255	—	39	22	7	—	—	Prisons
Total pour la R.S.F.R des Sov. et les Républiques alliées	146581	227382	269492	108430	48641	151133	210601	208854	76626	33418	44005	45423	41255	12958	6175	Total for the Soviet Republic and Allied Republics

2. Morbidité infectieuse en Russie en 1922. (Relevés mensuels.) (*Suite.*)
2. Monthly Notifications of Infectious Diseases in Russia in 1922. (*Continued.*)

Gouvernements	Dysenterie — Dysentery					Variole — Smallpox					Scarlatine — Scarlet Fever					Governments
	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	
	1-28	29.I-25	26.II-1.IV	2-29	30.IV-13	1-28	29.I-25	26.II-1.IV	2-29	30.IV-13	1-28	29.I-25	26.II-1.IV	2-29	30.IV-13	
I. *Russie européenne:*																I. *European Russia:*
1. Arkhangel	5	8	8	5	2	17	24	20	7	18	29	47	57	31	16	1. Arkhangelsk
2. Astrakan	7	8	17	12	10	88	97	57	25	23	10	5	2	2	4	2. Astrakhan
3. Briansk	64	30	31	43	8	20	52	20	16	3	45	150	85	25	26	3. Briansk
4. Vitebsk	43	42	29	34	14	30	40	31	12	6	152	89	126	55	18	4. Vitebsk
5. Wladimir.	73	71	64	68	36	51	64	88	25	16	76	162	188	85	74	5. Vladimir
6. Vologda	8	7	9	10	2	17	11	112	37	12	70	52	94	61	8	6. Vologda
7. Voronège	740	263	753	202	—	59	30	120	52	—	74	34	34	12	—	7. Voronege
8. Viatka	13	—	—	—	—	220	159	498	432	157	65	110	227	105	23	8. Viatka
9. Gomel	201	264	5	—	—	104	42	5	—	—	325	310	36	—	—	9. Gomel
10. Don	116	418	305	85	85	17	42	76	49	68	11	20	20	19	28	10. Don
11. Ekaterinbourg	88	118	181	138	—	356	214	251	84	—	52	25	78	28	—	11. Ekaterinburg
12. Ivanovo-Voznessensk	4	4	15	10	7	46	75	111	37	19	70	95	121	71	36	12. Ivanovo-Voznessensk
13. Kalouga	86	130	136	94	28	52	62	34	42	26	149	104	148	73	24	13. Kaluga
14. Kostroma	11	17	42	14	2	60	50	136	71	8	90	156	190	61	11	14. Kostroma
15. Kouban	73	134	108	122	158	87	404	136	276	209	19	22	7	7	2	15. Kuban
16. Koursk	155	161	192	281	—	98	106	130	169	—	181	199	175	178	—	16. Kursk
17. Moscou (gouv.)	33	29	52	44	58	27	42	51	46	10	302	314	229	170	74	17. Moscow (gov.)
« (ville)	62	57	59	46	35	71	88	63	24	19	241	200	140	116	71	» (city)
18. Mourmansk	3	—	—	—	—	—	—	3	1	—	—	—	2	—	—	18. Murmansk
19. Nijni-Novgorod	—	—	—	—	—	26	48	43	51	8	51	105	40	31	—	19. Nijni-Novgorod
20. Novgorod	—	—	—	—	—	6	2	3	8	—	25	98	176	63	—	20. Novgorod
21. Olonetz	2	—	—	—	—	—	—	—	—	—	7	15	14	12	—	21. Olonetz
22. Orel	139	198	215	100	89	83	121	81	46	31	207	253	116	19	24	22. Orel
23. Penza	132	1	—	—	—	49	94	28	—	—	385	252	29	—	—	23. Penza
24. Perm	275	143	253	200	—	80	55	151	108	—	65	65	75	34	—	24. Perm
25. Petrograd (gouv)	12	6	5	2	—	14	30	11	13	7	84	53	116	73	22	25. Petrograd (gov.)
» (ville)	19	44	31	9	12	11	13	28	8	16	62	60	57	27	13	» (city)
26. Pskov	20	13	15	44	21	33	11	21	4	2	71	92	54	35	15	26. Pskov
27. Riazan	63	144	29	57	38	769	248	157	121	50	179	277	243	68	12	27. Riazan
28. Rybinsk	1	45	—	—	—	13	16	1	5	—	76	227	28	14	—	28. Rybinsk
29. Samara	798	679	1687	1215	714	71	76	206	148	121	210	270	236	95	57	29. Samara
30. Saratov	—	—	—	—	—	131	67	46	—	—	229	130	122	—	—	30. Saratov
31. Dvina septentr.	8	8	33	15	4	25	54	78	62	10	28	47	34	39	3	31. North. Dvina
32. Simbirsk	342	489	445	—	—	64	395	119	—	—	230	390	254	—	—	32. Simbirsk
33. Smolensk	120	71	60	62	57	37	18	33	13	8	360	233	133	81	47	33. Smolensk
34. Tambov	199	81	68	61	—	287	138	106	88	—	137	64	45	4	—	34. Tambov
35. Tver	72	41	29	30	—	64	48	69	42	—	137	125	123	48	—	35. Twer
36. Toula	62	69	70	76	24	85	87	47	42	5	246	158	99	49	11	36. Tula
37. Tiumène	18	9	39	39	20	29	197	144	110	85	23	47	110	31	15	37. Tiumene
38. Oufa	266	666	676	774	623	18	4	29	9	3	51	99	138	25	25	38. Ufa
39. Tzaritzine	66	90	154	256	216	50	60	235	90	39	100	71	104	64	24	39. Tzaritzyn
40. Tcheliabinsk	9	—	355	—	—	5	15	—	—	—	2	—	50	—	—	40. Tcheliabinsk

