PLAGUE IN SOUTHEAST RUSSIA.

1877 - 1927.

Translation prepared by:
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None of the five large territorial foci of plague has been investigated as thoroughly and systematically as the one in southeastern Russia. But none of these is as little recognized in its significance as a prospective source of an epidemic or even pandemic outbreak, as this springboard situated at the gates between Asia and Europe which at the same time might be considered as a European glacis. The center of the real area of the plague is defined by a line drawn from Saratov to Uralsk - Gurev - Astrakhan and back to Saratov. The eastern and western boundaries of this parallelogram are formed by the lower river courses of the Volga and Ural rivers, the northern boundaries by the railroad Kuibyshev-Orenburg, and the southern boundaries by the territory situated between the delta of the two rivers. The border areas of this plague territory are the Kalmyk Steppe west of the Volga and parts of the district of Rostov on the Don and Voroshilovsk (Stavropol), and in addition the so-called Kirghiz Steppe east of the lower river courses of the Volga and the Ural. From there eastward the steppes and deserts continue far into Asia and finally join the higher Asiatic foci of the plague which has one of its principal centers in the Altai and the Tarbagatai mountains. Moreover this border area includes the whole east coast of the Caspian Sea, the fortress-like peninsula of which, Mangyshlak, is connected with the southeastern regions of Central Asia (Turkestan and Uzbekistan). It is from the animal world of this gigantic border territory susceptible to plague that the central area of this plague endemic, which is itself situated as a border area before the great, densely populated and fertile territory of eastern Europe, is contaminated with the plague virus. This ambiguous position, namely the transition from the Asiatic steppe and desert to the cultivated European soil with its extensive production of grain constitutes its geo-medical importance, since man as well as animals and plants are tied together to a community in such a peculiar environment that the health or disease of one group will decisively influence the well being of any other group within the community. None of them can escape from the geomedical conditions which arise when the equilibrium is disturbed and they will have the same fate. This fact must be considered carefully and dealt with accordingly when the incidence of disease in these areas is observed and investigated.

As a particular basis on which the epidemics of the southeast often progress to a really dramatic climax the soil should be mentioned. According to the observations of the Russian scientists it is remarkable that a great part of the endemic plague incidence among the rodents of the southeast is located in the salt steppe which as a residue of the Caspian Sea transition to land is situated to a great extent below sea level. For the time being one is under the impression that the salt steppe is one of the principal factors of the occurrence of plague in the central area of plague, since the animals as well as the plants can live only under conditions which suit them exclusively. Here particular attention must be paid to the fact that areas of epidemic belonging to the territory considered here and being located close to each other may have their special epidemic conditions which differ widely from those applicable to the remaining plague areas of the same territory. This is particularly valid for the fertile areas of the southeast which still count among the richest granaries of the world. The fertile territories east of the Volga from about Saratov to Stalingrad must be mentioned here, some of which are exposed to the springtime floods of the Volga similar to the Nile valleys. This, one should like to say, pregnant soil is gradually transferred to steppe and desert in the east and southeast. The central areas, of course, attract the steppe rodents as they offer them the most advantageous living conditions. Every failure of crops, whether it be caused by grain vermin, by locusts, by an excessive drought or humidity, or by the highly dreaded "Hoehenrauch" *) immediately provokes the conditions among the animals of this area which lead to an outbreak of plague as well as of tularemia. These conditions are manifested as inanition, hunger, mass death of the animals and the urgent desire to migrate in order to settle in areas richer in food. Simultaneously with the migrating rodents the plague is propagated. The migration of the rodents from the deserts situated east of the central area of plague may also be evoked by reasons as yet unknown to us, since the intrinsic dynamics of the animal migration are still unknown to us. It, therefore, may happen that such a migration almost completely silts up, in the genuine sense of this word, particularly in the deserts, and the migration comes to a stop,as soon as the epidemic, which in this case is the plague, has failed to get in contact with susceptible neighbors. It may furthermore happen that the few humans in the areas contaminated with plague may all die from plague, usually pneumonic plague, without any knowledge coming to the outside. The discovery of such tragedies in the steppe desert sometimes is not possible before one or two years

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*) The "Hoehenrauch", as it is called by the Volga peasants of German origin, in the southeast consists of a most minute dust or sand elevated by whirling air and **storm** in the central Asiatic deserts and carried away by the air current of the atmosphere to great heights. It drops onto the young crops which may be smothered by it. This kind of damage frequently leads to crop failures. An experienced olfactory organ is able to smell the "Hoehenrauch".

and then is discovered only incidentally. The lack of reports from such territories, therefore in no way speaks against the occurrence of plague. In addition it may happen that during a plague year the endemic focus so to speak "runs over" in spite of a very good crop and without any terrestrial or "cosmic" incidents and causes a "flood" of plague which becomes epidemic. These intrinsic geomedical reasons for such a natural phenomenon also are completely unknown to us.

But several very valuable results of investigations in the southeast are available which were obtained within more than two decades by the Institute for Microbiology and Epidemiology in Saratov and its outposts. These results cover the biogeographical facts which were distinctly observed with the plague carriers among animals. Domestic animals and steppe animals, living closely together with man are susceptible to plague. These domestic animals include the dog, the cat, the donkey, and the camel. The susceptibility of the dog and the cat as the enemies of the rodents and as the closest companions of man is evident. The susceptibility of the donkey and the camel is not yet so clear. That of the two-humped (Bactrian) camel and that of the one-humped dromedary is proved decisively, while that of the donkey is still debated. All cross-breeds between the two species are also susceptible to plague. These animals fall sick with the pneumonic and intestinal plague. There is no doubt that this happens through the food, as they take in plague microbes with the fodder which is contaminated by the defecations of the rodents. The same route of infection is taken by the southeastern plague of man in the fall periods and particularly during the winter, during which the infection is passed along by the grain dust. There is no proof yet, but rather the probability, that the infection is spread by ectoparasites from the camel to man. Man contracts the plague by eating the meat of sick camels.

The principal sources of infection, however, are all the rodents of the steppe, such as the ground squirrels (spermophili) of every species, all races of mice, the jerboas, the jumping hares, and the marmots, but least of all the rats which dwell only in certain damp regions. Every rodent must for practical purposes be regarded as contaminated with plague. The area contaminated by mice sick with plague has a diameter of 500 km., that contaminated by ground squirrels of as much as 8000 km.!

In the areas where grain is cultivated the peasants are in danger during springtime and during summertime, when they hunt the grain rodents, the nomads during the fall and during wintertime in the winter huts (a-ul) of the Kirghiz and the Kalmyks. The rodents migrate to those places to live in the winter grain stocks.

The endemic, however, remains in the soil itself, that means in the burrows of the rodents, and principally in those of the ground squirrels. Here, the animals hibernate beginning in October and continuing until April. From then on the ground squirrels show the greatest activity which ends in September. Simultaneously with this the fleas breed rapidly on the ground squirrels. In the springtime just after the end of the hibernation, the number of fleas is still very small and it increases more and more during summertime before the ground squirrels retreat into the burrows for hibernation. Throughout this period the fleas remain on them and live on the blood of their hosts. They harbor the plague microbes as long as 3/4 of a year. If a ground squirrel dies outside its burrow, the fleas flee into the next holes where they remain and where they become very prolific. In this way, a miniature plague focus develops. If other ground squirrels or steppe rodents such as polecats, marmots, or weasels adopt such a burrow, bringing their "own" fleas with them, the old "burrow fleas" seize the new hosts, while at the same time an exchange of fleas takes place as well. Thus, the conditions for the outbreak of plague sometimes become so confused that they cannot or only with difficulty be disentangled.

A further inconstant factor is the chronic plague of the ground squirrels, which develops towards the end of summer. With this plague the animals may live throughout the period of hibernation without any symptoms of disease. Even the best state of nutrition does not exclude a chronic intestinal plague of the animals, with a continuous excretion of microbes. The old animals may suddenly succumb to the plague after the hibernation, despite this chronic plague, and by this they may keep the endemic plague alive among the young ground squirrels and thus cause a new outbreak.

In connection with plague one must, of course, not forget tularemia which for the first time occurred in Astrakhan and throughout the Volga delta during the years 1877/78 and which at that time was called "Pestis mitis seu minor". It occurred, and even today still occurs, in southeast Russia in addition to the genuine plague, though its principal foci are found in Central Russia and Siberia, which is discussed in the chapter concerned with tularemia. Only some of the geomedical data of this southeastern tularemia are clarified. Certainty is established as to the water rats and the marmots being the virus reservoir, and as to nearly all steppe rodents being highly susceptible to natural and artificial contamination. The final results of the investigation of the southeastern centers cannot be given for the time being.

Among the plants the Kirghiz wheat (Russian: Kumartchik-Agriophyllum arenarium M a B) plays an intermediate part as a carrier of pneumonic plague. It is chiefly the field and the house mice who migrates to the stocks gathered from this grain for the winter within and without the Kirghiz a-ules, and there they frequently die in masses from plague. When the grain stocks are pulled apart, turned, aired, and when they are prepared for use, the dust containing microbes is inhaled or the contaminated fleas get on man so that he falls sick with the bubonic plague.

H. ZEISS and W. SCHREIBER.

Outbreaks of Plague in Russia in the Years 1899 to 1927

(or since 1878 according to DOERBECK)

From: N NIKANOROV, S.M.: Plague and its Prophylaxis. Saratov 1928 (Russian);

Supplements
according to D DOERBECK, F.: History of the Plague Epidemics in Russia, Breslau 1906;
according to Z ZEISS, H.: Plague in Russia (Muenchner Medizinische Wochenschrift 1925, 1926, and 1928);
according to A Bureau d'information sanitaire pour l'etranger de USSR and the epidemiological reports of the League of Nations

According to	Year	Place	Number of foci	Number of cases according to N:	D:	Z:	A:
D	1878	South of Lake Urmia and in the province of Kurdistan in January					
D	1878	Vetlanka and vicinity of the district of Yenotaevsk, imported from Resht (Iran), September to the end of March 1879	7	506			
D	1898	Ansob, district of Samarkand, Turkestan	1	237	lethal cases		
N	1899	Province of Astrakhan: Kolobovka and Ostrova (North coast of the Caspian Sea)	2	88			
D	1899	in the district of Zarev (left bank of the Achtuba) (July/Aug.)					
		Islands in the Caspian Sea: Irsaluaral (Oct.)	1	25			
N D	1900	Province of Astrakhan: Vladimirovka, District of Zarev, and the Talov District in the Kirghiz Steppe: Ashigbai, Kara-Kuga, Tekebai-Tubek	2 (4)	174	(189)		
D	1901 Oct.	Odessa (imported through ship traffic) Extermination of rats: 40,000 rats	1		unknown		
D	1902 May	Odessa Extermination of rats: 15,690 rats	1	49			
N D	1902	Province of Astrakhan: Aksai in the area of the Talov District of the Kirghiz Steppe.					

		of Ut-Kudas (Ush-Kuduk)	2	38		
N D	1903	Province of Astrakhan: Bukovskie Chutora, District of Zarev	1	15		
N D	1904/5 Nov.- Jan.	1st Sea District of the Kirghiz Steppe and Cossack settlement in the Ural territories: Saraitchik, Yamanchalinsk, and District of Gurev on both sides of the Ural river	3 villages	422	(483)	(424)
N	1905/6 Oct.- Jan.	2nd Sea District of the Kirghiz Steppe;Naryn part as far as the District of Krasnoyarsk <u>most serious outbreak in Russia in one hundred years</u>	1	659	(572)	(587)
N	1906	2nd Sea District of the Kirghiz Steppe	1	7		
N	1907	Province of Astrakhan: Kamish-Samarsk part of the Kirghiz Steppe, Czarist County. Province of Saratov. The islands on the Northern coast of the Caspian Sea, Ural District, County of Lbitchensk	5	34		(94)
N	1908	Talov part of the Kirghiz Steppe	1	12		(12)
N	1909	Kamish-Samarsk part of the Kirghiz Steppe (Region H.Kasanki) and Jambeytin Region of the Ural District	4	334		(334)
N	1910	Ural District (Ur.Usunkara)	3	7	(187)	(380)
N	1911	Outbreak in the 1st and 2nd Sea District of the Kirghiz Steppe	1	148		
N	-	Kamish-Samarsk part and 1st Sea District of the Kirghiz Steppe and Ural District, County of Jambeytin	10	86		
N	1911/12	Wintry outbreak in the Kamish-Samarsk part, 1st and 2nd Sea District	34	238	(335)	374
N	1912	Province of Astrakhan. - Black Sea and Czarist District, Ural District and Don Cossack territories - 2nd Don County	11	119	(132)	(242)
N	1913	Don Cossack territory; Ural District - Kalmyk District, Province of Astrakhan. Czarist County, Talov part and 1st District of the Kirghiz Steppe, Kitchkino	13	541	(438)	(535)
N	1914	Kalmyk Steppe - right bank of the Volga; Province of Ural, District of Jambeytin, 1st and 2nd Talov District	8	177		(156)
	1914	Baku		50 (imported)		
N	1915	1st and 2nd Turgunsk District and Kamish-Samarsk part of the Kirghiz Steppe	6(13)	44	(153)	No official data available
N	1916/17	1st and 2nd Turgunsk District and Kamish-Samarsk part of the Kirghiz Steppe	13 (5)	99	(32)	
N	1917	Ural District, Jambeytin County	5 (18)	53	(152)	
N	1918	Kamish-Samarsk and Talov parts of the Kirghiz Steppe	2 (5)	45		
A	1919	-	-			2
A	1920	-	-			87
N Z	1921/2	Province of Bukeevska, Urdinsk County near Talov	1	23		(646)
N Z	1922/3	Kalmyk territory - Remontinsk District.- Jambeytin and Kalmyk District in the Province of Ural. Chanimae-Chagie and Irmen Korun-Beyhen	4(4)	138	(123)	(160)
N Z	1923	Kalmyk territory - Kitchkino and Fedoseevka (North of Achai), in the Volga delta 38 cases: Yandik-Molshagny	1(1)	13	(25)	
N Z	1923/4	Autumnal and winter outbreak in the Province of Bukeev, Ural, Astrakhan, and the Kalmyk Territory	73(84)	469	(473)	(489)
Z	1924	In the Volga delta 15 cases				
N	1924	Province of Bukeev, Jengi District. Summer outbreak in the Kalmyk territory, Remontinsk District, Moreover Darinska (Turkestan) 54 cases	5	26		(144)
Z	1925	Plague on the banks of the Volga and the Don				
N	1925	Province of Ural, Bukeev District. Areas of the Talov and Glin communities; springtime outbreaks on the right bank of the Volga; North Caucasian border, Province of Stalingrad: Areas of Kolmoblast, Achmedov, and Karasamarsk communities in the Ural Province, Bukeev District, Jambeytin District, Areas of the communities of Kugin and Sarkul in the Ural Province	41	255		(257)
Z		Epizootic in the Remontinsk District and the autonomous Kalmyk territories: in the Uluss of Yadinsk-Motchach near Burata-Shabulak 19 counties contaminated; in the North as far as the border of Stalingrad Province; in the West as far as the boundaries of the area of the Don, there 10 counties contaminated; 3 free of plague South as far as Stavropol Province; here 2 counties contaminated				
N	1926	Ural Province, north coast of the Caspian Sea. Ural Province, North Caucasian territories, Salsk District. Stalingrad, Province and District; Astrakhan Province (Kirghiz nomads). Ust Urt Plateau, Adaevskovo Revkoma Mangishl. District K.A.S.S.R. and Buzachi Peninsula. Ural Province, Sartubin District	28	178		(179)
N	1927 I-III	Ural Province, Urdin District, County of Asgir, Jangalinsk District	2	72		(118)
A	1928	-				90
A	1929	-				81
A	1930	-				13
A	1931	-				6

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Leaflet

Microbiological and Epidemiological Institute of Government for Southeast Russia. Saratov

"The plague is a very dangerous and infectious disease. The following animals fall sick with plague: Rats, tarabagans (Manchuria), ground squirrels, mice, and other rodents, but also camels. From these carriers plague can be propagated to man:

1. When he catches and skins ground squirrels, camels and tarabagans sick with plague,
2. Through flea-bites when the fleas jump from sick rodents or persons to healthy persons,
3. When loading hay contaminated with mouse carcasses,
4. When he cleans pantries and heaps of grain with carcasses of rats and mice.

Every outbreak of plague among man is preceded by an epidemic among rats, tarabagans, mice, and by a plague of the camels."

INCIDENCE OF PLAGUE AND DISTRIBUTION OF GROUND SQUIRRELS WEST OF THE LOWER VOLGA

THE SIGNIFICANCE OF THE STEPPE RODENTS OF SOUTHEASTERN RUSSIA FOR THE EPIDEMIOLOGY OF THE PLAGUE.

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
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The complicated epidemiological conditions in those areas of southeastern Russia where the plague is endemic can be clear only to one who simultaneously considers the wild rodents of this plague focus in its entirety. All cases of human plague are to be traced back directly or indirectly to a contact with the rodent fauna. The plague of man is preceded by plague epizootics of the rodents.

Going into detail, however, the part played by the different rodent species with regard to the epidemiology of plague is very different. As regards their significance for the contamination of man with plague which, generally speaking, is only incidental to a larger catastrophe which began among the animals long ago and here already attained its climax, two groups of rodent species may be distinguished.

The first group comprises the so-called Reservoir Animals [1]. These are generally characterized by their mass occurrence throughout the year without regard to the seasons, a fact which as such increases the possibility of the plague microbes being preserved during the intervals between the epizootics. In addition they seem to possess a temporary relative resistance to the plague organisms. With these animals plague may take a subacute or chronic course during the period of activity as well as during hibernation. Considerably later it suddenly becomes acute for unknown reasons and then it causes the death of the animal. The reservoir animals, therefore, are a continuous source of infection by preserving the microbes.

In the endemic plague area of southeast Russia the grey ground squirrel (Citellus pygmaeus) and the yellow sand mouse (Pallasiomys meridianus) are the plague reservoir [2].

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[1] Fleas can preserve the plague microbes for months as was proved by experiments and also by observation in nature. However, the practical importance of the fleas as a natural plague reservoir is still a matter of discussion. This problem cannot be discussed in detail here. The "dynamic part" of the fleas as intermediate carriers of the infection from one rodent to the other and from there to man is not dealt with likewise. (cf. JOFF, I.G.: Problems of Ecology of the Fleas in Connection with their Epidemiological Significance. Piatigorsk 1941, written in Russian, look there for the literature).

[2] In the Central Asiatic plague focus the sand mouse Rhombomys opimus and the two tarbagans (marmots) Marmota caudata and Marmota baibacina in the Transbaikal focus the Marmota sibirica are the reservoir animals.

While during the warm seasons the ground squirrels usually fall sick with acute plague, their susceptibility to the microbes becomes distinctly less during the autumn, so that the plague takes a chronic course during hibernation. Therefore one may say that they "save" the microbes during the cold season.

Contrary to that the sand mice remain active throughout the year. They do not hibernate. Therefore, their plague may be as chronic, as the plague of the rats which are dreaded as plague carriers throughout the world. Sand mice have been shown to be carriers of the plague microbes for a whole year or even longer.

The second epidemiological group comprises the so-called intermediate carriers. They propagate the plague infection from the reservoir animals to man. It has not yet been proven decisively in detail, for all rodent species, whether they are able to be intermediate carriers or not. However, it is certain that in addition to the above mentioned reservoir animals the field hare (lepus europaeus), the jerboa (Dipodidae), the rat (Rattus norvegicus and Rattus rattus), the house mouse (Mus musculus), the big sand mouse (Meriones tamaricinus), the dwarf marmot (Cricetulus migratorius), the common marmot (Cricetus cricetus), the blind lemming (Lagurus lagurus), the onion mouse (Microtus socialis), and the field mouse (Microtus arvalis) are susceptible to plague and also able to propagate the infection through the fleas jumping from one animal to the other (see table).

Most of the above mentioned species, of course, play a minor part for epidemiology, as they use to live singly (example: field hares and jerboas) or under normal conditions have no contact with the reservoir (example; nomadic rat) 3).

Of a decisive significance for the epidemiology of plague, however, are those species, which normally live together in great masses, and in addition show a periodical mass propagation during certain years. These are the house mouse (Mus musculus), the steppe lemming (Lagurus lagurus), the onion mouse (Microtus socialis), and the field mouse (Microtus arvalis). It is clear that a plague epizootic of the mice is particularly widespread and dangerous to man in those years in which there is a mass propagation.

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3) The house rat (Rattus rattus), which otherwise is the principal plague carrier on earth, lives as single animals only in the ports of the Don and the north Caucasian area.

The contact of the intermediate carriers with the reservoir animals is established through the living together, in the same biotope during the summer months. The voles seize the burrows of the ground squirrels. Most of all the steppe lemming (lagurus lagurus) is in a constant contact with the ground squirrel. But the house mouse may directly contract the plague through the ground squirrel fleas during summertime when it lives outside the human settlements in the fields. With the onset of the cold season the house mice and voles are assembled in the human dwellings and granaries, where the infection may jump from the voles to the house mice which have a still closer contact with man.

In the areas in which the yellow sand mouse is the plague reservoir the infection is carried to man principally by a subspecies of the house mouse which likes to live in a sandy soil (Mus musculus wagneri).

On the whole, therefore, the human plague may be provoked in southeast Russia either as a summertime epidemic through the direct contact of man with the reservoir principally with the ground squirrel) (hunting for rodents, working in the fields, children playing with ground squirrels sick with plague), or indirectly as an autumn-winter epidemic through a preceding mouse epizootic.

It is clear that the species who have no contact whatever with the biotope of the reservoir animals, such as the dormice (Muscardinidae) of the Caucasian forest mountains, or the mole (water rat, Arvicola amphibius) have no significance for the plague epidemiology. Contrary to that among the animals other than rodents the camels fall sick with plague, when they eat hay contaminated by rodents suffering from plague.

The Russians know all the epidemiologic relations very well and their measures of prophylaxis have been principally directed against the sources of the propagation of the plague, which are the reservoir animals. The base of all preventive measures is the exact knowledge of the biological and ecological factors, which determine the geographical distribution, the density of population, the mass exchange and the wandering of the rodents. Numerous investigations in this direction were made by the plague research institutes in Saratov and Rostov [4]. The principal facts are given below in a short survey.

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[4] Periodicals: 1 Westnik mikrobiol.parasitol.epidemiol. Saratov (since 1922). 2. Trody gos.obl.protiwotchumnovo Inst.Rostov.Rostov (since 1939).

1. The Grey Ground Squirrel (Citellus Pygmaeus).

Only three of the numerous Eurasian races of the species Citellus which ranges among the squirrel-like rodents (Sciuridae) occur in Europe on the right bank of the Volga 5) river: these are the common ground squirrel (Citellus citellus), the pearl ground squirrel (Citellus guttatus), and the grey ground squirrel (Citellus pygmaeus). Among these the Citellus citellus also belongs to the German fauna (Saxony, Silesia).

Both of the two last named races live in the steppe territories of the Don and the northern Caucasus. The pearl ground squirrel (Citellus guttatus), however, does not occur beyond the line Dnepropetrovsk - Saratov in a southward direction. It is not difficult to distinguish the grey ground squirrel with its smaller size of the body and its grey to dirty yellow color interpersed with a weak yellowish-white spotting from the closely related bobak or steppe marmot (Marmota bobak) which only seldom occurs west of the Volga river.