41. Tcherepovetz	13	5	1	11	—	32	26	17	14	—	50	49	65	17	—	41. Tcherepovetz
42. Jaroslav	32	5	2	3	3	64	118	152	126	33	57	117	105	112	13	42. Jaroslav
43. Commune des Allemands	36	14	61	168	133	25	19	28	1	2	8	1	11	22	1	43. Marxland
44. Carélie	6	1	1	—	4	7	7	24	18	1	10	3	—	—	—	44. Karelian Rep.
45. Ter. des Votiaks	202	127	140	—	—	34	46	52	—	—	43	28	29	—	—	45. Votiak Terr.
46. Ter. des Zyrians	—	—	—	—	—	—	—	30	—	1	—	—	11	7	1	46. Zyrian Terr.
47. Ter. des Kalmouk	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	47. Kalmuk Terr.
48. Ter. Marie-Tcheremisses	24	24	17	47	—	12	29	100	91	37	16	7	2	1	—	48. Mari-Tcheremisses Terr.
49. Région des Tchouvachs	18	14	48	42	—	26	30	70	110	—	5	11	9	4	—	49. Tchuvash Terr.
Total pour les Gouv. et régions	4739	4748	6442	4419	2403	3569	3659	4066	2733	1043	5110	5394	4587	2074	698	Total for gov. and regions of Eur. R.
50. Rép. sov. des Bachkirs	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50. Bashkir Soviet Republic
51. Rép. sov. de la Russie Blanche	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51. White Russia Soviet Republic
52. Rép. sov. de Crimée	17	42	24	—	—	123	122	93	—	—	83	124	46	—	—	52. Crimea Sov. Rep.
53. Rép. de Tartarie	—	—	—	—	—	35	48	—	—	—	—	—	—	—	—	53. Tartar Republic
54. Ukraine	1154	1657	649	—	—	682	800	294	—	—	1863	1339	461	—	—	54. Ukraine
Total pour la Russie d'Europe	6000	6447	7115	4419	2403	4409	4629	4453	2733	1043	7056	6857	5094	2074	698	Total European Russia
II. *Caucase:*																II. *Caucasus:*
1. Stavropol	56	93	55	123	84	40	66	49	34	51	57	35	12	—	12	1. Stavropol
2. Tersk	21	27	118	134	86	54	53	65	29	28	3	22	10	4	2	2. Tersk
3. Rép. sov. des S. des Montagnards	74	62	53	103	30	2	1	20	99	37	2	8	4	35	—	3. Mountain Soviet Republic
4. Rép. de Géorgie	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4. Georgian Rep.
5. Daghestan	—	—	—	—	—	24	14	4	17	—	—	—	—	—	—	5. Daghestan
6. Kabardinsk	—	—	—	—	—	—	—	92	—	—	—	—	—	—	—	6. Kabardinsk
Total pour le Caucase	151	182	226	360	200	120	134	230	179	116	62	55	26	39	14	Total for Caucasus
III. *Sibérie:*	—	—	—	—	—	897	1109	895	—	—	2667	2171	1319	—	—	III. *Siberia:*
IV. *Asie moyenne:*																IV. *Middle Asia:*
1. Rép. des S. des Kirghises	1648	1711	1923	1063	—	—	—	—	—	—	—	—	—	—	—	1. Kirghiz Soviet Republic
2. République du Turkestan	702	617	42	—	—	58	63	5	37	25	13	8	7	4	—	2. Turkestan Republic
Total Asie moyenne	2350	2328	1965	1063	58	58	63	5	37	25	13	8	7	4	—	Total for Middle Asia
Voies navigables	20	10	13	—	—	24	36	16	—	—	—	—	—	—	—	Waterways
Chemins de fer	269	1423	1517	1010	627	225	993	1411	184	100	—	—	—	—	—	Railways
Prisons	53	128	82	10	—	—	—	1	—	—	—	—	—	—	—	Prisons
Total pr la R.S.F.R. des Sov. et les Républiques alliées	8843	10518	10918	6862	3230	5733	6964	7011	3133	1284	9798	9091	6446	2113	712	Total for the Soviet Republic and Allied Republics