The territorial distribution of the grey ground squirrel is given in the second map IV/1b 6). The western border is the Dnepr. From Dnepropetrovsk the boundaries turn northward first and then East to Orenburg (now Tchkalov) via Millerovo and Saratov. East of Orenburg it first runs in northeastern direction, passing the town of Magnitogorsk and then makes a sharp bend to the southeast following the Ishim river, then goes eastwards again to the territory which includes the origin of the Irtysh and finally reaches Lake Zaisan. In the east and southeast the border runs about along the edge of the Central Asiatic mountain ranges. In the south it follows along the northern coast of the Lake Aral, leads to about the Gulf of Kara-Bugaz, and then goes along the coast of the Caspian Sea to the mouth of the Terek. In the north Caucasian territory it is about identical with the line Grzny-Pyatigorsk-Rostov, finally leads along the north slope of the Yaila Range, and also includes the steppe territories of the Crimea.

It is clear that the Citellus pygmaeus is not equally distributed throughout this large territory, but that it is more or less closely tied to a certain area which offers it the optimal

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5) In the Transvolga territory furthermore: Citellus rufescens and Citellus fulvus.

6) According to a map of N. B. BIRULYA, Zool.Journ. Vol.20 (1941).

living conditions (in order to know them it is necessary to give its most important biologic data 7).

The ground squirrel feeds on the leaves and the depot organs of the steppe plants. Its favorite food are the bulbous meadow-grass (Poa bulbosa var. vivipara), whose breeding buds, rich in glycogen, are its food as well as the succulent wormwood (Artemisia), which satisfies its desire of liquid to a great extent.

Like most of the steppe rodents the ground squirrel lives in burrows which it builds itself. A distinction may be made between living burrows with a particular chamber in which the animals live, deliver their young, and hibernate, and simple, temporary flight holes, into which they only withdraw in case of danger. It is clear, that the abandoned living burrows are also used as flight holes.

The grey ground squirrel prepares for hibernation very early in the endemic plague territories generally even as early as in the first days of July. The hibernation ends with the beginning of March. Immediately after wakening propagation takes place. About the middle of April the young are born (six on an average), but they do not leave the parents' burrow before the middle of May to dig their own retreats. At this time the ground squirrel families separate.

The greatest concentration of ground squirrels may, therefore be foreseen for the beginning or the middle of March, when the animals mate, and for the middle of May until June, when the young leave the burrows of their parents. If during these periods a plague epizootic breaks out it naturally is most explosive and very extensive with regard to the number of cases as well as to the territories concerned.

Of the vegetation areas of south Russia the ground squirrel preferably lives in the grass-wormwood-semi-desert, and the alophyte (salt plant)-wormwood-semi-desert, while it avoids the plain grass steppe, the meadows or salt marshes [8]. It, therefore, prefers a biotope, in which various associations of plants - in accordance with the change of the micro relief and the type of the soil - are present simultaneously as in a mosaic ("complex biotope"). Here it

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[7] Cf.: TINKER, I.S. Epizootology of the plague of ground squirrels, Rostov 1940 in Russian language; the literature is mentioned there.

[8] Cf.: WALTER, H. The Vegetation in European Russia, Berlin 1942 (Parey).

finds food during all seasons.

A further demand of the ground squirrels from its environment is a vegetation which does not grow too densely and too high. It likes to look out for its enemies (steppe eagle, buzzard, falcon, kite, steppe polecat, etc.) by rising upon its haunches. Therefore, it usually avoids the high feather grass steppe (Stipa).

Among the different forms of soil a dry, salt ground interspersed with clay is preferred, which permits the growth of the salt plants and which is loose enough to permit the building of living burrows. The connection of plague with the salt soil around the Caspian Sea was underlined earlier by ZEISS and SCHREIBER in their study on "The plague in southeast Russia 1877 to 1927 " (cf.map IV/1).

The Russian scientists are of the opinion that the considerable distribution of the ground squirrels throughout the steppe areas since the middle of the past century must be considered as the direct result of the pasturing, that means of the change of the natural steppe (particularly feather grass steppe) to a pasturing steppe. The feather grass (Stipa) is eaten or trampled by the cattle, and instead of it wormwood and ephemeral plants spread, which offer favorable living conditions to the ground squirrel. By this process conditions of vegetation are created similar to those found in the above mentioned complex biotopes of the semi-deserts, which themselves also are almost everywhere subjected to a more or less extensive pasturage. The extension of the biotope of the ground squirrel as a result of the human advance to the natural steppe must be regarded as an epidemiological factor of the first degree. "With pasturing the plague comes".

Our map IV/1a, which in a general manner shows the density of the ground squirrel burrows in the endemic plague territories of southeast Russia by evaluation of the Russian data, demonstrated the relations of the density of the squirrel population with the ecological factors. The territories with the greatest density are at the same time the territories of the pasturing steppe and the complex plant associations.

Such an area of a dense squirrel population leads as a 50 or 100 km. wide band from Stalingrad via Elista to the Manych valley. To the eastward it is joined by the great ground squirrel area of the Kalmyk steppe. The salt marshes of the Manych separate it from a very densely populated, extended area which extends from about Salsk to the Kuma river.

The areas with a smaller population of ground squirrels are situated concentrically around these centers of the greatest concentration. As the map shows in addition, the area of the greatest density of ground squirrels is approximately identical with the zone of the most severe plague epizootics and epidemics.

The map was developed from the practice of the rodent extermination service in southeast of Russia, which during the past eight years before the onset of the war had constantly led an extensive campaign against the ground squirrels in the areas of endemics; it shows the state of 1941/42. The normal number of ground squirrels as compared with the number of their burrows is 5 to 10 % on an average. The number of ground squirrels is very low in the areas in which they were persistently and energetically checked. In these areas 1 to 5 ground squirrels account for 100 to 150 ground squirrel burrows per hectare (2.471 acres) and almost no plague of ground squirrels is found there. But it seems to have reappeared among the ground squirrels in those places where the measures against the ground squirrels were not carried through regularly and constantly.

2. The Yellow Sand Mouse (Pallasiomys Meridianus).

The second reservoir of the southeast Russian plague focus, the yellow sand mouse (Pallasiomys meridianus), is the representative of a rodent family (Gerbillidae), which otherwise preferably lives in the tropics. It is easy to distinguish it from the closely related species Meriones tamaricinus living in about the same area by the smaller size, the bright yellow color, and the white-haired foot soles.

The yellow sand mouse is widely distributed throughout Central Asia, Mongolia, and North Iran, and its western border is not far from Elista. Its biotope is the rather flat sand dune landscape with a strong vegetation. This is a living area in which ground squirrels are rarely found so that it would not be wrong to call the ground squirrel and sand mouse "vicarious reservoirs". The Pallasiomys occurs in the greatest density within the great sandy territory between the Ural and the Volga rivers.

Contrary to the grey ground squirrel the yellow sand mouse prefers the grain as food. It does not hibernate but it maintains its activity even during the lowest temperatures. It propagates only once during its lifetime. The young (3-8) are born in May.

The greatest contact among the individuals is established in autumn, because the population is largest at this time and the animals collect their winter depots. Therefore, extensive sand mouse epizootics must be expected in autumn.

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The Rodents of the Area of the Don and the North Caucasus and their Significance for Plague Epidemiology.

Family	Species	Name	Significance for plague epidemiology	The principal plague communicating fleas
I. Leporidae hares	Lepus europaeus	field hare	intermediate carrier	
II. Sciuridae squirrel	Marmota bobac	bobac marmot (steppe m.)	?	
	Citellus guttatus	pearl ground squirrel	no intermediate carrier	
	Citellus pygmaeus	grey ground squirrel	first plague reservoir	Ceratophyllus tesquorum (fur flea) Noepsylla setosa (nest flea)
III. Muscardinidae, dormice	Dyromys nitedula		no intermediate carrier	
	Glis glis	dormouse	no interm. carrier	
IV. Dipodidae, jerboas	Alactaga jaculus		intermediate carrier	
	Alactaga elater		intermediate carrier	Mesopsylla-species Ophthalmopsylla volgensis
	Alactagulus acontion		intermediate carrier	
	Dipus sagitta		interm. carrier	
	Scirtopoda telum	little jerboa	intermediate carrier	
V. Zapodidae	Sicista subtilis		no intermediate carrier	
	Sicistina betulina		no intermediate carrier	
VI. Spalacidae	Spalax microphthalmus		?	
	Spalax giganteus		no intermediate carrier	
VII. Muridae, mouse-like	Rattus norvegicus	Norwegian rat	intermediate carrier	Ceratophyllus fasciatus
4 subfamilies:	Rattus rattus	house rat	intermediate carrier	Xenospsylla cheopis
1. Murinae, genuine mice	Apodemus agrarius		no intermediate carrier	
	Micromys minutus		no intermediate carrier	
	Apodemus silvaticus		?	
	Mus musculus	house mouse	intermediate carrier	Ceratophyllus mokrzeckyi, Ctenopsyllus segnis
2. Gerbillinae, sand mice	Meriones tamaricinus	large sand mouse	intermediate carrier	Xenopsylla mycerini, Ceratophyllus laeviceps
	Pallasiomys meridianus	yellow sand mouse	second plague reservoir	
3. Cricetinae, hamsters	Cricetulus migratorius	dwarf hamster	intermediate carrier	Ctenophthalmus spec.
	Mesocricetus nigriculus	medium hamster	no intermediate carrier	
	Cricetus cricetus	common hamster	intermediate carrier	Ctenophthalmus species
4. Microtinae	Ellobius talpinus	blind lemming	intermediate carrier	
	Lagurus lagurus	steppe lemming	intermediate carrier	Ceratophyllus consimilis
	Pitymys majory		no intermediate carrier	
	Microtus socialis		intermediate carrier	Ceratophyllus- and Ctenophthalmus species
	Microtus arvalis	field mouse	intermediate carrier	

OCCURRENCE OF MALARIA AND DISTRIBUTION OF ANOPHELES IN CAUCASIA.

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
Technical Section (Medical).

1. Distribution of Anopheles.

Malaria is the most widely spread disease in all Caucasia. Anopheles have been found in altitudes up to 2000 m. (in the area of the Grusinian highway - Communication Ordshonikidse-Tiflis), in Daghestan in areas above 1300 m. in Abchasia up to 700 m. The coasts of the Black and Caspian Sea and the river valleys and deltas are particularly endangered. In north Caucasia, the artificial breeding-places such as cisterns, rice-fields, tobacco-fields, artificial fish ponds, above all the artesian wells in a poor state of repair play a particular part. On the Abchasian Black Sea coast, there is a certain hazard of infection throughout the whole year, since An. bifurcatus (3)*) develops even in winter (within 50-60 days). As regards transfer of malaria in winter, the possibilities of development for the larvae in the water-reservoirs of heated houses (+ 20°C. and more) are of importance.

The species of anopheles are epidemiologically important in various ways according to the predominant biotope. An. maculipennis (1) and An. superpictus (2) are most widely spread; the latter lives in the mountain brooks. Owing to the often salty surface-water, An. elutus (6) frequently occurs up to the southwestern Kaspi-area. An. nigripes (plumbeus) (4), distributed chiefly in southern and northwestern Transcaucasia, is supposed to have a marked epidemiologic importance since it is hard to fight as a tree cavity breeder. In the northern Caucasian region, particularly the districts on the Kuban, Cherkess (autonomous district Adige) and north Caucasian steppe are infested with An. maculipennis (1), in the western regions rich in rainfall and swamps considerably more intensely than in the arid districts of the east.

Near Sukhum, it was observed that the population in the mountains was more infected than that in the districts near the coast. As a reason it is pointed out, that in the mountains the cattle are not kept in stalls, which is the case in the plain. The accumulation of cattle in the stalls attracts the anopheles.

An. maculipennis (1) is important chiefly in spring, while An. superpictus (2) is most active as a vector in summer. In the Caucasus, adult anopheles appear from the beginning to the middle of April and

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*) The numbers in brackets refer to the respective species of anopheles on the map.

retire to hibernate in November.

J. HUESING.

2. Distribution of the various Forms of Plasmodia.

All three forms of malaria are present in Caucasia, though they are very differently distributed regionally: For Georgia, the following individual observations are available:

Table 1.

Region	Year	Pl.falciparum %	Pl. vivax %	Pl. malariae %	Mixed forms and indefinite forms %
Abchasia	1926	20,3	41	20,1	18,6
Sukhum	-	29	41	24	
Gagry	-	20	35	36	
Kakhetia	1933	51,5	47,4	1,1	
Alasantal	1933	82	?	?	
Tiflis	1933	24,7	26,3	37,3	11,7

In Azerbaidzhan, malaria tropica has been formerly absolutely predominant (up to 80 % of all cases), in the last few years, however, smaller percentages for malaria tropica have been reported, such as from the district Saljany 1921 - 1926: 40 - 70 %; 1938: 5,1 % (Tropical Institute Baku (see table 2). Also according to recent Russian publications (1938), the infections with malaria in these districts appear to have decreased. (Table 3).

Table 2.

Dynamics of the Species-Stock of Malaria Plasmodia in Azerbaidzhan.

Districts	Year	Number of examinat.	Parasite index	Species of Plasmodia			
				pl.falciparum	Pl. vivax	Pl. malariae	mixtae
Jevlach	1902	347	39,5	61,8	34,6	1,1	2,3
Mugan	1911	113	50,0	66,1	35.7	7.1	-
North-Mugan	1921	474	43.0	24.0	22.0	54.0	-
South-Mugan	1925	2018	5.3	25.7	24.3	44.8	2.7*)
Saljany	1921	265	33.5	9.0	21.3	69.7	-
Arax-Districts	1925	1187	2.0	17.9	14.7	64.7	8.7*)
Total of districts of the Azerbaidzhan Rep.	1936	31767	5.13	45.6	40.6	11.0	2.8
id.	1938	50926	5.5	51.2	23.5	17.1	8.2
Of those:							
North-Mugan (Sabinabad)	1938	997	9.0	77.8	16.7	4.4	1.1
South-Mugan, Pushkino, Imishkly	1938	2012	4.6	65.8	16.6	5.1	12.5
Arax District Sangelan	1938	1500	5.6	37.7	51.8	3.5	7.0

*) indefinite forms

Table 3.

Spleen-Index in Azerbaidzhan.

	1921 - 1926 %	1938 %
North-Mugan	84.0	12.5 - 30.8
South-Mugan	78.0	17.0 - 32.2
Saljany	72.0	4.9
Lenkoran	61.0 - 71.0	18.5
Lower Karabach	86.0	19.1 - 72.4
Kirovobad (Gandzha)	71.0	28.1
Kasach	74.0	21.7
Sakataly.	63.0	14.8
Nakhichevan District	77.0	24.0

For Armenia the following distribution is reported:

Table 4.

Year	Pl. falciparum %	Pl. vivax %	Pl. malariae %
1924	16.7	44.2	32.9
1928	18.5	58.9	15.0
1938	18.4	48.4	29.6

Malaria tertiana reaches its peak from April to June, quartana in late fall (an intense eruption of the fall-infections may possibly occur in January and February), tropica from July to October with the climax in August, especially in the eastern districts (table 5).

Table 5.

Seasonal Dynamics of the Species-Stock of Plasmodia

Azerbaidzhan

Year	Pl. vivax %	Pl. malariae %	Pl. falciparum %
1934			
Ist quarter	63.1	9.2	27.7
IInd quarter	55.5	21.1	23.4
IIIrd quarter	36.4	27.1	36.5
IVth quarter	23.7	1.1	75.2
1935			
Ist quarter	38.2	3.3	68.5
IInd quarter	9.4	1.5	3.1
IIIrd quarter	49.4	22.8	27.8
IVth quarter	25.7	40.0	34.3

J. MUGROWSKY.

EPIDEMIC DISTRIBUTION OF TULAREMIA IN THE AREA OF EASTERN EUROPE.

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
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The synoptical map of the occurrence of tularemia epidemics in man in Europe, Western Asia, and North Africa during the third and fourth decades of this century (map I/2) shows that, during the first 15 years from the bacteriologically and serologically confirmed discovery of its first occurrence on the European Continent (1926) to the present time, the disease has spread in the form of epidemics in man, principally in the adjacent areas along the large rivers on the vast plains of eastern Europe. In the southeast of the Russian area, there are not only the places with the oldest tularemia-epidemics known in Europe (e.g. Astrakhan 1926) and the places from which reports on former epidemics, exist, which were similar to tularemia (Astrakhan 1877, Don-delta 1903 "Tataryk"), but also during the last few years (1941/42) the most violent outbreaks so far known of this disease in Europe occurred there as well. For this reason, their extent in southeast Russia will be described in a special synoptical table and on a special map (see map IV/4a: tularemia-epidemics in southeast Russia).

For the epidemic course of the area of eastern Europe, tularemia has become during the last two decades, a "leading disease" (H. ZEISS), the further development of which in this area will have some influence on the epidemic situation of the central countries of the European Continent. For this reason, the task which is put to a medico-geographical consideration of the distribution of tularemia in the area of eastern Europe is the following: What prognosis can be established from the kind of the tularemia outbreaks so far observed in eastern Europe with regard to a possible endangering of Central Europe?

A medico-geographical examination of all previous occurrences of tularemia on the Eurasian Continent, as made by me first in 1939, shows the remarkable fact of a constant advance of the epidemics on the continent from east to west and south. A simple physical map with entries of the single local epidemics, however, does not communicate any clues for geographically caused facts, which permit conclusions for a further prognosis of the epidemic development in Europe.

Only the addition of the cartographical representation of those factors of the climate, of the soil, and of the region, which must be regarded, according to ZEISS' geomedical method of research, as links fostering disease and epidemics in the causal chain of an epidemical course (E. RODENWALDT) , makes the map a valuable means of geomedical research and makes a far-reaching prognosis for the examined regions possible. As the first attempt of a geomedical map, I published a map of the occurrence of tularemia in man in the European regions having only a little rainfall in "PETERMANN's Geographical Informations" 1940, table 24, in order to examine the opinion first stated by E. MARTINI, that the distribution of tularemia in Europe corresponds in a remarkable way to the distribution of rain. According to this opinion, tularemia epidemics particularly occur in areas with little rainfall, where one can find rodents whose proper home is in the steppe. Also the synoptical map I/2 "Tularemia-epidemics in Europe 1921-1941" is intended to illustrate the preferred infection of the European regions with little rainfall by colored entries of the various heights of the average annual rainfall (according to SYDOW-WAGNER's Methodical School-Atlas, 23rd edition, map 16).

The varying height of rainfall cannot be primarily held responsible for the presence or absence of epidemics in certain regions, it must rather be considered only as a leading symptom for climatic geofactors, in the limits of which there exists a certain optimum for the epidemic development. To explain these conditions, the regions with little rainfall in map IV/4 are marked by the line with an average annual rainfall of 500 mm as the regions with most epidemics of tularemia.

During a geomedical examination of the epidemic course, the geofactors of the soil and of the landscape must be added to the climatic factors. For tularemia was originally described as an epidemic of rodents, the kind of soil-covering or vegetation is one more important leading symptom for the geofactors of the region. For this reason, in addition to the regions with little rainfall, also the vegetation-zones according to H. WALTER have been entered in map IV/4, to illustrate the dynamics of the epidemic course of tularemia for East Europe cartographically. Such a representation is meant to demonstrate the association of the epidemics to the regional conditions of eastern Europe, without which those remarkable regional limitations of tularemia epidemics in immediately adjacent areas - such as in the Volga - Oka - Don region, which has been infested for a long time and the upper course of the Dnjepr, which has remained free from tularemia until now - cannot be understood.

The most remarkable fact is the similarity of the distribution of tularemia epidemics in eastern Europe with the extension of the steppe zones up to the boundary of the woods. The epidemic distribution has been first stopped there. This boundary between forest and steppe in the eastern European area is also very important in meteorological respects according to H. WALTER. "It coincides with the strip of increased barometric pressure - of the great weather-axis of the continent according to WOJEIKOW - and means a meteorological limit especially in winter". In addition, the forest-steppe boundary approximately coincides, according to H. WALTER, with the line of annual rainfall of 450 mm. While, in the forest zone, the rainfall is considerable and amounts to 500 mm on an average, sometimes even 600 - 700 mm., in the steppe-zone the rainfall decreases rapidly toward the south. Dividing the eastern area according to vegetation zones among the natural big landscapes of the tundras in the north, the immense forest regions, the steppe-zones and finally the half-desert and desert regions of the south, the uniformity of eastern Europe, to which we are accustomed by the picture of physical maps, is lost. WALTER writes: "These four regions are like four different worlds".

From its original distribution along the banks of the large rivers in the steppe regions of the southeast, the epidemic has tried to penetrate into the forest-zone among the large rivers, but it did not succeed in passing it or in developing constant foci in the forest territories. Only in individual cases and in small local groups did tularemia occur there corresponding to the slight distribution of rodents. The laws, on which this peculiar epidemical distribution of tularemia in eastern Europe is based, must be chiefly determined by special geomedical factors, which can be found by an oecological analysis of tularemia as an epidemic of rodents.

A preliminary condition of every epidemiological consideration of tularemia in man is the observation of the fact that no tularemia epidemic has occurred nor will occur without a previous tularemia epizooty, because tularemia is an epidemic disease of the rodents and thus can be transferred to man only after epidemics among rodents by direct contact with a virus carrier, by indirect transfer by insects, or by interposition of vectors, but it cannot be epidemically spread from man to man.

As a most important and wide-spread virus-reservoir for eastern Europe, the water-rat (arvicola amphibius) has been recognized. This rat lives on the reed and willow-covered banks of the large rivers. It gave rise to the first great tularemia epidemics among the water-rat hunters, the fur-dealers and village-inhabitants on the large rivers Ob, Volga, Ural, Oka, etc., which occurred in spring after the great inundation and spread chiefly by direct contact (catching, skinning) (see table to map IV/4a, epidemics Nr. 4 and 5.). On the other hand, the human infections of great fall -and winter- epidemics of the last few years have been caused by moles (microtus arvalis) and house-mice (mus musculus) (see Nr. 8-10, 24, 25, 31), whose domiciles overlap at least temporarily, those described for the water-rats. Then, these rodents receive the bacterium tularense and may carry it, as vectors into the human homes. From the field-mice which have died of tularemia, the infection usually spreads through a dust-infection when the grain is thrashed. It is still unknown whether murides or microtines themselves may become virus-reservoirs for bacterium tularense.

In addition, the importance of certain ectoparasites of the rodents as virus reservoir (ticks: dermacentor silvarum, laelaps echidninus, haemogamasus nidi, laelaps pachypus and eulaelaps stabularis; water-rat louse: hoplopleura sp., water-rat flea: ceratophyllus walkeri) is still unknown too, as far as eastern Europe is concerned. Even if experiments have shown the persistence of the agent in the mentioned species of ticks in analogy with American observations on D. andersoni, their epidemiological importance is still restricted by the comparatively rare infestation of the water-rats with ticks in southeast Russia and by the experiments of transfer, which succeeded in a few cases only.

A preliminary condition for the epidemic distribution in man is the dependence on the numbers of rodents, which is subject to a remarkably great periodic fluctuation. These fluctuations of the density of population of many species of rodents occur quite regularly according to their own laws. They are of geomedical importance in so far as the periodicity of mass-propagation of the rodents and the epidemics then setting in among them, including tularemia, determine the epidemic extent for man as well. Thus, the great temporal fluctuations in the distribution of tularemia in eastern Europe are quite explained.

Also as regards the space distribution of tularemia in eastern Europe, the oecology of the species of rodents serving as virus-reservoir and as vectors of the agent contains many indications which explain the preferred infestation of the steppe zone in contrast to the forest regions of eastern Europe. The epidemiologically as well as prognostically important observations of the tendency of the epidemic to advance from east to west and south, remain unexplained.