2. Morbidité infectieuse en Russie en 1922 (Relevés mensuels) (*Suite*).

2. Monthly Notifications of Infectious Diseases in Russia in 1922 (*Continued*).

Gouvernements	Diphtérie — Diphtheria					Grippe — Influenza					Paludisme — Malaria					Governments
	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	
	1-28	29.I-25	26.II-1.IV	2-29	30.IV-13	1-28	29.I-25	26.II-1.IV	2-29	30.IV-13	1-28	29 I-25	26.II-1.IV	2-29	30.IV-13	
I. *Russie européenne :*																I. *European Russia :*
1. Arkhangel	4	3	7	15	5	25	—	42	343	119	36	99	634	1020	602	1. Arkhangelsk
2. Astrakan	11	3	9	8	5	—	—	—	—	25	—	—	—	—	—	2. Astrakhan
3. Briansk	15	4	13	13	—	82	16	83	227	11	86	97	169	230	30	3. Briansk
4. Vitebsk	46	74	114	58	18	687	987	1223	674	237	1	2	14	19	5	4. Vitebsk
5. Wladimir	58	49	80	58	11	—	—	289	955	776	273	265	229	1342	1450	5. Vladimir
6. Vologda	6	5	12	3	—	—	93	—	138	16	—	—	—	—	—	6. Vologda
7. Voronège	24	12	83	86	—	—	—	209	—	—	24	45	237	64	—	7. Voronege
8. Viatka	5	13	11	5	—	—	—	—	—	—	—	—	—	—	—	8. Viatka
9. Gomel	203	156	31	—	—	1003	1177	336	—	—	70	22	6	—	—	9. Gomel
10. Don	15	12	17	12	8	136	318	394	278	78	—	—	—	—	—	10. Don
11. Ekaterinbourg	86	25	97	41	—	859	640	1162	399	—	—	151	—	—	—	11. Ekaterinburg
12. Ivanovo-Voznessensk	26	13	26	39	9	—	—	47	25	6	24	23	68	218	245	12. Ivanovo-Voznessensk
13. Kalouga	41	58	48	31	8	1125	1094	1736	960	238	—	—	—	—	—	13. Kaluga
14. Kostroma	7	24	19	13	6	27	124	103	84	21	28	—	—	—	—	14. Kostroma
15. Kouban	11	10	16	11	4	39	118	134	146	59	321	7	—	—	—	15. Kuban
16. Koursk	93	61	75	74	—	—	—	—	—	—	—	—	—	—	—	16. Kursk
17. Moscou (gouv.)	85	87	84	39	12	132	665	—	633	210	383	610	1308	2980	1352	17. Moscow (gov.)
» (ville)	72	115	116	41	31	295	299	614	196	135	17	17	132	144	203	« (city)
18. Mourmansk	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18. Murmansk
19. Nijni-Novgorod	10	6	6	5	—	—	—	—	—	—	—	—	—	—	—	19. Nijni-Novgorod
20. Novgorod	17	26	26	26	—	—	—	—	—	—	17	19	48	62	—	20. Novgorod
21. Olonetz	—	—	—	—	—	2	—	—	7	—	—	—	2	1	—	21. Olonetz
22. Orel	87	79	19	39	20	2273	3701	4593	1404	862	—	—	—	—	—	22. Orel
23. Penza	67	60	12	—	—	—	—	—	—	—	359	555	161	—	—	23. Penza
24. Perm	5	25	24	9	—	4	—	—	50	—	16	8	67	83	—	24. Perm
25. Petrograd (gouv.)	14	17	25	15	—	—	—	141	50	27	—	—	—	—	—	25. Petrograd (gov.)
» (ville)	64	39	43	43	26	167	178	130	114	134	—	—	—	—	—	» (city)
26. Pskov	21	20	40	19	2	—	172	—	—	—	4	11	10	17	4	26. Pskov
27. Riazan	60	128	73	34	8	443	640	1680	695	225	—	—	—	—	—	27. Riazan
28. Rybinsk	22	103	1	2	—	—	271	—	—	—	—	—	—	—	—	28. Rybinsk
29. Samara	123	93	143	59	24	2221	1479	3032	1738	1136	—	—	—	—	—	29. Samara
30. Saratov	76	61	39	—	—	—	—	—	—	—	—	—	—	—	—	30. Saratov
31. Dvina septentr.	2	—	6	—	—	—	—	17	—	—	39	108	1157	2222	663	31. North. Dvina
32. Simbirsk	81	98	100	—	—	2454	4779	3433	—	—	928	2470	3910	—	—	32. Simbirsk
33. Smolensk	97	94	95	51	41	—	745	2288	1655	587	—	—	—	—	—	33. Smolensk
34. Tambov	112	37	42	11	—	893	625	365	170	—	—	—	—	—	—	34. Tambov
35. Tver	49	57	66	22	—	—	—	—	584	—	46	30	86	78	—	35. Twer
36. Toula	59	82	34	32	11	360	322	618	523	158	—	—	—	—	—	36. Tula
37. Tiumène	18	37	38	19	5	158	184	228	98	104	—	—	—	—	—	37. Tiumene
38. Oufa	54	41	36	10	12	—	—	—	—	—	—	—	—	—	—	38. Ufa
39. Tzaritzine	15	33	65	40	17	132	129	316	222	166	315	239	475	617	859	39. Tzaritzyn
40. Tcheliabinsk	1	—	13	—	—	—	—	—	—	—	—	—	—	—	—	40. Tcheliabinsk