This tendency has even resulted, in some cases, in advances through the forest-zone to one of the nearest Central European dry regions, such as the March-Field (see map 1/2) and recently across the Memel to the area next to the Baltic Coast (district Heinrichswalde - Elch lowland 1943 and 1944). It is possible that these phenomena are caused by unknown migrations of infected rodents (JUSATZ).

Despite the described gaps which the picture of a geomedical consideration of tularemia in man shows even today, the previous course of its epidemic development in eastern Europe indicates that tularemia has possessed a great potential virus reservoir for two decades there among the rodents of the large steppe zones. After years with maximum population density of certain species of rodents (mice-years, hare-years, in Fennoskandia leming-years also) this reservoir may overflow and cause extensive epidemics in man, if such a development is not stopped by thorough instruction of the population in due time and control of the rodents carried out. As regards southeast Russia, a period of about ten years of mass-increase of mice is said to have been observed; in addition, slight increases in shorter periods can be recognized. For the prognosis of tularemia-epidemics, an exact knowledge of such fluctuations of the rodent population would be of great use.

The boundary between the steppe zones of the south and the forest regions of the north and west has turned out to be an approximately fixed limit for possible outbreaks of tularemia epidemics in man in eastern Europe. But the possibility of their leaping over a vegetation zone unfavorable to the mass-development of rodents and their getting hold of fixed regions with special climates even in this zone must be expected, when little rainfall fosters the development of rodents in steppe-like vegetation. With the decreasing dryness of the climate toward the West - approximately between the lines of equal dryness of 20 and 25 according to MORAWETZ, even this possibility becomes slighter and any further extension of tularemia toward Central and western Europe will be controlled.

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EPIDEMICS OF TULAREMIA IN SOUTH EAST RUSSIA.

(1926 - 1942)

(With 1 Illustration)

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
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As the most remarkable event in the epidemiological history of to-day, the rapid advance of tularemia from East to West and South on the Eurasian Continent gives occasion to follow attentivly the recent movement of this epidemics in the vast regions of Russia. Even now, the epidemic stands, as it were, before the gates of Europe, though it has announced its proximity to the Central European area by several precursors - the first great epidemics in Central Sweden, in the Moravian and Thracian basin 1935 to 1937. Since the first positive diagnosis of a tularemia epidemic in Russia in 1926, the disease has reappeared again and again after short intervals in the various regions of the Russian rivers and has attained in the last few years, particularly in 1941, in the South East of European Russia an extent far superior in numbers and space to all previously known tularemia epidemics in Europe and North America.

Even if there is no exact statistical material available due to the war in Eastern Europe, the figures known until now are sufficient to demonstrate the magnitude of the danger for the European Continent represented by this disease. While the first few reports from the years 1926 to 1928, almost without any exception, amounted to some hundred cases of epidemic occurrence of tularemia infections amoung the population along the large rivers after catching water-rats (arvicola amphibius) - the reservoir of the tularemia agent - recent data of the years 1940 to 1942 showed several tens of thousands of cases during one epidemic, according to other data, up to a hundred thousand cases among the population of single regions (see table).

Epidemic of Tularemia in the Rostov Region 1941/42.

Thus, the epidemiological picture of tularemia has considerably changed with its further extension in Eastern Europe, viz. field-mice (microtus arvalis) and house-mice (mus musculus) have now come to the foreground as the principal distributors of tularemia bacteria on their way from their reservoir in the water-rat to man. According to the opinion of Russian tularemia experts, the epidemic can be easily transferred from the water-rats to the field-mice, since the living spaces of both rodents touch each other at certain times in the reed-areas on the shores of the large rivers. The house-mouse, too, may temporarily get within the biotope of the water-rat and thus be infected with the agent of tularemia, or it may be infected by infected field-mice. Thorough bacteriological examinations will be necessary to show whether the field- or house-mouse may itself become a reservoir for the bacterium tularense. The extent of the epizootic and epidemic then only depends on the number of mice in the infected area. The mass-increase of these rodents which occurs with rhythmical intervals of ten years on an average and which could be observed last 1932/33 and 1941 in South East Russia, involves an increase of the epidemic in vast regions. The year 1941 afforded particularly favorable conditions for an increase of the mouse population, because a great part of the harvest in South Eastern Russia could not be brought in. The route of infection for man is then either through dust-inhalation during the thrashing of the grain contaminated with dead mice or through the partaking of water, bread, and other food contaminated with urine or excrements of the mice infected with tularemia, which had entered the homes after the cold weather set in. With tularemia the danger does not lie in a direct menace of the area surrounding an epidemic focus by infected persons carrying the disease, but in the at first unknown infection of the rodents of vast regions, without any manifest infection of man. According to all previous oberservations, it is the rodents only which principally spread tularemia, and from them, the disease may pass over to man in epidemic form. For this reason, the further distribution of tularemia in Europe will chiefly depend on the conditions which afforded adequate possibilities of development and propagation for the various species of rodents. Thus, South East Russia with her extensive steppe-regions and her slight rainfall will probably become after the first penetration of tularemia, a constant seat of this epidemic, whose northern and western boundaries are fixed by the natural boundaries between its steppe vegetation and the forest-zone.

To illustrate these geomedically important conditions, the vegetation-zones have been entered into the map according to the most recent representation of H. WALTER.

The vegetation-zone of the steppe regions permits free settling for the steppe rodents. The line of annual rainfall of 450 mm approximately coincides with the boundary between steppe and forest-zone according to WALTER. In the forest-zone, the average rainfall amounts to 500 mm; it sometimes rises to 600 - 700 mm. There, the epidemic extension of tularemia is evidently stopped by a natural limit, which it may temporarily pass in order to settle in more remote dry areas. At any rate, without an exception the occurrence of tularemia-epizootic among the rodents (field-hares) in the dry regions in Moravia and Thracia since 1935 to 1937 is unintelligible (see map I/2: tularemia-epidemics in Europe). These two examples of the most recent epidemic occurrence of tularemia in Europe show, at the same time , that such a geomedical consideration also permits one to establish a prognosis of the further extension of tularemia for a certain region. As regards the South East Russian region, it may be predicted, from the described geographical conditions, even to-day, that the steppe zone there with the large river-systems will be a constant danger-zone for epizootics and epidemics of tularemia, so that in and from this region further temporary tularemia epidemics must be expected, to which the forest-zone provides a natural limit.

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Tularemia Epidemics in South East Russia 1926-1942 (from East to West)

Nr.	Year	Region	Number of cases	Species of rodents
		I. River basin of the Ural.		
1	1928	Government Orenburg: 8 villages on the banks of the Ural-River.	103	water-rats
		II. River basin of the Volga.		
2	(1877)	Astrakhan and surroundings	unknown	unknown
3	1926	Volga-delta, south west of Astrakhan (Bolshoi, Mogol, Tshurki)	200	water-rats
4	1927	Governmental District Ryazan: on the banks of the Oka-River	unknown	water-rats
5	1928	Villages on the Oka in the region of Spassk, Kasimov, from Jelatma to Melenki after the spring-inundations. At the same time water-rat epizootic near Saratov	800	water-rats
6	1934	In the Stalingrad region, tularemia-epizootic among ground-squirrels in April	unknown	ground-squirrels
7	1938	Region of Orel (river basin of the Oka), sometimes whole villages infected, great ep idemic and mice-epizootic in the region from Voronezh to Moscow	5000	field-mice
8	1939	Region of Orel, recurrence in spring and fall		
9	1940/1	Region of Orel, new epidemic in the winter months		
10	1942/3	Region of Orel, recurrence in the winter months	unknown	field-mice
		III. River-basin of the Kuban.		
11	1938	Beginning of a tularemia epidemic in Alexandrovsk, more individual cases in winter 1939	unknown	unknown
12	1939/40	Tularemia-epidemic in the Kuban lowlands during the winter months	unknown	unknown
13	1940/1	Serious tularemia-epidemic in the Kuban lowlands in the region of Vorochilovsk and East Krasnodar with eastern and south eastern spreading from November 40 to March 1941 (north of Armavir-Ipatovskoe-Budennovsk-Grozny), simultaneous serious epizootic among the house-mice	30 000	field-mice, jumping-mice, rats, ground-squirrels, hares (also hedgehogs, cats, sheep and other big domestic animals)
		Reported in Armavir until 1 February 41	946	same
		In February	260	
		In Jankuli (south of road Vorochilovsk-Alexandrovsk)	3000	
14	1940/1	District Ordzhonikidze	8000	unknown
15	1941/2	Recurrence in the Vorochilovsk and Krasnodar area	unknown	unknown
		IV. River-basin of the Don.		
16	1932	Rostov (city), region of Novocherkassk and Bogajevskaya	unknown	water-rats (epizootic)
17	1933	Rostov (city)	unknown (rabbit-breeders)	rabbits
18	1933/4	Rostov, Novocherkassk, Bogajevskaya and Simovniki (high fatality rate among mice preceding the epidemic)	1000	field-mice, house-mice
19	1937	In the valley of the Lower Don near the city o Asov from June to begining of Sept mber	unknown (peasants, mowers, fishermen)	water-rats vector: Blood sucking insects *)
20	1938/9	Rostov on Don	unknown	unknown
21	1941	In the area from Stalin to Kharkov (River basin of the Donez)	a few cases	unknown
22	1941/2	In the area of Jelez (river basin of the Sossna) and Lossovka (river basin of Voronesh) particularly violent epidemic in Winter	unknown	field-mice
23	1941/2	In the river-basin of the Oskol (from Stari- and Novi-Oskol to Valuiki) in the winter months	unknown	field-mice
24	1941/2	Rostov (City and Rural district) and in vast extension, in the whole Rostov area and regions of Glubokij, Tarasovka, Kamensk (rural district), Sverski	more than 37,000	house- and field-mice
25	1941/2	Epidemic in the large Don-bend, Vorochilovgrad (City and surroundings), Kamensk, Glubokij. Beginning in November 1941	reported from January to June 1942: 1,508	field-mice
		V. River basin of the Dnepr.		
26	1935	Region between Kanev and Cherkassy	unknown	water-rats (epizootic)
27	1935/6	Cherkassy and ajacent villages on the right bank of the Don	100 rat-catchers	water-rats
28	1941	Sumy (river basin of the Psiol) Epidemic in spring up to the region north west of Charkov (high fatality rate among mice)	unknown	field-mice
29	1941	Bobruisk (river basin of the Berezina)	unknown	field-mice
30	1941	Gomel (river basin of the Sosh)	unknown	field-mice
31	1941/2	Epidemic in the region from Kursk (river basin of the Seim) to Charkov, near Shchigry from December 1941 to March 1942.	population infected up to 100%	field-mice
32	1942	Right bank of the Dnepr and region from Chigirin to Kirovograd	100	water-rats and field-mice

*) Chrysozona pluvialis, Chrys. relictus and other tabanidae, culex, anopheles, aedes Theobaldia.

EXANTHEMATIC TYPHUS IN THE EASTERN TERRITORIES OF EUROPE.

(With 12 charts and 2 Illustrations).

Translation prepared by:
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The rickettsioses found in the eastern territories of Europe are the typical exanthematic typhus (organism: rickettsia Prowazeki, Da Rocha Lima 1916), the murine typhus, (rickettsia Mooseri, MONTERIO 1931) and the volhynian fever (rickettsia quintana, SCHMINCKE 1917). The fièvre boutonneuse has not been found so far.

Murine typhus was observed during systematic investigations of the rats in several big cities. In Moscow 4 out of 33 rats were contaminated (KRITSCHEVSKI and RUBINSTEIN). 28.1 % of the grey and 41.4% of the white laboratory rats showed a positive Proteus OX19 reaction (KRITSCHEVSKI and SOLOMIOV). Rat typhus is of no importance for the epidemic progress of typhus, but all publications on the distribution of typhus through fleas are possibly concerned with rat typhus.

Volhynian fever (trench fever) - the first description was given by HIS and WERNER 1916 - had entirely disappeared during the years immediately after World War I, and it re-appeared with the beginning of the eastern campaign of World War II. It was observed throughout all parts of the Eastern Theater of Operations , in the frontline as well as in the rear areas, generally, however, as a disease of the German soldiers only. The indigenous population remained free from trench fever during the years between the two wars so that it is unknown to the physicians in Germany and even in the present day the native population does not fall sick with Volhynian fever. It sometimes occurs that other diseases are hidden behind the symptoms of Volhynian fever, such as the abdominal typhus of vaccinated patients. This was mentioned by OEILER in 1920. Volhynian fever occurs throughout the entire European Russia. Apparently it is particularly frequent in Galicia, Volhynia, and the southern parts of Central Russia.

Those making reference to typhus in eastern Europe think of the typical exanthematic typhus caused by rickettsia Prowazeki which is considered here exclusively.

1. Louse Infestation of the Population.

For the distribution of exanthematic typhus its obligatory coincidence with the presence of body lice is of importance. The absence of lice excludes typhus and the presence of lice means that there is some danger of spotted fever.

The louse infestation of the indigenous civilian population in eastern Europe is by no means general or constant. During the years 1942 and 1943 Dr. PAPPENHEIM conducted relevant investigations with an indigenous control organization by order of the director of the medical department attached to the office of the High Commissioner for White Ruthenia. Even though the statistical material obtained shows many faults, it gives the minimum figures and a sufficient survey. In the district of White Ruthenia 431,410 persons were examined for infestation with lice. 32,352 persons, that means 7.7 % were infested. There was a great difference between the various values.

Table 1.

Louse Infestation of the Population in White Ruthenia 1942 / 43.

Area	number of persons examined	Louse infestation %
Baranovichi	189,669	3.1
Gleboki	9,216	15.2
Hansevichi	168	58.3
Lida	137,508	9.4
Minsk county	18,795	16.8
Minsk city	12,488	1.7
Slonim	23,180	9.5
Sluzk	estimated (more than 50 %)	
Wilniki	40,386	13.4

Big differences were also found within the various areas. The louse infestation varied with the various seasons, but the greatest infestation was found not only during wintertime. In Minsk city in the period before October 1942 only 2.3 % out of 21,384 were infested with lice, in February and March 1943 only 2.1 % out of 70,618, and in May 1943 only 0.6 % out of 2,326 persons. Throughout the rural district of Minsk in April 1943 for 8,848 persons a percentage of infestation amounting to 15.0 % was found, in June 1943 a percentage of 18.4 out of a total of 9,947 persons. The difference between the town and the rural districts was particularly significant in the district of Slonim. In the town of Slonim the louse infestation decreased during the winter season.

Table 2.

Louse Infestation of the Population in the Town of Siclin.

Month	number of persons examined	infested with lice
November 1942	5,560	8.5
December 1942	4,598	4.7
February 1943	4,058	4.6
March 1943	4,904	4.5
April 1943	2,690	3.9

Kiev is given as an example for a big city. In 1942 47,084 dwelling places harboring 69,318 families and 161,239 persons were inspected (according to LEPJOCHIN). In spite of the marked shortage of dwellings and the close quartering only 4,428 (equal to 2.7 %) persons infested with lice were found.

In Lithuania louse infestation is particularly frequent in the southern parts situated along the border to White Ruthenia, in Latvia Lettgallia (around Daugavpils). Except for some small areas close to the border with a non-Estonian population situated in the region of Petseri and Pskov, Estonia is free from lice. Throughout the Polis territory, the eastern districts were considerably more infested with lice than the remaining part of Poland. In the towns it was particularly the Jewish population which carried the lice.

The louse infestation principally depends on the local conditions which in no case should be taken as a yardstick for other places. At any rate, the figures demonstrate that the frequently expressed opinion that typhus reaches its climax during the cold seasons because of the "contact between man and lice being closest during that period of the year" is definitely wrong.

2. Exanthematic Typhus in Lithuania.

Cases of exanthematic typhus occasionally occur throughout all Lithuania. However, there is a much greater incidence of typhus in the southern and eastern districts, since louse infestation is more general there. They are associated immediately to one of the principal eastern European typhus foci, the focus in White Ruthenia, which to a certain degree is extended to the Lithuanian territory. This is particularly obvious during epidemic outbreaks of exanthematic typhus.

For the entire country of Lithuania the following figures were recorded:

Table 3.

Exanthematic Typhus in Lithuania in 1920 - 1937.
Morbidity and Mortality
(calculated with the figures given in the reports of the League of Nations.

Year	Morbidity		Mortality	
	absolute fig.	f.10,000 inhabit.	absolute fig.	percentage of patients
1920	5302	26,05	431	8.13
1921	3004	14,76	167	5.56
1922	3409	16.75	226	6.63
1923	830	4.08	60	7.23
1924	618	3.00	51	8.25
1925	221	0.99	12	5.43
1926	325	1.45	30	9.23
1927	472	2.09	214	45.33
1928	519	2.26	235	45.28
1929	420	1.79	151	35.95
1930	382	1.61	137	35.86
1931	350	1.48	?	?
1932	237	1.00	20	8.44
1933	289	1.22	27	9.34
1934	268	1.08	19	7.09
1935	334	1.34	22	6.59
1936	238	o.95	11	4.62
1937	112	0.44	10	8.93

The mortality reported for the years 1920 and 1922 is very low, while it is very high for the years 1927 - 1930. During the period from 1935 - 1937 the mortality corresponds to that known for Europe. No reason for this difference can be given.

The districts situated along the border of the former Polish and recently Russian territory show the largest figures. The morbidity of the remaining districts is influenced by workers coming from the districts where typhus occurs (Table IV, Chart 1.

Table 4.

Typhus in the Administrative Districts of Lithuania 1933 - 1935.
(According to the reports of the League of Nations R.E.181).

	Absolute figures			Relative figures for 10,000 inhabitants		
	1933	1934	1935	1933	1934	1935
1. Kretinga	3	1	0	?	?	?
2. Taurage	12	2	4	0.81	0.14	0.27
3. Telsiai	16	6	2	-	-	-
4. Mazeikiai	28	21	2	-	?	?
5. Siauliai	4	12	56	0.14	0.44	2.04
6. Raseiniai	2	0	34	0.15	0	2.58
7. Sakiai	-	-	-	0	0	0
8. Vilkaviskis	7	15	0	0.74	5.06	0
9. Mariampole	0	6	0	0	0.49	0
10. Lazdiai	0	14	39	0	2.84	7.91
11. Alytus	77	24	30	4.51	1.40	1.76
12. Trakai	65	40	114	3.94	2.42	6.91
13. Kaunas	18	30	17	0.44	0.73	0.42
14. Kedainiai	2	8	3	0.19	0.77	0.29
15. Ukmerge	23	29	18	1.52	1.92	1.19
16. Panevezys	7	15	0	0.34	0.72	0
17. Birzai	1	1	7	0.09	0.09	0.62
18. Rokiskis	0.	11	1	0	1.14	0.10
19. Utena	15	0	2	1.30	0	0.17
20. Zarazai	0	0	5	0	0	0,77
TOTAL:	280	268	334			

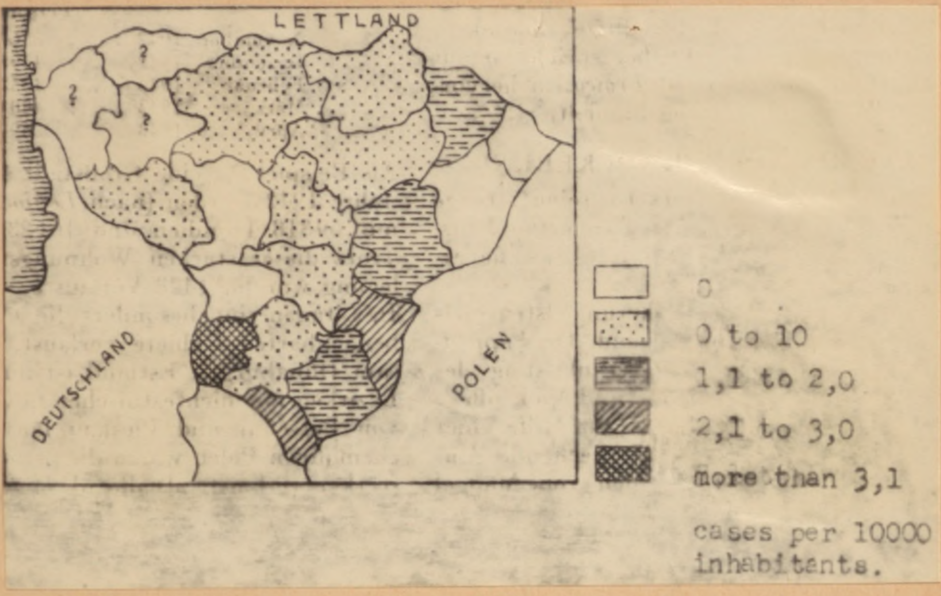

Chart 1.

Typhus in Lithuania 1934.

3. Typhus in Latvia.

In Latvia typhus principally occurs in the southeastern parts of the country, in Lettgallia. This district around Daugavpils with its poor population should be included with the White Ruthenian focus, although recently no typhus occurred within its boundaries.

The morbidity is as follows:

Table 5.

Typhus in Latvia 1920 - 1931.
(According to the Reports of the League of Nations
R. E. 164).

Year	cases absolute figures	cases f. 10,000 inhabitants	Year	cases absolute figures	cases f. 10,000 inhabitants
1920	1631	8.36	1930	67	0.35
1921	1288	6.61	1931	27	0.14
1922	1480	7.59	1932	9	0.05
1923	430	2.28	1933	7	0.04
1924	290	1.57	1934	15	0.08
1925	96	0.52	1935	8	0.04
1926	72	0.38	1936	7	0.04
1927	30	0.16	1937	5	0.03
1928	34	0.18	1938	5	0.03
1929	28	0.15			

Hence it appears that the occurrence of typhus in Latvia is not important.

4. Typhus in Estonia.

Estonia generally is free from lice and, as a result, free from exanthematic typhus. In 1919 and 1920, however, numerous cases were observed. During the subsequent years the number decreased and from 1928 on the epidemic had completely subsided.

Table 6.

Typhus in Estonia 1920 - 1929.
(Calculated with the figures given in the reports of the League of Nations R. E. 164).

Year	Cases absolute figures	Cases per 10,000 inhabitants
1919	1232	11.09
1920	4125	37.13
1921	356	3.20
1922	247	2.22
1923	42	0.38
1924	43	0.39
1925	21	0.19
1926	24	0.22
1927	18	0.16
1928	0	0
1929	0	0

5. Exanthematic typhus throughout the Former Polish Territory.

The former Polish territory is known as one of the centers of exanthematic typhus. During the years of World War I, shortly after the constitution of the Polish state and during the first years of its existence a high incidence of typhus was recorded. From 1923 on the number of cases decreased rapidly and after 1926 it maintained a certain moderate value.

Particularly important carriers of exanthematic typhus were the Jewish population of Poland. Among them typhus occurred as a disease of childhood. In adult age the Jews were found to be rather immune so that the disease took an abortive course with them. Wherever Jewish colonies existed exanthematic typhus did not disappear and even affected the indigenous Polish population.

Table 7.

Typhus in Poland 1916 - 1937.
(Calculated with the figures given in the reports of the League of Nations R. E. 164 and the reports of the Board for Epidemic Diseases 1921).

Year	Morbidity		Mortality	
	absolute figures	per 10,000 inhabitants	absolute figures	percentage of patients
1916	34,538	12,70	3,478	10.07
1917	43,840	16,13	3,776	8,61
1918	97,082	35.71	6,484	6,68
1919	231,306	85.1	19,891	8.60
1920	157,612	58.0	22,565	14.32
1921	44,835	16,5	4,023	8.97
1922	40,792	14.8	3,199	7.84
1923	11,185	3.99	898	8.02
1924	7,755	2.72	666	8.59
1925	4.196	1.45	338	8.06
1926	3.568	1.21	266	7.46
1927	2.950	0.99	265	8.98
1928	2.401	0.79	161	6.71
1929	1.988	0.65	146	7.34
1930	1.640	0.52	112	6.82
1931	2.154	0.67	?	?
1932	2.424	0.74	185	7.63
1933	3.454	1.05	200	5.79
1934	5.127	1.53	303	5.91
1935	4.149	1.23	249	6.00
1936	3.757	1.10	234	6.23
1937	3.477	1.01	196	5.64

The largest number of typhus cases occurred in the eastern areas of Poland (Table 8 and Chart 2)). These areas belong to the White Ruthenian focus which is the immediate eastern neighbor. Galicia also is an old classical focus. The number of typhus cases in the various administrative areas is shown in table 8.

Table 8.

Typhus in the Administrative Districts of Poland
1922 and 1935 per 10,000 inhabitants
(Calculated with the figures given in the reports of the League of Nations R. E. 7 and 181),

	1922	1935
City of Warsaw	10.9	0.2
District of Warsaw	5.9	0.2
Lodz	3.7	0.3
Kielce	5.5	0.4
Lublin	32.3	0.5
Bialystok	49.1	0.5
Novogrodek	52.9	3.6
Polesia	67.7	3.2
Volhynia	30.9	1.7
Poznan	0.2	0
Pomerania	0.5	0.009
Krakow	2.9	0.2
Lwow	7.1	1.6
Stanislawow	12.0	4.8
Tarnopol	7.1	1.0
Silesia	0.04	0
Wilno	13.1	5.3

The German territories of Poznan, Pomerania, and Silesia remained free from exanthematic typhus even during the years of epidemics.

The occurrence of typhus during the various seasons shows no difference to the adjacent countries. The climax generally is attained in April and May. The year 1930 shows that the climax sometimes may be attained at an earlier time (Table 9).

The total progress of typhus during the years 192[illegible] to 1935 is given in Illustration 1. The climax of 1934 corresponds to the progress of the typhus epidemic in the neighboring country, the USSR (Soviet Russia), and particularly in the Ukraine.

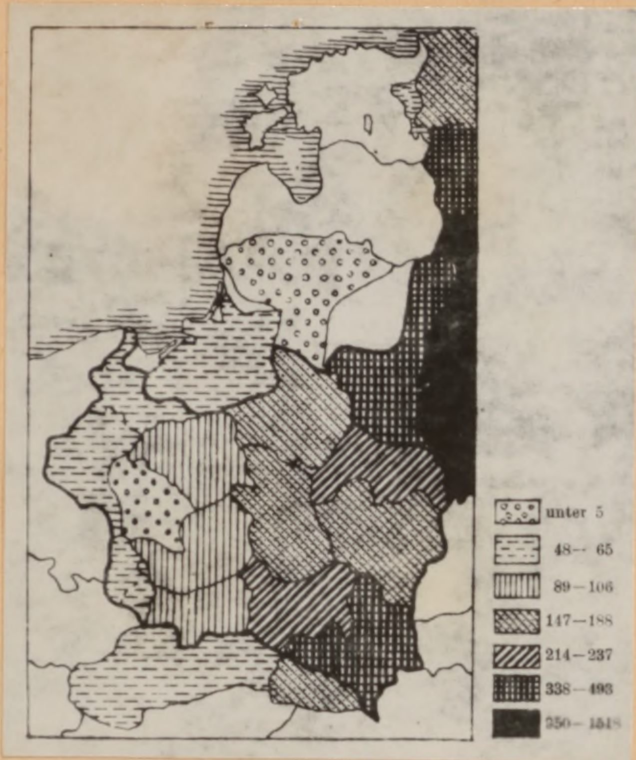

Chart 2.

Typhus in the former territories of Poland 1921
(Absolute figures according to the reports of the League
of Nations Rapp. epid. No. 1).

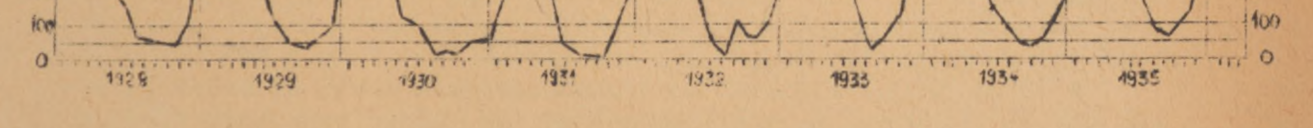

Illustration 1.

Typhus in the former Polish territory
1928-1935
Absolute figures
(According to the reports of the League of Nations R. E. 164
and 181).

Table 9.

Seasonal occurrence of typhus throughout Poland in 1930, 1935 and 1937.

(According to the reports of the League of Nations) given in groups of 4 weeks each.

	Months												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
1930	206	285	232	221	226	120	112	50	14	27	22	46	79
*) 1935	213	291	444	565	631	445	234	138	81	71	103	136	216
1937	361	464	463	630	691	358	104	55	22	32	47	92	158

*) For the year 1935 only 3568 out of 4149 were evaluated.

6. Typhus in European Russia.

At all times typhus was of a great importance throughout Russia. In most of the administrative districts it ranges among the most common diseases. During the past decade of Soviet administration the data were subjected to a rigorous censorship in many regions. In order to deny the occurrence of exanthematic typhus, orders were given to record it as "influenza" (1941 in Minsk, while there was a clear winter frost). The figures covering this period of time, therefore, are less reliable than the earlier reports. To obtain a clear survey on the distribution of typhus we at first restrict ourselves to the consideration of the years previous to 1941 (Table 10).

Typhus epidemics occurred during the years 1892 to 1894, after the war between Russia and Japan, and during the civil war in Russia 1919/1920. After the defeat of the White Army typhus was less frequent, but it continued to occur in great numbers among the troops of the White Armies of Koltchak and Denikin. The Soviet Russian administration made the observation that it recurred when the Red Army occupied the territories heretofore held by the White Army, and that it occurred in great numbers during the famine in 1922, while it rapidly decreased during the subsequent year as a result of "the excellently organized typhus control". The same rapid decrease, however, was observed in those countries which were not under the control of the Soviet administration and its typhus organization (Poland, Lithuania, Latvia, Estonia) .

Table 10.

Typhus in European Russia.
(According to BAIKIN and DOBREITZER, completed according to MUEHLENS and the reports of the League of Nations).

Year	absolute figures	per 10,000 inhabitants	Year	absolute figures	per 10,000 inhabitants
1881	90,956	10.5	1905	76,831	5.3
1882	46,731	5.7	1906	52,412	3.6
1883	32,050	3.7	1907	51,984	3.5
1884	32,419	3.7	1908	103,259	6.8
1885	33,412	3.5	1909	180,724	11.6
1886	45,332	5.3	1910	138,577	8.8
1887	65,163	5.7	1911	120,671	7.5
1888	64,679	5.9	1912	100,928	6.2
1889	60,018	5.3	1913	118,419	7.3
1890	60,766	5.3	1914	89,463	5.9
1891	74,462	6.3	1915	95,476	6.5
1892	184,142	15.5	1916	115,874	8.3
1893	147,952	12.4	1917	97,570	?
1894	105,316	8.7	1918	130,164	21.9
1895	71,552	5.8	1919	2,119,549	191.8
1896	44,889	3.6	1920	3,945,574	339.0
1897	35,822	2.8	1921	578,196	60.0
1898	38,881	3.0	1922	1,396,397	109.2
1899	53,028	4.1	1923	244,424	18.4
1900	52,523	3.9	1924	125,474	9.4
1901	52,601	3.9	1925	71,010	5.2
1902	59,184	4.3	1926	55,385	3.8
1903	70,402	5.0	1927	41,149	2.9
1904	54,178	3.6	1928	31,441	2.1

If one compares the distribution of exanthematic typhus throughout the European parts of Russia one finds the regular occurrence of typhus centers. On map IV/5 of the Epidemiological Atlas, which shows the distribution of typhus during the period from 1931 to 1935, White Ruthenia is clearly recognizable as a typhus focus. It is still more frequent in the densely populated Central Russian industrial area and above all in the areas around the Ural mountains. Contrary to that the figures of the considerable number of typhus cases in Karelia gives a false impression since here the detention camps for criminal offenders with their numerous epidemics are a much more important factor than the indigenous population living at considerable distance from each other. The same must be assumed for the areas around the Ural mountains.

The Ukraine, Transcaucasia, and the desert areas around the Caspian Sea show a considerably lower frequency of typhus.

There is a good reason to believe that the frequency of typhus is increased with an increased density of the population, with reduced living conditions and the degree to which the population is infested with lice. White Ruthenia always used to be an important focus of danger for the European parts of Russia. During the periods of a low typhus incidence it did not subside throughout this area and during the periods of a high typhus frequency this focus was extended to the adjacent areas. During the years of genuine epidemics typhus flows across all boundaries.

Typhus is particularly found in the dwelling places of the very poor. Therefore, the towns and among them the big cities are the proper foci of typhus epidemics. This also applies to the Ukraine, where in normal times typhus is distributed to a very small degree only. As a result of the suppression of the individual farmers and of the establishment of collective agricultural organizations, a proletariat was created in the rural areas as well where the people had to live under the most miserable conditions. Large rural communities were founded with a population number equal to that of middle sized towns, and there typhus was widely spread. On the other hand there are no congruent figures in the various administrative districts even during periods of misery. One should think that the distress was general during the years of the civil war. But in spite of this there were considerable differences in the typhus frequency. Table 11 shows numerous examples for this.

Table 11.

Typhus in some provinces 1917 to 1923 per 10,000 inhabitants
(According to BARIKIN and DOBREITZER).

	1911-13	1917	1918	1919	1920	1921	1922	1923
Kharkov	13.7	14.9	-	-	731.7	85	104	17.3
Orel	21.3	9.5	8.4	999.6	641.4	75	86	18
Pensa	7.2	7.0	32.6	486.4	611.9	70	157	15
Kursk	8.3	3.9	8.8	476.2	596.7	77	80	14
Voronesh	10.0	8.5	5.3	432.7	563.0	75	52	7
Simbirsk	3.6	5.3	13.4	397.0	501.0	96	279	57
Samara	3.5	0.3	1.4	320.6	495.0	64	133	11
Gomel	11.3	4.0	6.4	187.0	442.0	93	60	11
Kaluga	6.4	8.3	25.9	665.0	423.3	132	166	24
Saratov	5.3	10.9	18.0	499.0	421.0	68	204	18
Tambov	24.5	22.8	57.8	676.6	416.0	79	64	23
Poltava	11.0	3.7	-	-	398.8	143	241	28.5
Nishegorod	5.0	-	5.0	219.0	393.6	61	97	40
Tula	18.6	3.5	35.8	580.4	383.7	60	90	27
Smolensk	13.9	4.6	21.7	226.1	371.4	104	102	17
Chernigov	7.7	2.8	-	-	366.7	66	129	10.9
Rjasan	13.7	15.6	21.2	619.8	319.0	133	82	29
Vjatka	7.2	1.8	7.0	102.0	311.3	81	285	71
Vitebsk	4.3	7.4	5.8	148.0	299.4	104	56	11
Vladimir	0.9	0.2	4.2	408.0	296.7	82	157	19
Moscow	6.2	1.8	20.7	652.6	254.0	55	207	11
Ufa	1.8	0.9	12.6	254.0	252.0	27	-	-
Donez	-	-	-	-	246.6	49	111	11.3
Tver	3.1	0.7	6.8	324.7	239.0	48	54	20
Ekaterinoslav	8.0	9.9	-	-	224.6	38	157	11.9
Astrakhan	2.0	1.4	92.3	255.0	221.8	-	94	15
Pshov	1.5	1.9	2.2	122.0	218.0	64	30	9
Odessa	-	-	-	-	216.6	97	295	9.4
Leningrad	1.2	0.7	41.1	284.2	204.1	26	85	10
Volodga	3.0	0.8	3.9	113.6	188.3	40	108	29
Perm	12.9	4.4	1.2	18.0	165.0	85	345	53
Kostroma	1.0	0.3	2.3	98.3	165.1	35	55	17
Novgorod	2.5	0.6	6.6	219.0	102.8	26	44	5
Archangelsk	0.6	10.7	9.4	14.9	26.2	66	45	12
Jeroslav	2.3	0.8	8.0	241.0	233.0	69	160	19

Table 12.

Typhus in two districts of the northern part of European Russia 1924 to 1927.
(according to BARIKIN and DOBREITZER).

	absolute figures				per 10,000 inhabit.			
	1924	1925	1926	1927	1924	1925	1926	1927
Leningrad district:								
Leningrad	1261	417	228	190	10.9	4.3	2.1	1.6
Murmansk	116	1	3	14	64.4	0.5	3.3	6.1
Novgorod	926	730	124	209	9.4	7.2	1.4	2.0
Pskov	2548	2441	1681	1682	14.3	13.7	9.5	9.4
Isherepov	1745	1002	421	508	24.7	13.9	5.9	6.9
Northern district:								
Archangelsk	657	493	174	67	15.5	11.2	4.0	1.6
Volodga	1958	749	441	502	18.7	7.0	4.2	4.7
Northern Du-inal	1500	680	557	387	22.0	9.7	8.3	5.7
Komi	278	111	55	40	13.3	5.3	2.7	1.9

Great differences may be found even within geographically and climatically rather uniform administrative districts. The incidence of disease throughout the northern and the Leningrad districts give proof of this fact (Table 12).

To compare the typhus figures of the different administrative areas of the USSR (Soviet Russia) is made difficult through the frequent change of the boundaries and the names. Most of the figures of typhus incidence in 1911 to 1929 are exhibited in Table 13.

The data for the year 1922 in which typhus was particularly frequent can be found in Table 14, those for 1932 in Table 15.

Table 13.

Typhus throughout the large administrative districts of European Russia from 1911 to 1929 (according to BARIKIN and DOBREITZER, FLEROV and the reports of the League of Nations) per 10,000 inhabitants

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
North Region	3.4	2.3	1.8	1.1	1.5	2.5	2.9	4.8	85.8	132.1	43.8	85.4	28.0	26.5	7.6	4.4	3.9	6.2	2.5
Sea Region	2.2	2.1	0.8	0.8	0.9	0.8	0.9	27.7	218.2	183.5	36.1	47.8	13.0	12.5	8.9	8.0	5.4	7.4	10.9
Industrial Reg.	8.4	2.4	2.3	1.3	3.2	4.3	2.7	15.1	415.7	247.4	43.7	117.3	23.0	15.8	6.8	4.1	2.9	2.4	1.6
Centr.Agric.Reg.	16.2	13.5	18.2	13.7	11.3	9.9	11.4	26.0	601.8	511.2	54.5	67.2	14.9	8.5	5.5	7.2	6.7	3.8	3.6
Central Volga	4.2	4.6	5.9	4.9	5.3	8.7	5.8	14.7	333.4	593.1	63.7	172.0	23.0	15.4	7.6	7.9	5.5	2.2	1.7
Ural	5.3	8.9	8.6	9.0	5.8	5.3	2.4	6.7	121.2	274.9	66.7	210.4	44.0	12.8	7.5	3.3	3.2	2.5	1.6
Lower Volga	3.2	2.1	2.0	3.6	3.7	5.6	0.7	17.5	281.1	297.7	17.6	173.0	15.0	11.5	4.5	3.2	1.9	1.1	0.6
Ukraine	11.9	10.1	10.9	5.4	13.2	14.3	17.0	8.5	150.6	253.3	64.8	139.9	12.2						
Southwest Reg.	17.5	11.8	16.0	10.9	14.0	13.4	10.9	?	?	52.1	14.5	?	?	5.1	3.3	2.6	1.6	1.2	1.4
Russia Minor	9.9	7.6	7.1	6.2	6.8	7.9	7.0	?	?	443.2	64.4	?	?						
White Ruthenia	10.0	9.4	10.4	6.2	4.7	6.9	5.3	11.2	180.9	381.6	115.5	69.2	5.6	11.5	10.8	7.7	6.8	7.3	10.7
North Caucasus	3.2	1.9	2.0											2.0	1.0	0.7	0.5	0.7	0.3
Krym														4.7	2.5	1.9	0.8	0.7	0.3

Table 14.

Typhus in the USSR (Soviet Russia) 1922
per 10,000 inhabitants
(According to the reports of the League of Nations, R. E. 7).

West Region	
City of Petersburg	103.8
Gov. Petersburg	39.0
Gov. Novgorod	37.0
Gov. Pskov	30.2
White Russia	73.8
Gov. Gomel	64.5
Central Region	
Gov. Rybinsk	117.5
Gov. Yaroslav	172.4
Gov. Ivanovo-Vos.	84.5
Vladimir	126.5
Gov. Tver	58.8
Gov. Smolensk	83.2
City of Moscow	182.9
Gov. Moscow	140.5
Gov. Kaluga	145.1
Gov. Rjazan	68.5
Ukraine	
Gov. Saporoshe	137.5
Gov. Volhynia	151.2
Gov. Donez	38.9
	82.6
Gov. Dnepropetrovsk	171.0
Gov. Kiev	57.6
Gov. Kremenchug	142.1
Gov. Nikolaev	154.0
Gov. Odessa	377.8
Gov. Podolia	45.9
Gov. Kharkov	103.1
Gov. Poltava	262.4
Gov. Czernigov	130.9
North Region	
Murmansk area	285.8
Carelia	115.8
Gov. Archangelsk	43.7
Gov. Cherepovetz	38.0
Gov. Vologda	108.6
Gov. Severodvinsk	88.1
Area of Zyrianes	28.5
Gov. Kostroma	74.0
Southern Central Region	
Gov. Brjansk	87.8
Gov. Orel	80.4
Gov. Tambov	55.0
Gov. Voronesh	38.7
Gov. Kursk	86.6
Krym	187.8
South Region	
Gov. Stalingrad	47.4
Gov. Astrakhan	101.5
Kalmyk area	81.8
Don area	21.9
Kuban Gov.	56.5
Gov. Stavropol	30.2
Gov. Terek	52.3
Cherkess territory	4.3
Kabardinsk territory	0.5
Gorskaia	57.0
Daghestan	19.3
Transcaucasus	
Azerbaidzhan	25.9
Georgia	31.4
Ural Region	
Gov. Viatka	192.5
Votjask area	425.9
Gov. Perm	294.3
Gov. Ekaterinburg	308.5
Gov. Tiumene	126.2
Gov. Chelyabinsk	49.4
Bashkir Republic	154.6
Gov. Ufa	52.0
All of Russia	108.4

Table 15.

Typhus throughout the USSR in 1932.

absolute and relative figures (for 10,000 inhabitants)
(according to the reports of the League of Nations R. E. 164, 1932).

	absolute figures	relative figures
Ukraine	4,186	1.32
White Russia	1,559	2.92
RSFSR	32,788	3.62
North Province	1,353 *)	4.96
Leningrad Region	845	1.30
Carelia	476	16.30
West Region	1,949	2.93
Moscow	1,260	1.05
Industrial Region	642	1.47
Prov. Nishninovgorod	1,751	2.26
Black Earth	2,702	2.29
Central Volga	3,259	4.25
Tatar Republic	1,675 *)	6.19
Lower Volga	1,371	2.34
Ural	9,050	11.33
Bashkir	1,942	6.46
Krym	259	3.22
North Caucasus	892 **)	0.94
Daghestan	65	0.71
Transcaucasia	550	0.83
Azerbaidzhan	123	
Armenia	46	
Georgia	381	

*) No data for January - **) No data for March.

The considerable variation of the data given by various authors for the same year of report shall be demonstrated by the following example. 1932 FLEROV gives figures for the years 1920 and 1921, for 10.000 inhabitants. Nine years before figures for the same years had been recorded in the reports of the League of Nations R. E. 7, calculated for 100,000 inhabitants. After the adjustment of the figures to each other the following comparison results:

Table 16.

Comparison of the figures for typhus incidence throughout the USSR. (According to FLEROV and to the reports of the League of Nations for the years 1920 and 1921). (Calculated for 10,000 inhabitants).

	According to FLEROV (1932)		According to the reports of the League of Nations (1923)	
	1920	1921	1920	1921
North Region	132.1	43.8	122.6	37.5
Sea Region	183.5	36.1	240.2	90.7
Industrial Region	247.4	43.7	299.9	58.5
Central Agricult. Reg.	511.2	54.5	541.8	58.6
Central Volga	593.1	63.7	419.7	64.6
Ural	274.9	66.7	236.3	53.5
Lower Volga	297.7	17.6	?	?
Ukraine	253.3	43.7	227.0	42.5
Southwest Region	52.1	14.5	37.0	4.8

This table shows that FLEROV's data published at a later time differ considerably from those given earlier for the same years. The reason for this may be that the boundaries of the administrative districts had been changed in the meantime; some of the boundaries, however, (Sea Region, North Region) had not been subjected to a noticeable change. In all, this is a typical example of the value of the figures supplied by the Soviet administration.

The progress of typhus during the years 1930 to 1935 is exhibited by Illustration 2.

The development of the epidemic progress is shown by the charts 3 to 12 for the years 1918 to 1935:

1918: The principal area of typhus was the south, particularly the Ukraine. For large areas of the south the chart exhibits no data. But apparently the recorded total number of 130,164 cannot be understood in another way.

1919: Except for the southern areas, for which a considerable typhus incidence must be assumed, typhus advanced to Central and northern Russia. Above all it was widespread throughout the Black Earth area and the industrial area.

1920: Typhus was distributed rather constantly throughout all Russia.

1921: Decrease of typhus in the northern, eastern and southern borderline areas. It principally occurred in large numbers in Central Russia.

1922: There was a considerable increase of the typhus figures for the Ukraine, Central, and northeast Russia.

1924: Decrease in the south; constant and considerable occurrence of typhus in Central and north Russia.

1926: There was a considerable decrease of typhus incidence in south, southeast, northeast and north Russia. A typhus area remains in Central Russia and White Ruthenia.

1928: Typhus principally occurred in the White Ruthenian area. In the Ukraine and the north Caucasus there was a small number of cases only.

1933-1934: The number of typhus cases was small. It principally occurred throughout the White Ruthenian area.

1934-1935: Increase of the morbidity rate. White Ruthenia, Central Russia and in addition Karelia were particularly affected. The incidence of typhus was small in the southern Ukraine and the Caucasian areas situated close to the Black Sea.

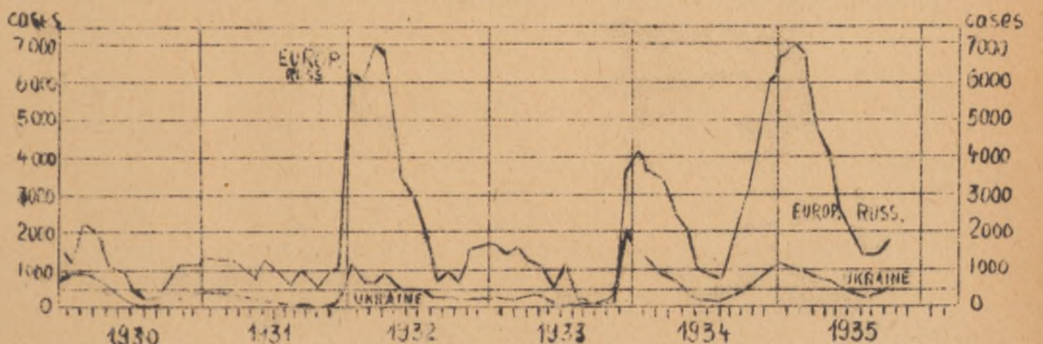

Illustration 2.
Typhus in the European parts of Russia (RSFSR) and in the Ukraine 1930 - 1935 Absolute figures
(According to the reports of the League of Nations R.E.164).