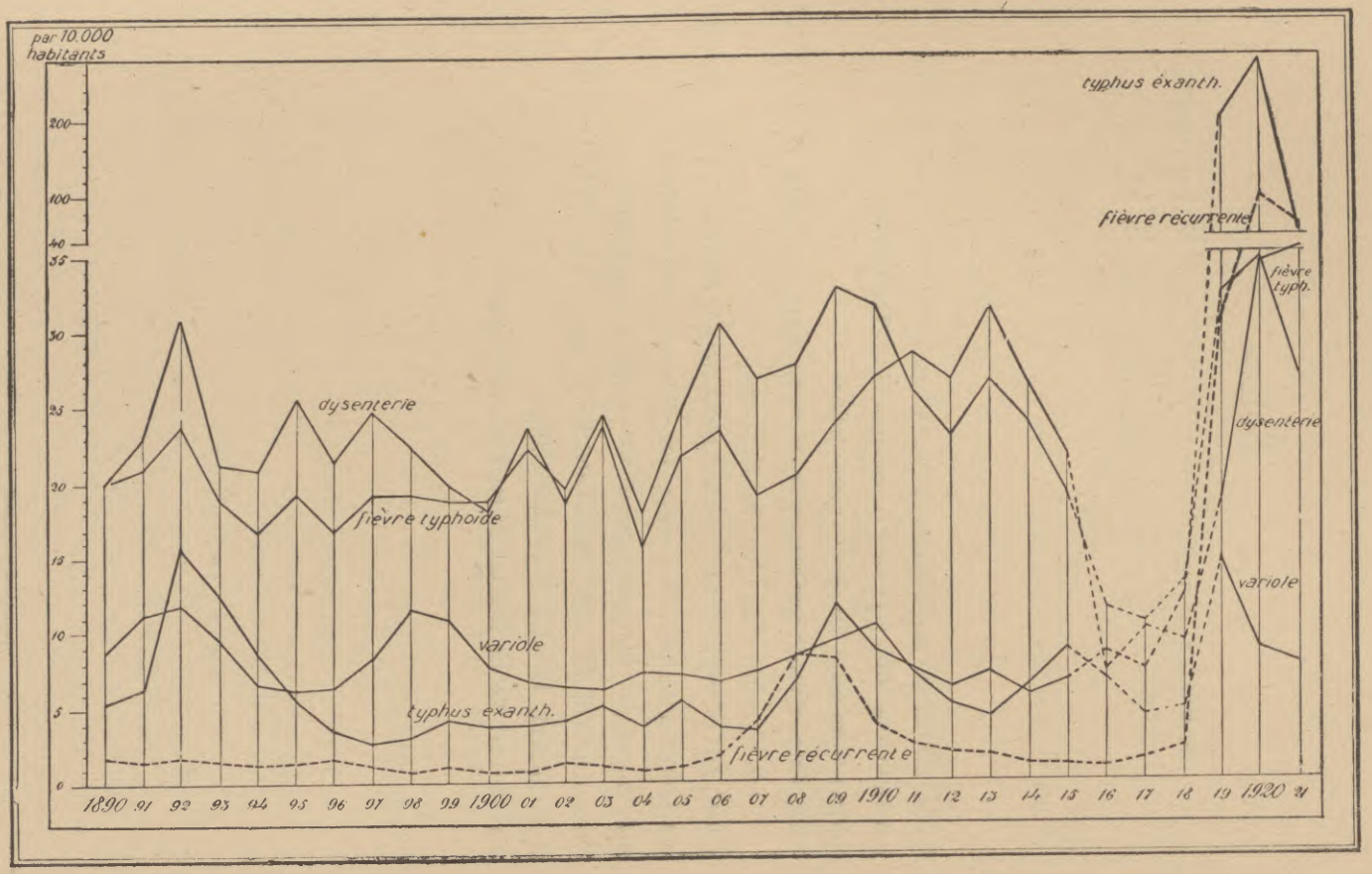
41. Tcherepovetz	2	—	1	4	—	476	463	626	854	—	—	—	—	—	—	41. Tcherepovetz
42. Jaroslav	35	25	22	13	8	—	—	—	—	—	7	8	3	8	—	42. Jaroslav
43. Commune des Allemands	10	11	23	5	3	—	—	—	—	—	—	—	—	—	—	43. Marxland
44. Carélie	1	—	2	—	—	28	31	20	4	53	—	—	—	—	—	44. Karelian Rep.
45. Ter. des Votiaks	42	4	6	—	—	1061	1258	1599	—	—	350	240	762	—	—	45. Votiak Terr.
46. Ter. des Zyrians	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	46. Zyrian Terr.
47. Ter. des Kalmouks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	47. Kalmuk Terr.
48. Ter. des Marie-Tcheremisses	1	1	1	29	—	305	454	321	150	—	—	—	—	—	—	48. Mari-Tcheremisses Terr.
49. Région des Tchouvachs	2	2	2	2	—	353	520	675	430	—	—	—	—	—	—	49. Tchuvash Territory
Total pr les Gouv. et régions	1955	1903	1953	1036	276	15754	21482	26454	13766	5386	3344	5026	10178	9105	5413	Total for gov. and regions of Eur. R.
50. République des Bachkirs	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50. Bashkir Soviet Republic
51. République de la Russie Blanche	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51. White Russia Soviet Republic
52. Rép. de Crimée	19	20	17	—	—	147	237	184	—	—	—	—	—	—	—	52. Crimea Sov. Rep.
53. Rép. de Tartarie	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	53. Tartar Republic
54. Ukraine	941	682	243	—	—	—	—	—	—	—	—	—	—	—	—	54. Ukraine
Total pour la Russie d'Europe	2915	2605	2213	1036	276	15901	21720	26638	13766	5383	3344	5026	10178	9105	5413	Total European Russia