While under normal conditions a certain average generally is maintained as regards the number of typhus cases, it is increased to large and very large epidemics. as soon as the general resistance is reduced. In the Russia of the Czars as well as in the USSR (Soviet Russia) famines played a particularly disastrous part. The highest number of typhus cases was attained during the years 1919, 1920, and 1922, when there was a famine and when the civil war had devastated the country (Table 17). An increase of the typhus morbidity rate to real epidemic proportions frequently occurred, when there was a failure of the crop in the previous year.

Table 17.

Typhus and Crops in Russia 1890 - 1913 (According to FLEROV).

Year	Bread Ration in the European parts of Russia per head in Pud (about 1 lb).			Typhus morbidity for 10,000 inhabitants	
	Total amt. of bread	Winter grain	Summer grain	All Russia	European parts of Russia
1890	23.69	12.07	11.62	5.3	5
1891	17.22	8.31	8.91	6.3	7
1892	21.01	10.11	10.90	15.5	23
1893	31.28	12.66	18.62	12.4	12
1894	23.49	8.35	15.19	8.7	8
1895	25.82	12.68	13.44	5.8	6
1896	26.23	12.01	14.22	3.6	5
1897	21.34	9.33	12.01	2.8	3
1898	25.57	11.92	13.65	3.0	3
1899	28.72	13.88	14.84	4.1	4
1900	23.44	11.68	11.76	3.9	5
1901	19.15	9.78	9.37	3.9	5
1902	27.35	12.18	15.19	4.3	5
1903	24.46	11.45	13.01	5.0	6
1904	22.93	12.91	10.02	3.8	4
1905	14.18	4.16	10.02	5.3	6
1906	15.66	8.75	6.91	3.6	4
1907	17.45	9.26	8.19	3.5	3
1908	17.89	8.82	9.07	6.8	7
1909	22.76	10.61	12.15	11.6	12
1910	21.78	10.51	11.27	8.8	9
1911	16.18	8.44	7.74	7.5	8
1912	22.20	11.89	10.31	6.2	7
1913	23.34	9.94	13.40	7.3	8

The increase of typhus during 1934 and 1935 was also caused by the failure of the crop in the previous years due to the organization of the farmers as a collective corporation.

It is certain that such relations between periods of misery and famine exist, but they are not always established. Waves of typhus epidemics may occur even without a disturbance of the social structure. LEPJOCHIN made reference to the fact that there was a considerable increase of the number of typhus cases in Kiev in 1908/09 without any social disturbances being causative for that event.

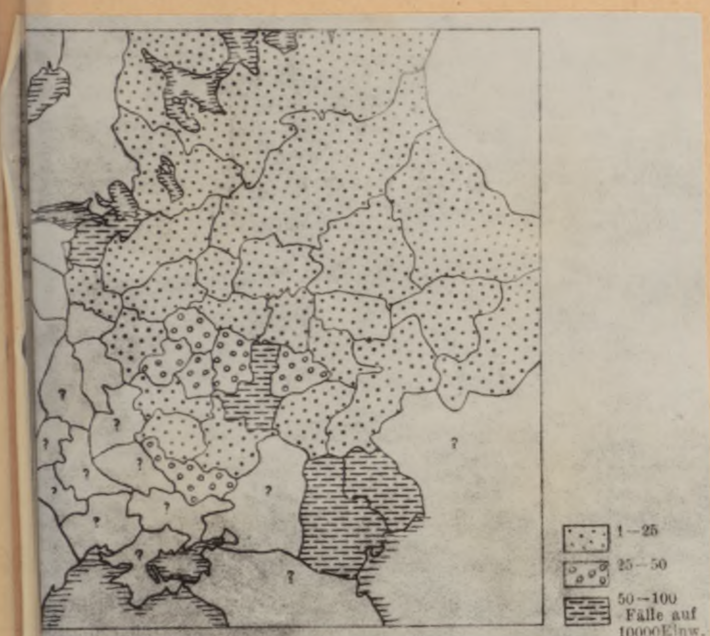

Chart 3.
Typhus throughout the European parts of Russia 1918 per 10,000 inh. (Acc.to the reports of the League of Nations R. E. 1)

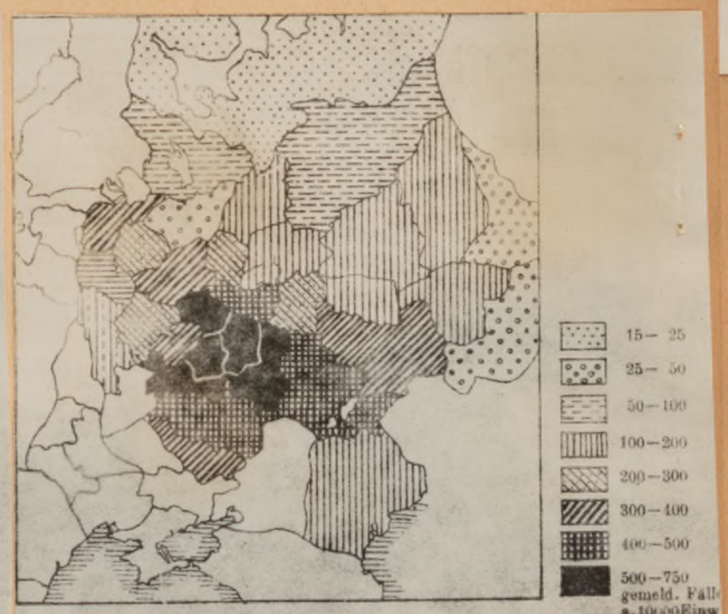

Chart 4.
Typhus throughout the European parts of Russia 1919 per 10,000 inhabitants (acc. to the reports of the League of Nations R. E. 1).

Table 18.

Typhus in Kiev 1905 to 1942 (According to LEPJOCHIN)

Year	number of cases	per 10,000 inhabitants	Year	number of cases	per 10,000 inhabitants
1905	713	18.1	1924	111	2.4
1906	23	0.5	1925	141	2.9
1907	8	0.2	1926	64	1.3
1908	1384	32.3	1927	52	1.0
1909	1729	38.8	1928	70	1.3
1910	419	9.1	1929	79	1.5
1911	196	3.9	1930	141	2.5
1912	184	3.7	1931	593	10.5
1913	107	2.1	1932	863	14.6
1914	102	1.9	1933	9742	170.0
1915	560	10.4	1934	736	9.5
1916	263	5.0	1935	375	4.8
1917	330	6.7	1936	197	2.5
1918	3033	59.2	1937	206	2.5
1919	16500	330.7	1938	157	1.9
1920	11891	285.8	1939	213	2.5
1921	3864	98.8	1940	298	3.5
1922	4380	105.8	1941	21	3.4
1923	383	8.8	1942	518	15.5

In 1942 nearly half of the cases examined had contracted their infection outside the city limits. In more than 1/3 of the remaining cases the contamination could be traced back to a contact (Table 19).

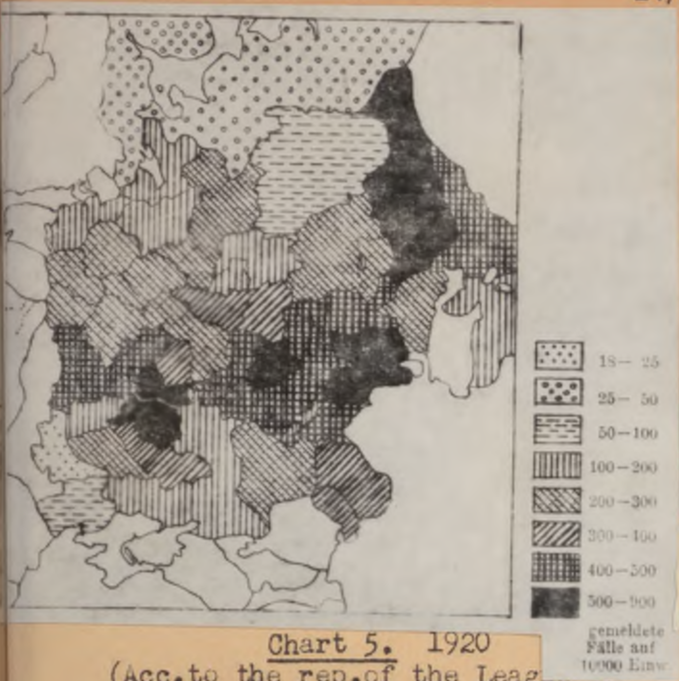

Chart 5. 1920
(Acc.to the rep.of the League of Nations R. E. 1)

Chart 6. 1921
(Acc.to the rep.of the League of Nations R. E. 1).

Chart 7. 1922
(Acc.to the reports of the League of Nations R. E. 7)

Chart 8. 1924
(According to HERMAN, LEVITOV, and ROGOSIN)

Table 19.

Sources of typhus among the indigenous population in Kiev 1942 (according to LEPJOCHIN).

Total number of typhus cases	518 cases
Cause investigated in	450 cases
I. Contaminated outside the town	219 cases (48.6%)
a) arrived during incubation period	137
b) Contaminated during the journey	66
c) Contaminated by entering patients	16
II. Contaminated inside the town	169 cases (37.6%)
a) Contaminated on the market place	12
b) Contaminated in the public baths	10
c) Contaminated at public meetings	89
d) Contaminated by typhus patients	58
III. Unknown causes	62 cases (13.8%)

During the years of epidemics the figures of group III indicating the cases in which the source of typhus was unknown are particularly increased.

The seasonal distribution of the morbidity rate differs slightly within the vast territory of Russia. In Central and northern Russia in the years 1923 - 1936 the climax is generally attained during March, in the Ukraine principally during January and February. There is no doubt that this variation is due to climatic causes (Table 20).

Table 20.

Rhythm of the typhus epidemics in Northern and Central Russia and in the Ukraine 1923-1936

(According to the reports of the League of Nations R.E. 170,177,179,180,181,182,183,184)

(Absolute figures)

European parts of Russia (without the Ukraine, White Russia, the waterways, and the railroads)

Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1923	38269	31722	29641	20814	17788	8233	4090	3347	2496	2667	3110	5384
1924	11063	13807	15443	12845	12312	6577	3665	2405	1926	1749	1554	3773
1925	7685	7773	2125	7271	6069	3620	1912	1151	1127	1270	2154	3169
1926	5777	6577	7666	5614	5098	2787	1460	1087	862	767	1744	3055
1927	4541	5391	5516	4293	4035	2364	1190	801	814	696	1107	2205
1928	2845	3153	4027	3360	3128	1740	978	698	681	734	1159	2464
1929	3473	2971	4286	4166	3819	1590	672	640	593	775	937	1630
1930	1992	1550	2848	2463	1660	1205	438	206	344	703	1262	1174
1931	1344	1286	1309	1080	810	1285	920	605	954	532	832	939
1932	6295	6005	7063	6737	3591	3097	2253	718	881	607	1567	1691
1933	1722	1426	1577	1237	1037	495	1214	219	1077	1650	2442	3542
1934	4227	3610	3363	2586	2073	1045	810	761	1471	2688	4049	5885
1935	6729	7018	6830	4812	4196	2619	1923	1324	1388	1653	2223	3100
1936	5148	4655	4054	3972	3916	2453	1111	780	855	1123	2261	3051

Ukraine

Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1923	8030	5637	4643	4236	3485	1400	680	436	353	478	812	1117
1924	2070	2597	2798	1926	1533	663	271	178	189	220	358	no data
1925	1370	1341	1308	1333	878	559	248	193	153	299	502	939
1926	1303	1297	1449	1426	668	402	190	116	127	221	349	549
1927	840	816	708	608	508	233	95	84	114	149	193	282
1928	533	460	494	377	391	196	144	89	135	157	202	436
1929	538	522	659	735	640	199	107	77	90	176	187	372
1930	729	960	932	786	461	257	132	61	52	--	--	340
1931	410	419	429	?	?	?	?	15	72	0	0	16
1932	1160	627	587	817	534	461	452	242	287	149	167	127
1933	162	171	150	187	176	62	152	67	309	479	662	2100
1934	1500	1140	780	721	438	174	151	132	26	430	553	975
1935	1180	1008	945	781	697	485	308	257	338	426	564	796
1936	1264	1233	1184	1175	987	382	235	132	184	302	430	644

Chart 9.

Typhus in the European parts of Russia 1926 per 10,000 inhabit. (acc.to HERMAN, LEVITOV, and ROGOSIN)

Chart 10.

Typhus in the European parts of Russia 1929 per 10,000 inhabit. (acc.to HERMAN, LEVITOV, and ROGOSIN).

Accordingly the minimum of the morbidity is attained in August for the Ukraine, in September and October for the southern areas.

During the years of epidemics the morbidity rate is particularly increased during the summer months. This fact is considered as characteristic by the Ukrainean epidemiologists. The figures for Kiev give proof for this fact:

Table 21.

Increase of the number of typhus cases during summertime in Kiev during years of epidemics.
(According to LEPJOCHIN)
(absolute figures)

	Years of epidemics 1931	1932	1933	Year free from epidemics
January	18	202	88	43
February	17	61	177	120
March	18	114	280	80
April	13	42	878	104
May	13	218	1224	46
June	6	32	1349	25
July	10	26	1207	30
August	5	22	645	10
September	22	20	951	9
October	19	17	1540	11
November	66	23	1018	19
December	386	57	385	21
TOTAL:	593	836	9742	518

The mortality from typhus is different during the various epidemics.

Recently it has varied between 7 % and 12 %, but there may be local variations attaining a value of 25 % and more. It is apparent that the mortality was higher in earlier times and it is not clear what the cause is for its decrease. Figures for Leningrad and Moscow are given in Table 22. In the Ukrainian town Dnepropetrovsk the mortality of the patients admitted to the hospitals was similarly high as noted in Leningrad.

Table 22.

Mortality from exanthematic typhus during the epidemics in Moscow and Leningrad (according to FLEROV).

M o s c o w

Year	1906	1907	1908	1909	1910	1911	1912	1913
Number of patients	133	363	1460	1133	2177	1745	332	336
deceased	38	35	229	226	316	467	49	50
mortality in %	28	10	15	20	14	26	15	15

Year	1914	1915	1916	1917	1918	1919
Number of patients	245	251	259	1095	6988	
deceased	51	121	232	?	268	
mortality in %	20	40	25	?	3.8	
L e n i n g r a d						
Number of patients				571	10976	36357
deceased				40	913	3439
mortality in %				7.0	8.3	9.7

Table 23.

Mortality from typhus in Dnepropetrovsk among the patients admitted to the hospitals.
(According to the reports of the League of Nations R. E.7)

	Number of patients admitted	Number of deaths	%
1920	5268	389	7.4
1921	971	64	7.0
1922	2250	262	11.6

During every epidemic the physicians and the nursing personnel were exposed to a particular danger.

During the period from 1919 to 1922 more than 1800 physicians died in the USSR from typhus (DOBREITZER). Particular data for the years 1919 and 1920 are given by FLEROV.

Table 24.

Losses of physicians and nursing personnel through typhus
(According to FLEROV).
(absolute figures).

	Physicians	Lay surgeons (Feldschere)	Nurses	Midwives
		Moscow District 1918/19		
Suffering from typhus	198	165	96	20
deceased	29	24	9	
= percent	14.6	14.5	8.5	
		Charkov District 1919		
Strength	263	61	148	
suffering fr.typhus	47	52	42	
equal to %	17.	7.9	28.3	
deceased	9	9	2	
equal to %	19.1	17.5	4.7	

Table 24 (cont'd).

	Physicians	Lay surgeons (Feldschere)	Nurses	Midwives
		Donez District		
Strength	519	1259	605	243
suffering f.typhus	309	758	419	108
equal to %	59.4	60.2	69.3	44.5
		Krym		
suffering f.typhus	111	127	96	30
deceased	26	14	5	4
equal to %	23.4	11.0	5.2	13.3

Chart 11.
Typhus in the European parts of Russia from 1 October 1933 to 30 September 1934 for 10,000 inhab. (Accord.to the reports of the League of Nations R.E. 181)

Chart 12.
Typhus in the European parts of Russia from 1 Oct. 1934 to 30 September 1935 for 10,000 inhab. (Accord.to the reports of the League of Nations R.E. 181).

Since classical typhus in many cases shows an abortive course, particularly with children and persons who had been sick with it previously, nothing definite can be said on the real number of typhus cases in relation to the various age groups. The available surveys contain no data concerning the type of typhus. However, it is permissible to assume that reports were given only about the classical type of exanthematic typhus of a moderate severity, and that no regard was paid to the abortive form. The latter usually is not recognized, although it is frequent in areas of typhus endemics.

The highest incidence of classical typhus is found with the age groups between 15 and 50 years. Among them the persons between 15 and 30 years of age are particularly susceptible. (Table 25).

Table 25.

Typhus and Age Groups.
(According to FLEROV)

Age group years	901 patients in Sysran	8.947 patients in the Jeransk district
0 - 1	6	40
1 - 2		62
2 - 3	25	61
3 - 4		98
5 - 10	42	695
10 - 20	213	2796
20 - 30	234	1989
30 - 40	178	1384
40 - 50	109	1053
50 - 60	68	511
over 60	26	50

Males generally fall sick with typhus more frequently than females (Table 26). In the period from 1911 to 1915 in Leningrad the same figures were found as in Greater Moscow (FLEROV). Recent experience showed that no change had occurred.

Table 26.

Proportion of male and female typhus patients throughout the District of Moscow 1898 to 1902 for 10,000 inhabitants. (According to FLEROV)

Age group years	male	female	both sexes
0 - 1	-	-	-
1 - 4	0.1	0.0	0.1
5 - 9	0.2	0.2	0.2
10 - 14	0.9	0.4	0.7
15 - 19	2.0	1.1	1.5
20 - 39	1.9	1.3	1.6
40 - 59	0,8	0.6	0.7
60 and more	0.0	0.2	0.1
TOTAL:	0.9	0.2	0.8

Summary.

Exanthematic typhus has its origin in eastern Europe. It depends on the louse infestation of the population. This, however, is not the only factor for the typhus epidemics. Misery, famine, and war frequently are accompanied by exanthematic typhus. The louse infestation of the population is only one of the factors, even though it is indispensable. One of the most important typhus foci of eastern Europe, where typhus never subsides and from where it is imported to other areas, is White Ruthenia. This focus includes the administrative area of White Ruthenia, some of the former west Polish provinces and several adjacent districts of Lithuania.

Other typhus foci are situated around the Ural mountains. The seasonal climax of typhus is attained in the late winter and during springtime. In the northern parts of European Russia it is attained later than in the Ukraine. If an epidemic sets in, the morbidity rate during summertime is increased first. If these are small, no epidemic is to be expected during the wintertime.

The mortality from typhus varies considerably with the different years. In times of epidemics the physicians and the personnel are exposed to particular danger.

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LEPROSY

IN SOUTHEAST RUSSIA AND IN THE TRANSCASPIAN AREA

Translation prepared by:
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According to some of the Russian scientists the leprosy occurring throughout the countries around the Caspian Sea is a "forgotten infection in Southeast Russia". In the west and the south the area of its geographical distribution borders on the large Asiatic area of epidemics, while in the east its sporadic incidence extends to the Ukraine (Kherson, Crimea) and to Saratov in the north. In the midst of this area several foci are demonstrable, some of which were studied in detail, namely the Volga delta, the Kuban river basin, the area of Voroshilovsk (Stavropol), the Terek lowlands, Erivan, and the district of Krasnovodsk in Turkmenistan.

Even though the heretofore available material is incomplete, its cartographical exhibition may be attempted now to provide a first preliminary medical base for the necessary geomedical investigations into the cause of the endemic occurrence of leprosy in the border areas of the central European-Russian territory which in our days is free from leprosy. This also is particularly necessary to investigate the problem whether or not the extent of the lepromatous border areas was increased during the recent years and whether or not the adjacent countries were invaded. As there is no reliable statistical material, such an attempt must rely exclusively on the available literature. It must be complemented by the medical historians giving information on when Central Europe and Central Russia became free from leprosy. With these data available the question would be decided, which is important for the examination of OBERDOERFFER's thesis, whether the leprosy foci of the Russian border areas are, so to speak, the last areas of retreat for the former general distribution or whether they represent new advance posts of the Asiatic area of epidemics.

Some of the Russian scientists using among other sources the older statements of MUENCH, for comparison asserted that leprosy increased in frequency in the Southeast of Russia after World War I. MUENCH gave reliable information on the occurrence of leprosy throughout the province of Astrakhan. Relying upon older studies the Russian scientists confirm the occurrence of leprosy foci in several settlements of the Astrakhan Cossack territory even during the second and third decade of the 19th century. For 1883 MUENCH referred to 100 cases throughout this area. After his second visit in 1888 he gave the figure of 150 cases. According to the statements of MUENCH the area of endemics includes the settlements along the coast of the Caspian Sea with the Volga delta and the left bank of the Volga river extending 150 Werst (Russian linear measure) north of Astrakhan. However, some cases of leprosy were also found on the lower course of the Ural river between Uralsk and Gurev. In 1898, 40 cases of leprosy in 17 settlements of the Ural district were recorded in the official reports.

The first accurate estimate of the lepers in the province of Astrakhan made in 1923 gives the number of leprous persons as 250 or 300. Other sources of information recorded 500 patients sick with leprosy at that time. These data were confirmed by the sick roll of the Astrakhan Office for Skin and Venereal Diseases and for Leprosy, in which 165 cases of leprosy had been registered during the period from 1924 to 1935. From 1 October 1925 to 1 February 1926, 74 new cases of leprosy were observed throughout the lower Volga area, 50 of them being males, 24 females; classified according to their nationality they were 69 Russians, 4 Persians, 1 Kirghiz; classified according to their profession they were 38 hunters, 27 workers, 6 farmers, 3 clerks. The majority of the new cases was found in the settlements which were known to be leprosy foci (cf. map IV/6a after N.S.EFRON and Z.N. GRSHEBIN: Distribution of Leprosy throughout the District of Astrakhan. From: Astrakhan Med. Journ. 1923, # 7-9 of the Russian edition). A certain number of the new patients, however, lived in villages which had not been mentioned in the tables of MUENCH and in those established in 1923. As these data usually do not refer to the isolated cases one must assume that the new places recorded in the rolls are not the incidental place of residence of the lepers, but that they are areas of distribution of leprosy which heretofore were unknown. The Russian scientists, therefore, assumed an increase of the epidemic occurrence of leprosy during the period after World War I. The increasing number of the severe leprosy cases in the Astrakhan area speaks in favor of this assumption. For 1926 the number of leprosy patients throughout the province of Astrakhan is given as 500 or 600.

For the adjacent southeastern provinces only few data on the leprosy incidence are available. During World War I, 30 cases of leprosy were observed throughout the province of Saratov. In 1926, Solenoe-Saimtch, Tcherny-Yar, and Kamenny-Yar were mentioned as leprosy foci of the Stalingrad province. In all, Southeast Russia may be considered as an area where leprosy is endemic; the center is situated in the Volga delta basin, including Astrakhan and several other principal foci (cf. map IV/6a) in which leprosy seems to occur with the same frequency as in the adjacent Kuban area.

A second leprosy focus exists in the Kuban area throughout which leprosy is known under the term "Krymka". However, the scientists do not believe that it was imported from the Krym, and they assume that the original focus was situated in Iran, from where it had invaded in prehistoric times or later when the Kuban area was colonized by the Greeks and the Romans. The first reference to leprosy in this area was made in 1784 (GMELIN) and 1785 (FALK), but it was not earlier than 1884 that MUENCH gave a record on 17 cases of leprosy in the Russian Cossack districts of the Kuban territory to which it allegedly was imported by the close contact between the newcomers and the old residents in the beginning of the 19th century. After the introduction of the official statistics (1895) it was revealed that in the Russia of the Czars the Kuban territory held the second place after the Baltic territories (Livonia and Kurland) as far as the number of lepers was concerned. In Soviet Russia the Kuban territory ranged in the first place. Table I is compiled with Russian material lacking accuracy and it shows a certain constancy of the number of lepers during the last four decades so that it doubtlessly is permissible to speak of a focal incidence of this epidemic throughout the Kuban territory.

Table I

Number of Lepers throughout the Kuban Area

Year	1888	1889	1890	1891	1892	1893	1894	1895
Number of cases	2	43	74	52	102	70	141	166

Year	1897	1901	1903	1904	1905	1906	1907	1908
Number of cases	119	187	190	187	193	165	232	215

Year	1909	1910	1911	1912	1913	1914	1926
Number of cases	223	207	204	139	289	169	175

By 1 January 1928 a Russian leprosy expedition had recorded 158 lepers in the Kuban area (8 lepers per 100,000 persons), 120 of them originating from 42 villages of the Kuban district (cf. map IV/6b). In addition 39 persons afflicted with leprosy were found, who came to the Kuban area from other regions of Russia. The leprosy cases recorded in the towns are such immigrated persons. The geographical distribution of leprosy throughout the districts is demonstrated in the map IV/6b and in Table II. This survy is based upon the difference in the origin of the patients living in the lepra asylum of Kholm in 1927:

Table II

Origin of the Patients of the Lepra Asylum in Kholm

Kuban district	75	persons
Black Sea district	13	"
Armavir district	11	"
Maikop district	8	
Yaisk county	3	"
Karatchai county	2	"
Adige district	1	"
Ter district	3	"
Stavropol district	1	"
Don district	14	"
Taganrog district	5	"
Kerch town	2	"
Various Russian provinces	8	"
Armenia	5	"
Iran	1	"
total	152	patients

The task of the above mentioned expedition was not only the numerical registration of the leprosy distribution throughout the various villages of the Kuban area, and to record its increase, but also to investigate the local conditions enhancing the spread of leprosy. This was primarily attributed to the low state of civilization of the indigenous rural population. Leprosy occurs principally among the agricultural laborers although it is not exclusively restricted to a certain profession. In the towns lepers are hardly ever observed. The increase of leprosy observed during the ten years after World War I was traced back to the living conditions, poor in themselves, which were deteriorated by the war and the famine. In congruence with that the course of the tuberous and mixed forms of leprosy was increased in severity, particularly with the immigrants. In the Kuban area leprosy was found more frequently with the female than with the male sex. This was also observed on Oesel island, throughout the Baltic countries, and in other Russian areas of leprosy endemics. It indicates certain common conditions for the spread of leprosy, not recognized heretofore, which also seem to involve the Kuban territory. Here leprosy occurred even during early childhood. A leprosy asylum for this area was established in Kholm.

There is a further leprosy focus of Southeastern Russia in Daghestan. Only one recent statement (1932) on its extent is available revealing 13 leprosy patients who were recorded in 9 settlements of the Soviet Republic Daghestan. The majority of the cases was found in the district of Kakhib and single cases in the district of Tcharodinsk.

The leprosy in Azerbaidzhan and in Armenia as well as in Turkmenistan is connected with the large area of the endemic occurrence of leprosy in Kurdistan and Northern Iran (cf. map II/6). The area of the distribution of lepra here allegedly conincides according to the opinion of M. OBERDOERFFER with the distribution of the corn-campion contaminating the grain. Almost all Russian studies on leprosy throughout the above mentioned countries make mention of lepra being imported to the countries around the Caspian Sea and of the Caucasus from the old lepra foci around Tabriz and from Northern Iran. The formation of a focus in Armenia was the cause for the foundation of a lepra asylum not far from Erivan. In 1901, 168 cases of leprosy were observed in Transcaucasia, 111 of them in Erivan.

Only few data on the distribution of leprosy throughout the Transcaucasian area are available. In Turkmenistan there is a leprosy asylum in Khodsha at a distance of 16 km. from the railroad station of Ghiaurs of the Central Asiatic Railroad, 50 km. from Ashkhabad and 7 km. from the Iran frontier.

In the period from May 1928 to May 1930, 42 lepers were admitted there, 34 of them being Turkomen, 5 of them Persians, 3 of them Russians. The majority of the patients originated from the district of Krasnovodsk, one third of them from the border district of Hassan-Kuli, and a few single cases from the town of Ashkhabad. There is a further leprosy focus on the island of Chelechen. There, the profession of the majority of the lepers was fishermen and sailors. The greater the distance of a certain area from the coast of the Caspian Sea, the fewer lepers are found in it.

In the Central Asiatic republics of Uzbekistan and Tadzhikistan leprosy only seems to occur in single cases. Here, too, special settlements for lepers were mentioned (Makhao). In the reports on the leprosy colonies in the Sirdaria district of Uzbekistan and near Ura-Tyube in Tadzhikistan made in 1928, attention is attracted by the fact that in these villages the lepers and their healthy children as well as persons afflicted with other diseases (vitiligo) are mentioned as being isolated.

To compare the difference in the occurrence of leprosy throughout the various areas around the Caspian Sea with regard to the number of cases the heretofore available material is not sufficient. Concerning the distribution of the 479 cases recorded in 1925 throughout the various areas, the largest number of cases occurred in the Volga delta where 129 patients were found. In the Kuban area and in the Northern spurs of the Caucasus 111 cases, in Turkmenistan 77 cases, and in Azerbaidzhan 36 leprosy cases were recorded. According to a recent survey (1939) the 3,000 cases of leprosy observed in Russia were distributed as follows: 1,000 cases in Turkmenistan, 700 cases in Caucasia, and 600 cases in the Volga delta.

TH. BERSIN and H.J.JUSATZ

WORM INFESTATION OF THE POPULATION OF CAUCASIA.

(With 2 maps in the text).

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
Technical Section (Medical).

As regards the treatment of worm infestation of man in the Caucasian region, one naturally depends on Russian material, which was published chiefly in the Russian language and indigenous periodicals or manuscripts. Only a small part of it was published in foreign international papers. There is the question as to what extent the Russian data of worm infestation of the population are reliable. It may be remarked that numerous observations of German scientists in the occupied eastern territories suggest that the Russian examinations, though largely performed reliably, have been glossed over before publishing. In addition, it is a fact that the training of the personnel in the Russian research institutes may be inadequate. ZUMPT and MINNING (1943) have lately reported on such observations in Russian malaria stations in the Ukraine. If we use the Russian data after all in the following, this certainly does not mean that we incur any responsibility for their correctness.

The occurrence of intestinal worms can be quite easily ascertained by examinations of the stool for worm eggs. Such examinations for worm eggs have been organized on a large scale in the Caucasian region by the scientific tropical institutes in Rostov, Tiflis, Machatsch-Kala, Baku, and Eriwan. These institutes performed the examinations at their places themselves or established so-called helminthological points dispersed as outposts at numerous places and worked on the reports coming in from these places. In addition, there were Hygienic Examination Offices in the larger towns, so-called Town-Laboratories, which also made examinations of the stool by order of surgeons. As far as these examinations stood under the direct supervision of the scientific institutions and laboratories - this particularly applies to the towns - their findings are fairly reliable. The same is equally true for the work of those helminthological points, which were directed by a surgeon specially trained for this purpose. The results of those helminthological points which were under the supervision of an incompletely trained assistant, are certainly less reliable. For this reason, I have not at all or only with reserve used the results obtained by these last mentioned helminthological points (e.g. in the region of Ordschonikidse). - A small part of the examination-results was obtained under the direct control of the Moscow Central Institute (Central Institute for Tropical Medicine, Head of the Helminthologic Section, Academic Professor K. J. SKRJABIN). These are particularly the results of the 25th governmental helminthological expedition into the region of Shakhty and of another expedition into the region of Armenia.

The infestation figures indicated in the map refer to the intestinal parasite ascaris lumbricoides, to the whip-worm trichuris trichiura, to the hook-worms ankylostoma duodenale and necator americanus, to the dwarf-tape-worm hymenolepis nana and to the cattle - or pig tape-worm taenia saginata or taenia solium. In the table, strongyloides stercoralis and the trichostrongylus-species of man are considered in addition to the mentioned helminth-species. The varying height of the infestation values agrees almost everywhere with the climatic, geological, and other local conditions. For this reason, I think it possible that the infestation figures on the whole show a picture corresponding fairly well to reality, though it is of course quite possible that some of the percentages of the infestations have been adjusted higher and lower. In addition, favorable for the evaluation of the reported examination-results is the fact that almost generally the same methods of examination (centrifugation, saline flotation method according to FUELLBORN, and sometimes cultivation according to TELEMANN) have been used. Only the "anal-scrapings" has not always been examined; accordingly, the data on the spreading of the maggot-worm enterobius vermicularis have not been entered in the map and table. - Finally, one should consider that the values refer to different years with sometimes considerable intervals. Since it is well known, however, how extraordinarily hard it is to control the helminth-infections within a population having only slight hygienic concepts, who conservatively cling to the traditional way of living, the mistake caused hereby cannot be considered very great.

If you look at the occurrences of helminths as represented in the principal map, a number of appearances strikes you at once, e.g. the rising from north to south of the black and red columns of the spread of the intestinal worms and of the whip-worm and the increasing height of the total infection. It is probably correct to assume that these increases are essentially caused by the climate which becomes warmer and in part also more moist, towards the south. Worm infestation generally and the spreading of ascaris particularly are accordingly small in the arid territories of the Kalmyk-steppe. Furthermore we observe that in the cities, such as Rostov, Stalingrad, Astrakhan, etc., the dwarf tape-worm hymenolepis nana is relatively frequent with children. In the south, on the coast of the Black Sea near Pati, and on the coast of the Caspian Sea near Lenkoran, there is a sub-tropical, moist and hot climate, which drives up the blue columns of the hook-worm distribution. So much for the introduction! In the following, we now report in due order on the other peculiarities of helminth distribution in the 25 districts mentioned in the map:

1. Rostov on the Don and Surroundings.

The Rostov region has been examined particularly well as, since 1933, a helminthological section existed in the Tropical Institute in Rostov under the supervision of the lady doctor M. DOBROWA. She established 18 so-called helminthological points in the Rostov district and in the Asov-Black Sea region, which were annexed, as independent wards to polyclinics, hospitals, or malaria stations. Each of these helminthological points was under the guidance of a doctor. It was the task of these helminthological points to examine the population of their respective area for worms, with special regard to children 6 - 12 years of age, workers and employees of restaurants or other institutions of the food trade, and enlisted men. In addition, they were meant to fight the worms on a big scale by medicines, and to enlighten the population as regards hygiene. The work of the helminthological points was supervised by the Rostov Institute. In addition, there were Hygienic Examination Offices (City Laboratories), which executed individual examinations, in cities such as Rostov, Taganrog, etc. in the region north of the Caucasus.

As shown by the map, the average of the persons infested with intestinal worms in the Rostov region amounts to approximately 40 %. In the city of Rostov itself, still far higher figures are mentioned, though it is doubtful to what extent these figures are true for the total population, since the majority of the persons examined were children. In comparison with Central Europe, the relatively intense infection with the dwarf tape-worm hymenolepis nana (27- 16 %) is remarkable. Besides the worm species mentioned in the map and table, a few others, such as ankylostoma, diphyllobothrium (imported) and strongyloides have been observed.

A special examination is available from the city of Novocherkassk (RAEWSKAJA 1927). For lack of hygienic establishments, the destroyed houses were used as latrines by the population there in the years following the Revolution. The stool tests made there contained 43 % eggs of trichuris and 6 % eggs of ascaris.

2. Shakhty and the Mine-Districts.

No considerable differences from the Rostov region appear. In 1925, the mines were not infested with hook-worms. The height of the other infestations is less than that of Rostov (see SKRJABIN 1929). In the last few years, ankylostoma was perhaps carried in by foreign miners.

3. Salsk and the Manych-Lowland.

The frequency of the infestation is comparatively small, a phenomenen, which is probably explained by the drought and the salt content of the soil.

4. Elista and Surroundings.

The height of infestation is relatively low in the Kalmyk-steppe and in Elista, since the scarce rain rapidly oozes away in the desert-like sand-steppe and thus affords but insufficient conditions of development for the worm eggs. In addition, the ground is not much soiled owing to the nomadic way of living of the Kalmyk's. Also the fact that the Kalmyk's eat hardly any vegetables, has its share in the trivial distribution of the worms. Hymenolepis nana is but rarely observed, as contrasted to the frequent occurrence in Rostov and Shakhty.

5. Stalingrad.

Though Stalingrad, as well as Astrakhan belongs to the Volga-region and not to the Northern Caucasus, these cities have been mentioned here for comparison. The infestation values roughly correspond to those of Rostow. In addition to the worm species mentioned in the map and enterobius excepted, which is of course widele spread as well as in Rostov, in some cases trichostrongylus, diphyllobothrium, fasciola, and dicrocoelium have been ascertained by examinations of the stool.

6. Astrakhan and Surroundings.

The values indicated in the map refer exclusively to children (school boys), 8 - 14 years old, so they perhaps give a picture not quite corresponding to the actual conditions.

7. Jeisk.

There are but scarce data available. There seem to be no great differences from the Rostov values.

8. Krasnodar.

While the average annual temperature of Rostov amounts to 9.2°C and the average annual quantity of rain to 470 mm., the corresponding figures of Krasnodar, situated more to the south at the edge of the northern Caucasus in the Cuban region, are somewhat higher, viz. 11,3°C. and 636 mm. It is remarkable and perhaps a consequence of this climatic difference that the intensity of the trichuris infestations is already considerably increased there. Besides, it must be remarked that many vegetables are grown in the area around Krasnodar and partly eaten raw, while the culture of grain is prevalent in the Rostov region and accordingly fewer vegetables are consumed.

9. Kropotkin and Surroundings.

As contrasted to Kraenodar and Novorossiisk, the climate of Kropotkin situated farther in the interior, is more continental, and the soil, consisting of sand is rather infavorable to the development of helminth-eggs (eggs of the geohelminths). All the same, the unhygienic conditions in the town cause a considerable height of worm infestations which somewhat exceeds even that of Rostov. The sewage of the town is drained unfiltered into the Cuban, although there are bathing places down river from the outlets of the sewers (DOBROWA 1940).

10. Vorochilovgrad and Surroundings.

Like Kropotkin, Vorochilovgrad is situated in an area of vegetable cultivation. According to EHRLICH (1929), among 150 children examined in a children's home of the town, 85 % were infested with trichuris. It is possible that the data given by the helminthological points of the surroundings are too low (see table, trichuris only about 20 %, total height of infestations only 31 %).

11. Pjatigorsk and Surroundings.

Also here, the date of the helminthological posts (for Pjatigorsk and Tsherkask) contain values that are too low, while the higher percentages determined by an expedition of the Rostov Tropical Institute are probably correct. It is remarkable that ascaris occurs much more frequently than trichuris. Besides, the cattle tapeworm is relatively frequent because many cattle are bred and the meat is only partly or inadequately examined.

12. Nalchik and Surroundings.

The height of infections varies according to the situation of the places examined. The differences in the villages of the Cabardino-Balcarians are particularly remarkable. For instance, SHIKHOBALOVA (1936) has examined a village of the plain with Cabardian population and several small villages in the highland with Balcarian population. The worm infestation of the Balcarian villages is considerably greater. While the Cabardians live in comparatively clean and extensive buildings - every member of the family has a bed of his own, every yard has a latrine - the mountain cabins of the Balcarians are built over each other on the slopes so that the yard of the upper cabin serves as roof for that below. In such a dark, usually very dirty cabin, several families often live together. There are no latrines at all. As observed by the author, the children deposited their excrements in a stream and then bathed in it, drinking-water was taken from the same place. The children of both tribes are particularly infested. According to the mentioned author, their worm-infestation amounts to 49 % with the Cabardinians and to 92 % with the Balcarians.

13. Ordzhonikidze and Surroundings.

This is a region rich in forests in the promontories, in which particularly the geohelminths (ascaris, trichuris) are widely spread. BESSONOWA (1929) found especially high figures of infestation among the workers of the coal-mines of Sadovskii: total height of infestations = 83 %, ascaris = 27 %, trichuris = 79 %, taenio = 5 %, trichostrongylus = 7 %.

14. Grozny and Surroundings.

As contrasted to Ordzhonikidze and Nalchik, the slight infestation with ascaris lumbricoides is remarkable.

15. Kizlyar.

In comparison with the other towns and villages of the Terek area, the worm infestations have not spread much in the town of Kizlyar. This may be related to the fact that Kizlyar is situated at the southern edge of the comparatively arid and sandy Nogaian steppe. The annual rainfall is low (see table).

Table 1.

Place	average annual temperature	annual quantity of rain
Nalchik	8,8°C.	605 mm.
Ordzhonikidze	8,5°C.	844 mm.
Grozny	11,1°C.	503 mm.
Kizlyar	1,1°C.	284 mm.

16. Novogrossiisk and Surroundings.

Owing to the considerable moisture of the sandy soil destitute of forests, the conditions of development for geohelminths are rather unfavorable.

17. Sotskhi and the Black Sea Coast.

According to the favorable climatic conditions - high average annual temperature of 13,8°C. and annual quantity of rain of 1430 mm. - thus a pronounced moist and hot climate, the infestations with ascaris and trichuris are excessively intense. The infections are particularly fostered by the fact that the customary food, besides bread, consists chiefly of raw vegetables and fruit (salad, onions, cucumbers, radishes, tomatoes). The population lives largely on the cultivation of tobacco, vegetables and fruit; in this work they are often in close contact with the earth, which is usually fertilized with animal and human excrements. In addition the vegetable-gardens in the country and in the small towns are used as latrines by the children, so that the ground may be considerably soiled in some places. In some towns and villages (Adler, Goriaskhi-Klutsk, etc.) the dirtyness of the drinking water is said to foster the spreading of the infestation (DOBROWA 1940).

18. Kuba, Kussary, etc.

The eastern Caucasus, where Kuba and Kussary are situated, is arid and destitute of forests; both ascaris and trichuris are frequent. It is a peculiar fact that the height of the ascaris infestations surpasses that of trichuris. It is the question, however, to what extent these phenomena are actually present or feigned only by the method of stool-examination used (TELEMANN or FUELLEBORN).

19. Poti, Coast Districts and Rion Lowland in Western Georgia.

The subtropical climate of Western Georgia, which is mild even in winter, affords, especially in the coastal region (from Sukhum to Batum) most favorable conditions of development for the eggs of the geo-helminths. To mention one of the coastal towns, Poti has an average annual temperature of 14,5°C. and an annual rainfall of 1626 mm. For this reason, we find there the typical nemath-helminths of the countries with hot climates, the hook-worms. They are endemic for Western Georgia. The endemic zone extends in the north to Gordi and Kiutskha (Imeretia) and in the east to Choragouli (see text-map 1 according to KANELAKI and KAMALOW 1937).

Map 1.

Hook-worm infestation of the population in Poti and the corresponding coastal region.

(The figures indicate the percentages of the occurrence among the population (according to KADELAKHHI and KAMALOV).

One has estimated that approximately half a million of the inhabitants of Georgia are infested with hook-worms. Necator americanus occurs most frequently. Only 8-9 % of the infestations are caused by ankylostoma duodenale. About 10 % of the persons infested with hook-worms are seriously ill, 45 % show less serious symptoms of disease, and the rest may be called worm-carriers only. The relative non-malignancy of the diseases is caused by the fact that the population can be infested only 6 months a year, during the cooler winter-months, no infestations are possible, and the patients lose many worms in this period. LUBCHENKO reports according to PODIAPOLSKAJA (1936), that the following hook-worm figures were determined with 708 Georgians after medical treatment to control the worms:

with 426	= 1 - 10	hook worms
" 176	= 11 - 50	" "
" 54	= 51 -100	" "
" 52	=101 -500	" "

The causes of the infestations are the same as in other countries with hot climates: The absence of latrines, walking bare-footed, eating unwashed raw vegetables, eating earth, primitive accommodations etc. The natives, particularly in the southern rayons (Gadanski), often live in dark huts with loam floors, together with their domestic animals in the same room. For the same reason, intestinal and whip-worms are widely spread as well.

20. Tiflis and the Mountain-Districts of Eastern Georgia.

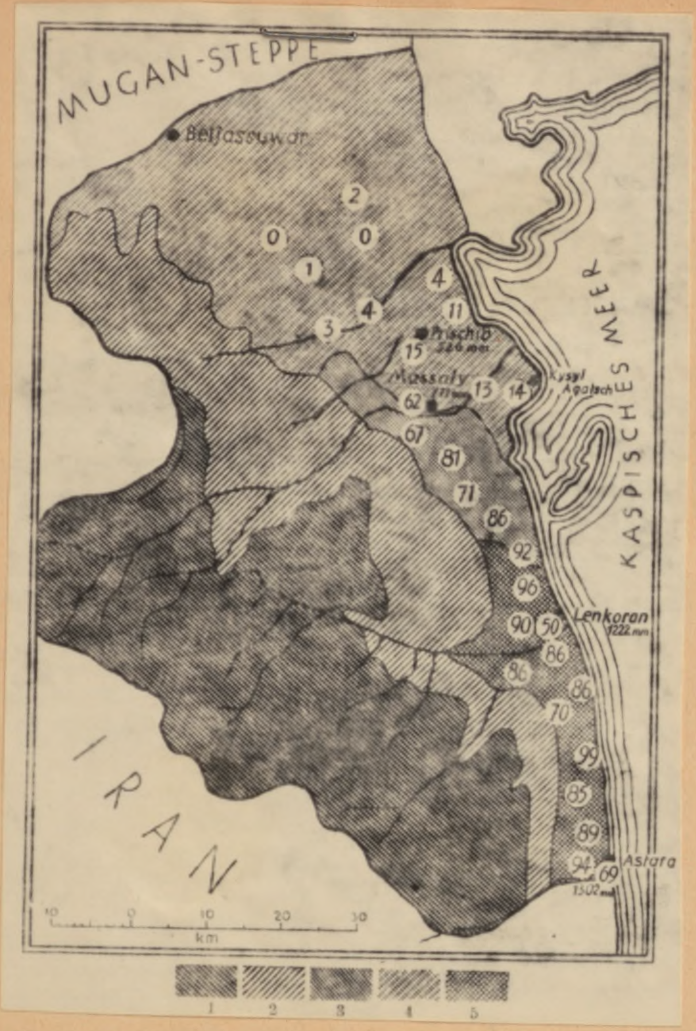
While intestinal and whip-worms are spread among the population to an equal extent in Eastern and Western Georgia, the hook-worms are almost completely absent in the eastern part of Georgia, for the climatic conditions (average annual temperature of 10,9°C and annual rainfall of 495 mm) afford only insufficient conditions of development for the hook-worms. The worm infestation among the population of the city of Tiflis has been examined particularly conscientiously under the guidance of the helminthological section of the Tiflis Tropical Institute - KANDELAKI and KAMALOW. The 2 - 8 years old children of the kindergartens are considerably infested, chiefly in the outskirts of the city. Among other species, SWANIDSE found in 1930, intestinal worms mentioned in the map and in the table other species have been observed in smaller numbers, such as echinococcus infestations in 1,13 to 1,20 %. According to COLIJAN (1933) the disease of echinococci which occurs in Russia only on an average of 0,02 % of the population, is rather frequent in the whole Caucasian region.