II. *Caucase:*																II. *Caucasus:*
1. Stavropol	9	15	4	5	3	213	173	129	76	68	—	1	10	—	6	1. Stavropol
2. Tersk	3	19	16	—	4	53	62	33	23	28	14	16	53	13	35	2. Tersk
3. Rép. des S. des Montagnards	1	1	4	4	2	179	233	225	116	105	—	—	—	—	—	3. Mountain Soviet Republic
4. Rép. de Géorgie	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4. Georgian Rep.
5. Daghestan	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5. Daghestan
6. Kabardinsk	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6. Kabardinsk
Total pour le Caucase	13	35	24	9	9	445	468	387	215	201	14	17	63	13	41	Total for Caucasus
III. *Sibérie:*	1320	1190	973	—	—	—	—	—	—	—	—	—	—	—	—	III. *Siberia*
IV. *Asie moyenne:*																IV. *Middle Asia:*
1. Rép. des S. des Kirghises	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1. Kirghiz Soviet Republic
2. République du Turkestan	26	26	14	—	—	—	—	—	—	—	—	—	—	—	—	2. Turkestan Republic
Total Asie moyenne	26	26	14	—	—	—	—	—	—	—	—	—	—	—	—	Total for Middle Asia
Voies navigables	—	—	—	—	—	—	198	300	—	—	164	420	488	—	—	Waterways
Chemins de fer	8	74	783	—	—	—	—	—	—	—	2093	7372	8004	3739	1844	Railways
Prisons	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Prisons
Total pr la R.S.F.R. des Sov. et les Républiques alliées	4282	3932	4007	1045	285	16346	22386	27325	13981	5584	5615	12835	18733	12857	7298	Total for the Soviet Republic and Allied Republics