21. Armenia with Erivan and Nakbichevan.

As regards the worm infestation of the population of Armenia, some excellent work is available, which was published by the Erivan Tropical Institute (KALANTARIAN 1926, 1933, 1934, 1935). Besides the very frequent intestinal and whip-worms, tape-worms, species of trichostrongylus and echinococcus infestations as well as less frequently strongyloides stercoralis,necator-americanus (carried in), hymenolepis diminuta, dipylidium caninum, fasciola hepatica, dicrocaelinum lanceatum and bilharzia haematobia. Necator and bilharzia are not endemic. According to SKRJABIN 58 % of the dogs in Armenia are infested with echinococcus granulosus, while 58 - 72 % of the cattle, sheep, etc. are carriers of cysts. According to COLIJAN, there was no meat-inspection in Armenia even as recently as 1933. - The frequent occurrence of trichostrongylides is probably associated with the intensive sheep-breeding. In man, the species trichostrongylus instabilis, tr. extenmatus, tr. probolurus, tr. orientalis, tr. vitrinus and tr. skrjabini have been observed according to KALANTARIAN. - In the territories of Nakhichevan, situated in the south of Armenia, where there is much stock-farming, 100 % of the sheep are infested with fasciola and dicracoelium; the shepherds, too, are usually infested with these hepatic leeches.

22. Sakataly and Surroundings.

The district of Sakataly consists of mountains and of flat country. The flat country is rich in forests, watercourses and gardens; the population is comparatively dense there. The climate is hot and moist. The annual quantity of rain amounts to 900 mm. Since there are no latrines in the villages, the preliminary conditions for a wide spreading of worms are present there (JAGUBOFF 1929). The region Ali-Abadski in the flat country is mostly infested with hook-worms (72%). In addition, the frequent occurrence of tape-worms (taenia saginata) is remarkable. It is caused by the customary eating of pieces of beef (Shashlik), which are only superficially roasted on the spit.



Map 2.

Hook-worm infestation of the population in Leukoran and the corresponding coastal region.

1 mountains (higher than 1000 m)
2 promontories (250 - 1000 m)
3 and 5 subtropical yellow earth } plains lower than 250 m.
4 steppe-soil

The figures indicate the percentage of occurrence among the population. (according to ZDROVSKI and VOSKRESSENSKI).

23. Kirovabad(Gandzha) and the Kura lowland.

The spreading of worms is, on the whole, similar to that of the region last mentioned, with only one difference: there exist no seats of infection with excessive occurrence of hook-worms.

24. Baku and the Coast northwest of the City.

In 1924, in the Baku University Clinics, the first cases of hook-worms in Azerbeidshan were found. They were 8 seriously ill persons, in which up to 1400 hook worms were found after administering an antihelmintic. Also in the following time, hook-worm have often been observed in the patients taken to the clinics. The patients were chiefly inhabitants of the Sakatalski and Lenkoranski districts, particularly workers in the rice-fields and tea-plantations. In Baku itself, hook-worm infections are comparatively rare.

25. Lenkoran and the adjacent coastal district.

According to the climatic and geological conditions, the district of Lenkoran can be divided into three regions (see text-map 2): a mountainous zone (1000 m. and more), the zone of the promontories (250 - 1000 m.), and the plain. The plain has a subtropical climate. Its northern part, the Prishibinski region, has relatively little rain (526 mm per year) and a salty steppe-soil. Its inhabitants are not, or only rarely, infested with hook-worms. On the other hand, the southern part of the flat country affords the best conditions of development for hook-worms, since the soil is formed by yellow earth which is rather impermeable to water, and since the annual rainfall amounts to considerably higher figures. The town of Lenkoran, for instance, has an average annual temperature of 14,6°C., and an annual rainfall of 1255 mm. The examination of the population of this region accordingly showed a particularly intense hook-worm infestation, which amounts to almost 100 % in some villages. As LINDTROP (1925/26) thinks, it is above all the cultivation of rice, during which the peasants work with the muddy water of the fields up to their knees and often up to their hips, which fosters the infestations. On the other hand, WOSSKRESENSKI (1929) asserts that it is less the cultivation of rice than the other ways of living that accounts for the infestation. Particularly walking bare-footed and lying on the infested ground and the religious ablutions performed by the Moslem population are said to be important causes.

During helminth-treatments, one has counted 70 % necator americanus and 30 % ankylostoma duodenale. The numbers of worms in one person varied from 17 - 50 to a maximum of 944 - 1496. The majority of the worm carriers had 100 - 500 worms. According to the findings of ZDRODOVSKI and WOSSKRESENSKI (1929), the average contents of hemoglobin of the blood of 747 persons amounted to 49,6% (SAHLI). That is a very low value, which perhaps, however, is caused not only by the ankylostomiasis, but also by other diseases, such as the widely spread malaria etc.

In addition, it is worth mentioning that, in the Lenkoranski-district, strongyloides stercoralis occurs more frequently and that, in the southern part of the flat country, even 36 % of the population are infested with them.

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Towns or regions	persons examined	persons infected	ascaris %	trichuris %	ankylost. %	trichostrongyl. %	strongyloides %	hymenolepis %	taenia %	age of the persons examined	year of examin.	author	method of examin.
a) Don region.													
1. Rostov on the Don river and Surroundings.													
City of Rostov	865	62.3	13.7	30.6	0.0	0.0	0.0	15.0	2.0	children	1927	Haskina-Munder	Fuelleborn Telemann
same	845	49.3	7.3	15.4	0.0	0.0	0.0	10.3	0.1	same	1928	same	same
same	369	59.6	5.8	13.6	0.0	0.0	0.0	13.6	0.0	same	1930	Fomina	smear acc.to Fuelleborn anal scrapings
same	1907	49.0	8.0	26.2	0.0	0;0	0.0	12.6	0.4	same	1931	Jadova	same
same	499	73.5	6.0	19.2	0.0	0,0	0.0	12.0	0.0	same	1934/35	Gorjatschewa	same
same	1000	13.8	5.6	1.2	0.0	0.0	0.0	3.1	0.0	same	1932	Piwowarowa	same
same	502	39.4	8.2	16.1	0.0	0.0	0.0	4.6	0.0	adults	1931	Jadowa	same
same	206	37.0	12.1	21.8	0.0	0.0	0.0	1.4	1.0	same	1933	Dobrowa	same
same	11043	31.1	3.1	5.5	0.0	0.0	0.0	7.0	0.6	children + adults	1934/1935	city lab.	Fuelleborn, Telemann
same	1753	88.0	11.4	16.0	0.0	0.0	0.0	16.0	1.8		1934/1935	lab.of the helminth, Cabinet	smear acc.to Fuelleborn anal scrapings
City of Novotskerkassk	907	28.1	0.0	1.4	0.0	0.0	0.0	7.0	0.1	same	1934/1935	city lab.	Fuelleborn, Telemann
City of Taganrog	2129	25.6	3.6	6.0	0.0	0.0	0.0	7.3	1.9	same	1934/5	same	same
City of Asov	187	37.6	7.0	12.9	0.0	0.0	0.0	2.7	2.8	same	same	same	same
Rayon center Bogaveskaja	352	24.1	6.4	6.6	0.0	0.0	0.0	10.7	0.7	children	1938	Alchowa	smear acc.to Fuelleborn
Rayon center Aksaijkaja	150	16.0	3.8	5.3	0.0	0.0	0.0	7.0	0.5	same	1940	Globoeva	same
Sum resp. mean value:	22714	42.3	6.8	13.2	0.0	0.0	0.0	8.7	0.8				
2. Shakhty and Mining-Districts.													
City of Shakhty	585	20.0	4.5	7.7	0.0	0.0	0.0	2.4	1.4	children + adults	1934/1935	city lab.	Fuelleborn, Telemann
District of Shakhty	2098	29.7	0.8	24.4	0.0	0.0	0.0	2.2	0.1	same	1925	Skrajabin, Smirnow	smear acc.to Fuelleborn
City of Novoshatinsk	3082	13.4	3.4	5.7	0.0	0.0	0.0	5.4	0.5	same	1940	Alchowa	same
City of Sulin	181	13.5	2.7	4.3	0.0	0.0	0.0	6.0	0.5	same	1935	city lab.	same
City of Kamensk	176	19.0	5.1	5.1	0.0	0.0	0.0	6.7	0.7	same	1926	Kowalemko	Fuelleborn, Telemann
City of Milervo	391	30.0	2.6	11.5	0.0	0.0	0.0	0.4	1.9	same	1934/5	city lab.	same
Rayon Gunderowski, coalpits	341	14.3	2.2	2.8	0.0	0.0	0.0	9.0	0.0	same	1940	Gorjatschewa	smear acc.to Fuelleborn
Sum resp. mean value:	6854	20.0	3.1	8.8	0.0	0.0	0.0	4.6	0.7				
3. Salsk and Manytsh-lowlands.													
City of Salsk	402	24.1	7.0	9.2	0.0	0.0	0.0	7.4	0.3	children and adults	1934/1935	city lab.	Fuelleborn, Telemann

Towns or regions	persons examined	persons infected	ascaris %	trichuris %	ankylost. %	tricho-strongyl. %	strongy-loides %	hymeno-lepis %	taenia %	age of the persons examined	year of examin.	author	method of examin.
b) Kalmyk - steppe.													
4. Elista and Surroundings.													
City of Elista (Russians)	112	17.8	5.3	8.0	0.0	0.0	0.0	0.0	0.0	children adults	1929	Sadowinikowa	smear acc. to Fuelleborn
City of Elista (Kalmyks)	169	4.7	1.7	0.6	0.0	0.0	0.0	0.6	0.0	same	1929	same	same
Rayons:													
Gr.Derbetovsky	227	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.4	adults	1932	Schmelow, and Trofimova	smear acc. to Fuelleborn anal scrapings
same	301	17.2	0.0	0.0	0.0	0.0	0.0	1.9	0.3	children	1932	same	same
M. Derbetovsky	54	18.5	0.0	5.5	0.0	0.0	0.0	9.0	1.8	children	1929	Neuland-Dobrova	smear acc. to Fuelleborn
Sum resp. mean value:	863	12.4	1.4	2.8	0.0	0.0	0.0	2.3	0.5				

Towns or regions	persons examined	persons infected	ascaris %	trichuris %	ankylost. %	tricho-strongyl. %	strongy-loides %	hymeno-lepis %	taenia %	age of the persons examined	year of examin.	author	method of examin.
c) Volga - district.													
5. Stalingrad.													
City of Stalingrad	435	32,5	14.9	8,7	0.0	0.0	0.0	0.7	0.2	adults workmen	1929	Neuland-Dobrova	smear acc.to Fuelleborn
same	1174	13.0	0.5	5.0	0.0	0.2	0.0	1.0	0.2	Soviet-soldiers	1929	same	same
same (Armenians)	55	58.0	5.4	40.0	0.0	3.6	0.0	5.4	0.0	children	same	same	same
same (Tartars)	72	54.0	2.5	8.0	0.0	0.0	0.0	44.0	0.0	same	1929	same	same
same (Russians)	101	28.5	2.0	6.0	0.0	0.0	0.0	16.8	0.0	same	1929	same	same
same	845	49.4	8.6	15.8	0.0	0.9	0.0	8.2	0.0	children adults	1928/1930	Skrjabin	same
same	554	48.3	7.2	11.6	0.0	0.0	0.0	0.0	7.2	same	same	same	same
Sum resp. mean value:	3236	40.5	5.9	13.7	0.0	0.7	0.0	10.9	1.1				
6. Astrakhan and Surroundings.													
City of Astrakhan (Russians)	606	70.7	1.6	8.1	0.0	0.0	0.0	9.4	0.2	children	1930-1933	Basarova, Woschaeva	Fuelleborn, anal scrapings
same (Tartars)	49	59.4	2.0	12.2	0.0	0.0	0.0	20.4	0.0	same	same	same	same
same (Kalmyks)	91	24.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0	same	same	same	same
Village Selitrajoje	270	79.6	1.1	1.8	0.0	0.0	0.0	12.5	0.7	same	same	same	same
Village Krasny-Jar	119	59,6	0.0	0.0	0.0	0.0	0.0	8.0	0.0	same	same	same	same
Fishing Village Oranshereiny	46	69.6	2.1	19.5	0.0	0.0	0.0	19.5	0.0	same	same	same	same
Kalmyk Village Dolban	89	28.0	0.0	1.1	0.0	0.0	0.0	1.1	0.0	same	same	same	same
Friedrich Engels school	152	70.4	3.9	22.3	0.0	0.0	0.0	7.9	0.0	same	same	same	same
Sum resp. mean value:	1422	57.6	1,3	8.1	0.0	0.0	0.0	10,0	0.1				

Towns or regions	persons examined	persons infected	ascaris %	trichuris %	ankylost. %	tricho-strongyl. %	strongy-loides %	hymeno-lepis %	taenia %	age of the persons examined	year of examin.	author	method of examin.
d) Northern Caucasus Area, Kuban-District.													
7. Jeisk.													
City of Jeisk	592	51.2	11.3	14.4	0.0	0.0	0.0	9.5	0.8	children adults	1934/ 1935	city lab.	Fuelleborn, Telemann
8. Krasnodar.													
City of Krasnodar	5170	50.9	16.2	27.8	0.0	0.0	0.0	4.4	2.0	children adults	1934/ 1935	city lab.	Fuelleborn, Tiemann
same	810	65.0	15,4	50.1	0.0	0.0	0.0	1.6	0.1	adults	1934	Kandalova	smear acc.to Fuelleborn
same	471	77.4	10.6	40.8	0.0	0.0	0.0	1.5	0.0	children	1933	same	same
Sum resp. mean value:	6451	64.4	14.1	39.6	0.0	0.0	0.0	2.5	0.7				
9. Kropotkin and Surroundings.													
City of Kropotkin	167	42.0	19.1	25.0	0.0	0.6	0.0	2.0	0.6	children	1934	Dobrova	smear acc.to Fuelleborn
same	126	45.0	15.2	31.0	0.0	0.0	0.0	0.0	0.0	adults	1934	same	same
same	186	32.0	4.3	16.0	0.0	0.0	0.0	0.0	3.2	children adults	1934/ 1935	city lab.	Fuelleborn, Telemann
City of Tikhoretsk	292	41.6	13.8	16.6	0.0	0.0	0.0	5.0	3.0	same	same	same	same
City of Armavir	255	74.6	29.4	16.0	0.0	0.0	0.0	3.0	0.0	children	1935	Levitzki	smear acc.to Fuelleborn
Sum resp. mean value:	1026	47.0	16.4	20.9	0.0	0.1	0.0	2.0	1.4				
Plateau of Vorochilovgrad.													
10. Vorochilovgrad and Surroundings.													
City of Vorochilovgrad	4127	31.4	11.5	20.6	0.0	0.0	0.0	5.3	0.3	children adults	1940	annual report of the helm. point in Stavropol	
same	150	94.0	17.3	85.3	0.0	0.6	0.0	2.0	0.0	children	1929	Erlich	Fuelleborn, Telemann anal scrapings
Rayon Center Alexandrovskoe	840	28.6	1.7	14.4	0.0	0.0	0.0	11.9	0.4	children adults	1940	annual report of the Malaria-Station	smear acc.to Fuelleborn
Rayon Center Petrovskoe	136	13.9	0.0	2.8	0.0	0.0	0.0	11.2	0.0	same	same	same	same
Sum resp. mean value:	5253	41.9	7.6	30.7	0.0	0.2	0.0	7.6	0.2				
Northern Caucasus, Plateau of Vorochilovgrad.													
11. Pjartigorsk and Surroundings.													
City of Pjartigorsk	7822	19.2	10.3	14.3	0.0	0.0	0.0	2.6	0.4	children	1940	ann.rep. of the helm.point	smear acc.to Fuelleborn
City of Tsherkesk	5622	25.7	16.2	7.1	0.0	0.0	0.0	2.1	0.4	children adults	1940	same	same
City of Mikojan-Shakhar	738	43.1	29.2	5.8	0.0	0.0	0.0	1.2	5.4	same	1938	ann.report of the malaria station	same
Village Kostokhetagvrova	850	54.0	54.0	4.3	0.0	0.0	0.0	5.0	4.5	children	1938	Alchova	same
Karatshaev-area, coal-mines	2230	49.1	46.0	8.0	0.0	1.0	0.0	7.2	2.4	children adults	1938	same	same
Sum resp. mean value:	17262	38.2	31.1	7.9	0.0	0.2	0.0	3.6	2.6				
Terek - region.													
12. Nalchik and Surroundings.													
City of Nalchik	870	67.0	72.0	50.0	0.0	0.0	1.0	7.0	3.0	children	1941	ann.report of the helm. point	smear acc.to Fuelleborn
Rayon Center Murtasovo	182	69.0	53.0	15.0	0.0	0.0	0.0	3.0	0.5	same	1941	same	same
Rayon Center Maiski	220	50.0	28.0	22.0	0.0	0.0	0.0	5.5	1.0	same	1941	same	same
Karadiner-village	131	37.4	30.0	11.4	0.0	0.0	0.0	1.0	2.0	children adults	1933	Schikhobalova	same
Balkarier villages	125	91.6	87.2	48.8	0.0	0.0	0.0	0.0	1.0	same	1933	same	same
Sum resp. mean value:	1528	62.8	54.0	29.4	0.0	0.0	0.2	3.3	1.5				
13. Ordzhonikidze and Surroundings.													
City of Ordzhonikidze	2150	89.1	35.7	48.3	0.0	0.0	0.0	4.0	0.8	children	1940	ann.rep.of the helmin. point	smear acc.to Fuelleborn
Rayon Pravobereshny	215	42.5	13.6	17.8	0.0	0.0	0.0	10.8	0.3	same	1940	same	same
Rayon Ardonskij	225	89.9	65.8	21.5	0.0	0.0	0.0	3.3	0.0	same	1940	same	same
Rayon Dar-Kokhsky	150	55.9	41.1	24.8	0.0	0.0	0.0	0.0	0.0	same	1940	same	same
Village Elchotovo	150	53.5	34.2	22.3	0.0	0.0	0.0	0.0	0.0	same	1940	same	same
Sadonskij-mine	142	83.1	26.7	78.7	0.0	7.0	0.0	1.4	5.0	adults	1928	Bessonova	same
Sum resp. mean value:	3032	69.0	36.2	35.6	0.0	1.2	0.0	3.2	1.0				
14. Grozny and Surroundings.													
City of Grozny	2300	61.6	15.4	49.7	0.0	0.0	0.0	6.7	1.7	children	1940	ann.rep.of the malaria station	smear acc.to Fuelleborn anal scrapings
City of Prokhladny	200	55.0	12.0	44.5	0.0	0.0	0.0	0.0	2.0	same	1940	same	same
City of Modosk	99	78.7	4.0	50.5	0.0	0.0	0.0	2.0	0.0	same	1927	Kosakova, Tolstopjatova	Telemann Fuelleborn
same	75	68.5	2.7	58.9	0.0	0.0	0.0	1.3	1.3	same	1927	same	same
same	41	65.0	0.0	49.0	0.0	0.0	0.0	0.0	7.3	adults	1927	same	same
same	150	64.0	15.0	40.0	0.0	0.7	0.0	0.0	8.0	children adults	1927	same	same
Rayon Sunskhenskij	121	69.7	27.1	45.7	0.0	0.0	0.0	5.9	0.0	same	1940	ann.rep.of the malaria station	smear acc.to Fuelleborn
Rayon Nasranovskij	150	36.1	15.9	17.1	0.0	0.0	0.0	2.4	0.0	children	1940	same	
Sum resp. mean value:	3136	62.3	11.5	44.4	0.0	0.1	0.0	2.3	2.5				
15. Kizlyar.													
City of Kizlyar	1839	18.5	3.2	8.1	0.0	0.0	0.0	6.2	1.0	children adults	1940	ann.rep.of the helm. point	smear acc.to Fuelleborn

Towns or regions	persons examined	persons infected	ascaris %	trichuris %	ankylost. %	tricho-strongyl.%	strongy-loides %	hymeno-lepis %	taenia %	age of the persons examined	year of examin.	author	method of examin.
e) Western Caucasus.													
16.Novogrossiisk and Surroundings.													
City of Novogrossiisk	2980	32.7	8.1	16.4	0.0	0.0	0.0	4.9	1.1	children adults	1934/ 1935	city lab.	Fuelleborn Telemann
City of Anapa	235	31.8	13.5	4.4	0.0	0.0	0.0	9.6	2.2	same	same	same	same
Sum resp. mean value:	3215	32.2	10.3	10.4	0.0	0.0	0.0	7.3	1.7				
17. Sotskhi and Black Sea Coast.													
City of Sotskhi	1418	79.0	35.7	60.9	0.0	0.0	0.0	7.6	0.7	children adults	1934/ 1935	city lab.	Fuelleborn Telemann
same	1037	90.8	41.3	79.1	0.0	0.0	0.0	6.8	0.1	children	1930	Baschka-rova	smear acc.to Fuelleborn
City of Adler	380	96.0	94.7	79.0	0.0	0.0	0.0	3.1	0.0	same	1933	Dobrova	same
same	80	83,7	63.7	30.0	0.0	0.0	0.0	1.2	10.0	children adults	1925	Stradoms-ki	emulsion of feces with water
City of Tuapse	2113	84.0	48.0	23.0	0.0	0.0	0.0	9.0	1.0	same	1934/ 1935	city lab.	smear acc.to Fuelleborn
same	390	59.7	15.6	42.0	0.3	0.0	0.0	3.0	0.0	children	1935	Riskina	same
City of Maikop	360	98.9	85.0	76.0	1.1	0.0	0.0	13.6	0.0	same	1935	Dobrova	same
Spa Karbadino	217	94.2	57.1	34.7	0.0	0.0	0.0	0.0	0.0	same	1928	Haskina-Munder	Fuelleborn, Telemann
Spa Goratch-Klutch	251	92.0	77.0	65.0	1.6	0.0	0.0	3.1	0.0	same	1935	Dobrova	smear acc.to Fuelleborn
Village Georgi-evskoe	493	94.5	93.0	73.0	0.0	0.0	0.0	2.0	0.1	children adults	1937	same	same
Sum resp. mean value:	6739	87.3	61.1	56.3	0.3	0.0	0.0	5.0	1.2				

Towns or regions	persons examined	persons infected	ascaris %	trichuris %	ankylost. %	tricho-strongyl.%	strongy-loides %	hymeno-lepis %	taenia %	age of the persons examined	year of examin.	author	method of examin.
f) Eastern Caucasus.													
18. Kuba, Kussary, etc.													
City and district of Kuba	451	89,6	49.2	82.5	0.7	2.9	11.5	0.0	2.0	children adults	1927/1928	Woskressenski	Fuelleborn Telemann
District of Kuba	7816	81.7	70.0	4.4	0.0	0.0	0.0	0.0	15.7	same	1940	Andri	smear acc.to Fuelleborn
Rayon Kussarsk	1000	81.6	75.8	39.0	0.0	0.3	0.0	0.7.	.0.2	same	1940	same	same
Rayon Samur-Chizinski	550	54.7	50.8	14.0	0.0	0.0	0.0	0.0	2.7	same	1940	same	same
Sum resp. mean value:	9817	76.9	61.4	35.0	0.2	0.8	2.9	0.2	5.1				