2. Morbidité infectieuse en Russie en 1922. (Relevés mensuels.) *(Fin.)*

2. Monthly Notifications of Infectious Diseases in Russia in 1922. *(Concluded.)*

Gouvernements	Scorbut — Scurvy					Government
	Janv. Jan.	Fév. Feb.	Mars March	Avril April	Mai May	
	1-28	29.I-25	26.II-1.-IV	2-29	30.IV-13	
I. *Russie europ.:*						I. *Europ. Russia:*
1. Arkhangel	2	—	7	4	7	1. Arkhangelsk
2. Astrakan	—	7	28	2	9	2. Astrakhan
3. Briansk	215	152	449	68	168	3. Briansk
4. Vitebsk	2	—	11	1	3	4. Vitebsk
5. Wladimir	229	252	408	360	203	5. Vladimir
6. Vologda	73	44	11	24	8	6. Vologda
7. Voronège	73	111	62	66	—	7. Voronege
8. Viatka	424	541	615	339	149	8. Viatka
9. Gomel	16	9	—	—	—	9. Gomel
10. Don	4	—	—	—	—	10. Don
11. Ekaterinbourg	1	98	162	199	14	11. Ekaterinburg
12. Ivanovo-Voznessensk	39	45	60	37	34	12. Ivanovo-Vozniessiensk
13. Kalouga	78	76	209	146	63	13. Kaluga
14. Kostroma	34	28	57	14	31	14. Kostroma
15. Kouban	2	144	186	149	109	15. Kuban
16. Koursk	—	—	30	292	169	16. Kursk
17. Moscou (Gouv.)	522	569	703	433	113	17. Moscow (Gov.)
» (Ville)	8	5	13	1	6	Moscow (City):
18. Mourmansk	—	—	—	61	40	18. Murmansk
19. Nijni-Novgor.	15	—	112	170	75	19. Nijni-Novgor.
20. Novgorod	38	46	108	45	24	20. Novgorod
21. Olonetz	—	—	—	—	—	21. Olonetz
22. Orel	—	—	—	—	—	22. Orel
23. Penza	154	1458	1839	1428	798	23. Penza
24. Perm	15	49	21	15	—	24. Perm
25. Petrograd (G.)	8	17	—	—	—	25. Petrograd (G.)
» (V.)	—	—	12	2	5	Petrograd (C.):
26. Pskov	44	76	230	83	17	26. Pskov
27. Riazan	137	225	261	126	51	27. Riazan
28. Rybinsk	25	77	5	3	—	28. Rybinsk
29. Samara	319	307	1228	501	507	29. Samara
30. Saratov	—	—	—	—	—	30. Saratov
31. Dvina sept.	2	6	14	11	—	31. North. Dvina
32. Simbirsk	1305	2099	1847	—	—	32. Simbirsk
33. Smolensk	194	133	221	107	58	33. Smolensk
34. Tambov	—	—	—	—	—	34. Tambov
35. Tver	344	288	366	136	—	35. Twer
36. Toula	—	—	—	—	—	36. Toula
37. Tiumène	—	—	—	—	—	37. Tiumene
38. Oufa	74	126	93	9	102	38. Ufa
39. Tzaritzine	63	63	347	198	155	39. Tzaritzyn
40. Tcheliabinsk	78	—	3	—	—	40. Tcheliabinsk
41. Tcherepovetz	29	—	—	—	—	41. Tcherepovetz
42. Jaroslav	77	135	99	61	14	42. Jaroslav
43. Commune des Allemands	—	—	3	20	2	43. Marxland
44. Carélie	—	30	10	13	1	44. Karelian Rep.
45. Ter. Votiaks	638	631	682	487	—	45. Votiak Terr.
46. Ter. Zyrians	—	—	—	—	—	46. Zyrian Terr.
47. Ter. Kalmouks	14	7	3	—	—	47. Kalmuk Terr.
48. Ter. Marié-Tcheremisses	279	697	2866	1220	753	48. Mari-Tcheremisses Terr.
49. Région des Tchouvachs:	—	53	147	176	—	49. Tchuvash Territory
Total pour les Gouvernements et régions	5574	8553	13528	7025	3663	Total for governments and regions of Eur. Russia
50. Républ. des Bachkirs	—	—	—	376	194	50. Bashkir Republic
51. Rép. de Russie Blanche	—	—	—	—	—	51. White Russia Soviet Rep.
52. Rép. Crimée	33	88	50	—	—	52. Crimea Sov. Rep.
53. Rép. Tartarie	1815	—	—	—	—	53. Tartar Rep.
54. Ukraine	400	1598	1367	—	—	54. Ukraine
Total pour la Russie d'Europe	7822	10239	15121	7401	3857	Total European Russia
II. *Caucase:*						II. *Caucasus:*
1. Stavropol	44	46	37	16	16	1. Stavropol
2. Tersk	—	33	100	—	5	2. Tersk
3. Rép. des S. des Montagnards	10	—	167	15	7	3. Mountain Sov. Republic
4. Rép. de Géorgie	—	—	—	—	—	4. Georgian Rep.
5. Daghestan	—	—	—	—	—	5. Daghestan
6. Kabardinsk	—	—	351	—	—	6. Kabardinsk
Total pr Caucase	54	79	655	31	32	Total for Caucasus
III. *Sibérie:*	105	76	486	340	297	III. *Siberia:*
IV. *Asie moyenne:*						IV. *Middle Asia:*
1. Rép. des S. des Kirghises	27	387	236	418	—	1. Kirghiz Soviet Republic
2. République de Turkestan	23	3	—	16	13	2. Turkestan Republic
Total Asie moyenn.	50	390	238	434	13	Total Middle Asia
Voies navigables	17	5	2	—	—	Waterways
Chemins de fer	308	1040	1502	411	142	Railways
Prisons	44	107	101	30	—	Prisons
Total pour la R.S.F.R. des Sov. et les Rép. alliées	8400	11936	18103	8647	4341	Total for the Soviet Republic and Allied Republics

Infectious diseases in Russia, 1890-1921, per 10,000 inhabitants.



ERRATA

IN PART I OF THE REPORT BY PROFESSOR L. TARASSÉVITCH.

(See *Epidemiological Intelligence*, No. 2.)

Page 6, fourth line of the last paragraph: for «disinfection» read «disinsection».

Page 7, fourth line of Note (1): for «Tcherrtoff» read «Tchertoff».

Page 8, twenty-third line: for «1921» read «1920».

Page 12, fifth, sixth, seventh and eighth lines: in all figures showing proportion of morbidity read not «$^0/_0$» but «$^0/_{000}$» (per ten thousand).

Page 13, fourth line of the text and first and third lines of the notes: for «Federoff» read «Federof».

Page 14, antipenultimate line of the notes: for «Masson» read «Mañson».

Page 17, fifth line of the fourth paragraph: for «12,000» read «10,000».

Page 21, first column of the table, second and third lines: for «per 10,000» read «per 1000».
third column: for «1,639» read «163,9».

Page 24, eighth line: for «is estimated» read «he estimates».

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