Towns or regionss	persons examined	persons infected	ascaris %	trichuris %	ankylost. %	tricho-strongyl. %	strongy-loides %	hymeno-lepis %	taenia %	age of the persons examined	year of examin.	author	method of examin.
g) Transcaucasus, Georgia.													
19. Poti, Coast - areas and Lowlands of Rion of Western Georgian.													
City of Poti	150	100.0	73.7	92.1	13.2	0.0	0.0	0.0	0.0	children adults	1929	Kandelaki, Kamalov	smear acc.to Fuelleborn
City of Kutais	358	89.9	49.4	71.9	21.4	0.0	0.0	0.0	0.0	same	1929	Losebende	same
City of Sukhum	686	76.8	37.3	87.2	20.6	0.6	0.2	2.0	3.0	same	1926/7	Evdokimw	same
same	145	93.2	24.8	52.4	72.4	0.0	0.0	1.3	0.0	children	1925.	Blaschin	same
City of Batum	710	99.8	63.6	77.8	52.8	0.0	0.0	0.5	0.0	same	1928	Mtschedlidse	same
Rayon Sugdidski	3153	85.0	60.7	51.3	53.4	0.0	0.0	0.0	0.4	children adults	1929	Kandelaki Kamalov	same
Rayon Zchakaya	3268	87.4	54.3	64.1	58.6	0.0	0.0	0.0	0.3	same	1929	Schjenti	same
Rayon Khonski	1052	91.9	72.0	76.2	31.7	0.2	0.0	0.2	0.4	same	1932	Kandelaki Kamalov	same
Rayon Zhaltubski	2334	86.5	46.4	41.0	67.9	0.4	0.2	0.0	0.1	same	1932	same	same
Rayon Dzhugeli	1730	89.2	74.1	32.4	30.9	0.0	0.0	0.3	0.2	same	1934	same	same
Rayon Koragulski	1902	95.8	86.7	58.3	31.4	0.4	0.0	0.2	0.1	same	1934	same	same
Rayon Samtredi	850	94.1	59.9	70.0	14.3	0.5	0.0	0.0	0.0	same	1931	same	same
Rayon Gori	4319	97.3	81.7	64.3	36.5	0.0	0.0	0.0	0.Q	same	1934	same	same
Rayon Gali	759	91.5	36.3	30.1	70.2	0.0	0.0	0.0	0.5	same	1928	Meladse	same
Rayon Gadantski	450	86.5	31.5	34.2	63.1	4.0	1.0	0.0	1.0	same	1927	Blaschin	same
Sum resp. mean value:	21866	90.9	56.8	60.2	42.6	0.4	0.1	0.4	0.4				
20. Tiflis and the Mountain Areas of Eastern Georgian.													
City of Tiflis	4272	57.0	31.0	45.5	7.1	0.2	0.4	2.3	2.6	children	1926/1932	Grdadse Kamalow	smear acc.to Fuelleborn
same	3678	96.8	69.5	72.1	2.8	0.0	0.2	5.2	2.0	children adults	1926/1931	Kandelaki Kamalow	same
same	3235	76.4	59.1	67.3	3.9	0.4	0.2	2.5	3.9	same	1928/34	same	same
same	630	64.8	55.6	72.0	5.2	0.0	0.0	0.5	6.3	same	1922/4	Makwiladse Didebouli-dse	same
same	251	91.0	38.7	83.7	8.9	1.2	0.0	0.5	4.8	same	1930	Kandelaki Kamalow	same
same	715	91.5	38.0	86.0	14.0	0.6	0.0	11.0	1.0	same	1929	Swanadse	same
same	1300	87.0	41.3	78.0	14.0	0.5	0.0	11.0	0.2	children	1930	same	same
same	409	82.9	34.2	71.1	1.2	0.0	0.2	14.0	3.1	same	1929	Karibow	same
Rayon Zepski	154	96.7	85.7	69.5	0.0	0.0	0.0	1.3	0.6	children adults	1933	Kandelaki Kamalow	same
Rayon Onski (Ratscha)	165	92.2	78.4	58.4	0.0	0.0	0.0	0.0	4.6	same	1932	same	same
Rayon Telav	275	97.5	78.0	91.3	0.0	0.8	0.0	0.4	5.7	same	1932	same	same
Rayon Gurdzhanski	475	93.3	67.4	60.0	0.0	0.0	0.9	4.4	6.2	same	1932	same	same
Rayon Gare-Kochski	146	90.0	39.0	69.0	0.6	0.0	0.0	16.4	2.0	same	1932	same	same
Rayon Bortzhalinski	396	97.0	60.3	85.0	0.0	6.0	0.0	5.0	3.3	same	1932	same	same
Rayon Karaiaski	69	89.7	57.1	57.1	0.0	0.0	0.0	4.0	0.0	same	1933	same	same
Rayon Akhaltsikh	197	91.5	74.2	76.3	0.0	0.0	0.0	0.0	15.0	same	1933	same	same
Rayon Diushetski	103	98.0	52.0	97.0	0.0	0.0	0.0	1.0	3.0	same	1933	same	same
Rayon Goryski	3666	83.4	76.5	63.6	0.0	2.1	0.3	0.4	2.2	same	1930	same	same
Ore mines of Tkvibuli	600		72.0	68.0	2.0	0.0	2.5	2.0	3.5	adults	1925	Makwiladse, Didebouldise	Telemann, rare Fuelleborn
Ore mines of Tchiaturi	400		65.0	68.0	2.5	0.0	2.0	1.5	1.8	same	1925	same	same
Sum resp. mean value:	21136	87.6	58.6	71.9	3.1	0.6	0.3	4.2	3.6				
21. Armenian with Erivan and Nakhichevan.													
City of Erivan	228	100.0	91.4	95.7	0.0	49.1	0.0	0.9	8.6	children	1925	Kalantarjan	Fuelleborn, suspension of feces +physiol.NaCl solution
same	109	97.2	48.6	95.4	0.0	6.4	0.0	0.0	3.7	17 - 20 years old	1925	same	same
City of Leninakan	744	76.3	41.7	48.2	0.0	0.9	0.0	3.0	6.0	children	1924	Plawtow	Telemann, suspension of feces and water"Bass,Hall"
City of Kafan	845	97.4	66.7	91.5	0.0	11.0	1.1	0.8	32.2	children adults	1930	Kalantarjan	smear acc.to Fuelleborn
Rail road stations of Sanahin, Karaklis	474	100.0	88.6	97.3	0.0	23.2	0.0	6.7	1.7	children	1925	same	
Rail road station of Arasdajan	1511	97.8	75.1	94.0	0.0	11.4	0.0	2.8	6.5	adults	1930	Badaljan	Smear acc.to Fuelleborn, Telemann
Rayon Bajastski	2063	97.8	89.7	90.5	0.0	29.1	0.0	1.0	9.1	same	1928	same	same
same	1048	96.3	91.8	86.0	0.0	37.1	0.0	2.8	4.7	children	1925/8	same	same
Rayon Etchmiadsinski	3035	81.1	50.5	53.1	0.0	3.7	0.0	4.9	11.6	adults	same	Ananjan Kasarjan	same
same	558	90.8	64.3	65.2	0.0	3.7	0.0	7.2	3.9	children	same	Badaljan	same
Rayon Shamshadinski	1900	84.0	60.9	70.5	0.0	7.5	0.0	0.8	18.0	children adults	1926	Kesababjan	same
same	1178	87.4	69.7	72.0	0.0	7.7	0.0	0.9	10.4	children	1925/8	Badaljan	same
Rayon Alaverdi	277	92.4	77.3	80.9	0.0	4.0	0.0	5.1	6.5	same	1929	Kalantarjan	same
same	269	99.3	71.4	91.4	0.0	3.3	0.0	0.0	22.3	adults	1929	same	same
Rayon Davalinski	336	83.1	29.6	68.8	0.0	5.4	0.0	2.7	8.6	same	1929	Badaljan	same
same	192	83.0	13.5	75.5	0.5	7.3	0.0	11.5	11.5	adult immigrants	1929	same	same
same	90	72.2	25.6	65.6	0.0	3.3	0.0	8.9	0.0	children	1929	same	same
same	73	75.3	13.7	65.8	0.0	2.3	0.0	27.4	8.2	children, immigrants	1929	same	same
Rayon Idzhervanski	500	95.0	89.0	93.0	0.0	1.5	0.0	0.0	14.1	children	1929	Mirsajan	same
Rayon Kosachzki (Aserbaijan)	1000	82.2	45.0	85.0	0.0	0.0	0.0	0.0	52.6	adults	1928	Bogojawlenski, Levitski	Fuelleborn anal scrapings
same	1328	92.5	38.3	79.7	1.7	9.6	1.1	4.7	28.4	children adults	1927/1928	Wosskresenski	smear acc.to Fuelleborn. Telemann
Nakhichevan	909	66.0	35.5	30.0	0.0	0.5	0.0	2.5	11.5	same	1927	Plawtow	smear acc.to Telemann
Sum resp. mean value:	18667	84.7	59.9	73.7	0.1	9.9	0.1	4.1	12.2				
Azerbaidzhan.													
22. Sakataly and Surroundings.													
District Sakatalski	923	100.0	76.9	96.2	31.5	1.3	0.0	0.4	27.2	children adults	1927/1928	Jagubow	Fuelleborn Telemann
Rayon Kochski	215	100.0	87.4	99.1	0.9	0.0	0.0	0.0	19.5	same	same	same	droplet of thin feces
Rayon Belokanski	100	100.0	72.0	97.0	36.0	0.0	0.0	1.0	21.0	same	same	same	same
Rayon Ali-Abadzki	400	100.0	78.5	93.5	72.3	1.5	0.0	0.8	34.3	same	same	same	same
Rayon Lagodetski (Georgia)	352	96.0	85.0	70.0	0.8	0.0	0.0	0.6	0.0	same	1932	Kandelaki Kamalow	smear acc.to Fuelleborn
Sum resp. mean value:	1990	99.2	80.0	91.2	28.3	0.6	0.0	0.6	20.4				
23. Gandzha and Kura lowlands.													
Rayon Gandzhinski	718	77.2	28.8	53.8	0.0	0.1	0.6	2.6	10.9	children adults	1927/1928	Wosskresenski	Fuelleborn, Telemann, suspension of feces with water
Rayon Geokchai	1917	95.6	46.5	89.1	1.3	1.6	0.0	0.5	17.0	same	same	same	same
Rayon Agdam	2189	70.3	27.8	62.1	1.7	6.9	0.0	0.0	17.7	same	same	same	same
Rayon Nukha	924	83.1	44.8	[illegible]2.2	6.8	0.0	0.0	0.6	12.3	same	same	same	same
Rayon Anderen	491	96.9	24.7	92.3	2.8	12.0	0.0	1.2	6.1	same	same	same	same
Sum resp. mean value:	6239	84.6	34.5	69.9	2.5	4.1	0.1	1.0	12.8				
24. Baku and the Coast north west.													
City of Baku	93	100.0	38.0	100.0	6.4	0.0	0.0	1.1	17.2	adults	1925	Lindtrop	Fuelleborn, Telemann
same	37		41.1	97.0	8.1	0.0	0.0	5.4	1.8	same	1925	same	same
Rayon Davitzhinski	1005	63.0	36.3	38.8	0.0	0.2	0.0	2.7	4.8	children adults	1940	Andris	smear acc.to Fuelleborn
Rayon Chatzhmazki	1107	71.6	47.0	26.0	0.0	0.0	0.0	0.2	2.9	same	1940	same	same
Sum resp. mean value:	2242	78.2	40.6	65.4	3.6	0.1	0.0	2.4	6.7				
25. Lenkoran and coastal area of Lenkoran.													
Rayon Lenkoranski Northern part:	1080	73.9	12.3	65.5	38.8	0.1	7.0	3.3	3.9	children adults	1927/1928	Waoss	Fuelleborn, Telemann, suspension of feces with water
Central part:	3066	94.6	44.8	84.4	64.5	0.3	6.7	1.9	1.5	same	same	same	same
Southern part:	1918	95.7	26.6	71.5	85.6	1.3	36.0	1.0	0.9	same	same	same	same
Sum resp. mean value:	6064	88.1	27.9	73.8	63.0	0.6	16.6	2.1	2.1				

PRECIPITATION AND ISOTHERMS IN THE EASTERN EUROPEAN TERRITORIES

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
Technical Section (Medical)

The map IV/9 showing the precipitation and the temperature covers almost the entire European Russia. It extends over about 40 meridians and 20 parallels of latitude. This large extent involves a considerable variation of the climate which is reduced by the fact that the consequences of the greater weather situation for large areas usually are rather constant due to the absence of a vertical subdivision of the country.

The principal factor for the climate of the East is its location between the Atlantic Ocean and the extensive Asiatic continental mass. Both factors have a mutual effect upon the climate in the eastern territories. Under the influence of the considerable radiation of the Asiatic mainland during the winter, the weather situation here frequently shows areas with a high barometric pressure. From this territory the air masses often advance as far as to Europe in the form of cold air fronts. Contrary to that the Asiatic land mass is considerably warmed up during the summer. Regions of a low barometric pressure are formed to which cool damp sea-air will flow from the West. Herewith the summertime influence of the second factor determining the climate of the eastern territories was mentioned. During the winter, however, the Atlantic Ocean also exerts some influence as sometimes the cyclones carry warm damp air from the west with them which is causative for considerable temperature variations during winter. These variations, however, have a noticeable effect in the vicinity of the coast only where, as their result, considerable degrees of cold alternate with thaws, while in the interior of the country the temperature almost always remains below zero even with the greatest variations.

With the exception of the coasts the climate of the eastern territories is continental with cold winters and warm summers. This is more marked towards the east. Only the coasts are under a maritime influence.

When considering the map of the mean values in the eastern territories attention is attracted above all by the division of the climate elements into zones. The distribution of the precipitation is determined to a high degree by the prevalence of the western winds in the northern parts, and of the eastern winds in the southern parts of Russia. The western winds carry moisture with them so that the highest values of precipitation (600 to 700 mm.) are observed in the west and in the northwest of the territories studied. From here the precipitation decreases rather regularly towards the southeast on the one hand and towards the northeast on the other. The values are lowest (200 mm. and less) on the Caspian Sea. The aridity of this area is caused by the eastern winds which carry little moisture with them, as they blow from a large continental mass. To this the considerable evaporation due to the great heat must be added. As with the exception of the Ural mountains there are no noteworthy mountains, the windward effect is almost entirely eliminated so that the map shows no local increase in the amount of precipitation. In the course of the year the summer rains prevail nearly always. These are caused by winds from westerly directions which predominate during the summer season. When the cool damp air flows over the hot continental mass thunderstorms are frequently formed. That explains also why the number of days with precipitation usually attains its maximum during the winter, although the minimum of the monthly amount of precipitation is found during that same season. During the summer rainfalls are less frequent, but a great amount of water pours down in form of thunderstorm rainfalls. When considering the conditions of the climate in Russia the southern coast of the Crimea holds an exceptional position, as it extends to the zone of the Mediterranean climate and therefore shows the maximum of rain in winter which is very mild.

The temperature conditions are very different in summer and in winter. In accordance with the geographical latitude in summer the temperatures increase from north to south. In July for instance the mean temperatures in the north of the eastern territories show values of 17° C. while in the south and particularly in the southeast 24° C. are attained. The distribution of the isotherms in winter is entirely different. During this season the contrast between the influence of the mild Atlantic Ocean and the cold Asiatic continental mass comes into effect so that the temperatures decrease from west to east or to northeast. While the minus 3° C. January isotherm runs along the Baltic coast, Tcherdyn which is located in the northeast of the territory considered has a mean January temperature of minus 18° C., and Aktyubinsk (50° northern latitude at the eastern margin of the map) has a mean January temperature of minus 15.6° C. The above mentioned increase of the continental weather character from the west to the east becomes particularly distinct when the annual variation of temperature is considered. In the western part of the eastern territories the difference between the highest and the lowest monthly mean temperature amounts to 20 to 22° C., and it is increased towards the east and the southeast to 36 or 38° C. This is principally due to the winter which is much colder in the east than in the west. The course of the humidity curve also shows similar differences. While the variation in the vicinity of the coast is 20 % only, the difference between the highest and the lowest monthly value in Rostov is 30 %.

The great uniformity of the Russian ladscape makes the classification into various areas of climate very difficult. This is possible only with the zones of vegetation which also depend on the climate, as the total of the climate factors effective in a certain area is best expressed by the natural vegetation. The vegetation permits distinguishing several zones of vegetation, the climate of which differs considerably. A thin strip along the coast of the Arctic Sea consists of tundra, which, however, is not displayed on our map.

The coniferous zone borders on the tundra and it is extended approximately to a line reaching from Lake Ladoga to Lake Onëga, from there to Vologda, to Kasan, and finally to Ufa. In this region the winter is very severe, the summer rather warm (July, 16° to 17° C. in the parts shown on our map). The annual amount of precipitation is about 500 mm.

South of the coniferous zone the zone of the mixed forests intrudes from the west as a broad wedge. In this zone leafy woods and coniferous woods are found simultaneously. The former may occur here due to the milder climate. The winter is not quite so severe (mean January temperature minus 7° to minus 11° C.) and the mean July temperatures of 17 to 18° C. do not mean an excèssively hot summer. The precipitations are sufficient (600 to 700 mm.). This area of mixed forests in the south extends to about the line from Lvov to Kiev, to Voronesh, to Tambov, to Pensa, and to Kasan.

South of it the very thin strip of the leafy wooded area proper is found in which there are no conifers except for the pine. The conditions of the climate are similar to those in the mixed forest zone.

Then the steppe zone follows which covers the entire south of Russia with the exception of the lowlands on the Caspian Sea and of the mountains. The climate conditions permit no trees. The winter lasts long and it is severe with very cold winds from the east, while the summer is hot and dry with a July temperature of 20 to 25° C. The annual precipitations range between 300 and 500 mm.

Towards the southeast the steppe zone gradually changes over into the semi-desert which extends along the northern coast of the Caspian Sea to the southern Ural mountains. In this area the winter is cold and the summer is very hot (July temperature above 25° C.). The precipitation is very small, in some areas below 200 mm.

In nature the various zones of vegetation cannot be so sharply delimited from each other but they flow slowly together in large stretches.

Exceptional areas are the Ural mountains, the Caucasus, and the Yaila mountains to which this zonal subdivision does not apply. They have a mountainous vegetation which above all depends on the relief and only secondarily on the climate.

Public Office for Weather Forecast
(Air Force)

DENSITY OF POPULATION IN THE EUROPEAN EAST

Translation preapared by:
U. S. Fleet, U. S. Naval Forces, Germany,
Technical Section (Medical)

In 1940, 57 % (6,542 million square kilometers) of the entire area of Europe (11,4 million square kilometers) was part of the European portion of the Soviet Union. Of the 543 million inhabitants living in a space fixed by the convention of the geographers and statisticians, 152 millions (28 %) lived in an area which was part of the USSR.

The character of the people of the east is influenced by an extensiveness and spaciousness which has decisively fixed the economical and political development over centuries. In contrast to the abundant variety of geological formation of the soil of western Europe, there is the uniformity of the natural structure of the east. From the Baltic Sea to the Pacific Ocean there is an extensive area of forests, which in the extreme north changes into the almost uninhabitable area of the Tundra. On the other hand there are steppes from the Carpathian Mountains reaching far into Central Asia and towards the south they change into the Inner Asiatic desert zones. Once upon a time these steppes were a very convenient traffic connection for horsemen. In between there is a fertile zone of cultivated farmland, which reaches its largest width in the western black-earth area and further to the east finally shrinking into a small strip. The uniformity of this geological formation is interrupted neither by the large streams which flow in a transverse direction (north-south) nor by the Ural Mountains.

"Russia's ascent from a Viking state to a great European power" under the reign of Peter the Great gave this nation the means of power which were essential in the fight for their total area. Those means of power on the other hand could not eliminate the geopolitical and continental tensions. "It is a country that is pressed forcibly towards Europe, but on the other hand it is entwined and kept by Asia" (M. BRAUN). During the 19th and 20th century this almost ùninhabited space - which even today is sometimes talked about as a deserted area-is filled up with people to the capacity of their nutritional elbow room.

Russia's population 1724 - 1851 (in millions)

Year	Empire of Peter the Great	Augmentation areas	Population of the entire area
1724	13	-	13
1762	19	-	19
1796	29	7	36
1815	30.5	14.5	45
1851	39	28	67

During the course of these 130 years the population of Russia in her original area has increased three times their amount and, if the augmentation areas are considered, it amounts to even five times her original population.

For the year of 1858, BOUSCHEN calculated the entire number of people to be 74 millions, 60 millions of which live in the European part of Russia - excluding Poland and Finland. The largest population at this time was found in the governments of Moscow, Kiev, Podolia, Kharkov, Tula, and Kursk. This represents an area which in its peculiarities is equal to the black-earth area from Podolia to the Ural Mountains.

The crisis-like agricultural development since the elimination of the bondage, which occurred only in the middle of the 19th century, is marked by an increase of population which even exceeds the agricultural intensification. In the period between the years of 1860 and 1900 the rural population increased to about 70 %. From 1900 to 1914 the entire area of cultivation increased 10 %, the yield of the harvests 20 %, and during the same period the rural population increased 30 %. In addition to a strong natural growth, this increase of the population was due to continuous conquests and incorporation of new areas with non-Russian peoples. In spite of the losses during the Japanese War (1904-1905) and the tremendous bleeding of the First World War which caused a loss of more than 45 million people (2 millions killed on the battlefields, 7 millions decrease of birthrate, 26 millions lost by secession of the border states, 2 million victims of the civil war, 3 million deaths due to cholera and typhus epidemics, 5 million fatalities in the famine of 1921/22), there was an increase of about 40 million people ascertained during the first three decades of this century (1897-1926), which corresponds to the total number of the population of Italy or France respectively!

Official report concerning the fluctuation of the number of population of the USSR (in thousands)

Date	Means of determination	Total population	Urban population	Rural population
9/ 2/1897	Census	106,432,300	15,825,600	90,606,700
1/ 1/1914	Estimated increase (Fortschreibung)	139,312,700	24,686,600	114,626,100
1/ 1/1918	dto.	142,579,900		
17/12/1926	Census	147,027,900		
Population locally present			26,316,400	120,711,500
(Domiciled population)			(25,321,500)	(121,706,600)
1/ 1/1929	Estimated increase (Fortschreibung)	154,287,700	27,630,200	126,657,500
1/10/1933	Assumed increase based on previous estimate (Planannahme)	169,200,000	34,300,000	134,500,000
1/ 1/1933	Estimated increase (Fortschreibung)	165,748,100	39,739,200	126,009,200
(Domiciled population)			(40,303,000)	(125,454,400)
31/12/1937	Assumed increase based on previous estimate (Planannahme)	180,700,000	47,100,000	134,600,000
12/12/1937	Soviet estimate	169,000,000		
17/ 1/1939	Census	170,467,100	55,909,900	114,557,300

The few available reports not only let us recognize the change of the dynamics of growth but also the incisive shift of rural and urban population and the extraordinary growth of the cities.

Increase of population in the USSR 1927-1937

Period	total increase in millions	annual increase in millions	increase for 1,000
In the years 1927/28	7.3	3.7	24.5
I. Five year plan 1929-32	11.4	2.8	18.8
II.Five year plan 1933-37	3.3	0.7	4.1

In the period between the 1st and 2nd Five Year Plan a decrease of the annual increase of population of 1 sixth of the former amount can be observed. In this connection the preliminary results of the census of January 1937 with 159 millions, which was annulled by the Soviets, gains a certain probability. Instead of an increase of 33.7 millions which was expected since 1920, only an increase of 12 millions could be ascertained. The preliminary results of the census of the 17th January 1937 confirm this fact in spite of the elimination of obvious faults. Instead of an avalanche-like increase of the population a certain standstill must have taken place. With 170 millions in 1939 the supposed increase based on estimates (Planannahme) for the end of 1933 was just reached.

The figures based on the census of 1939 concerning the different age groups, allow the following calculation of the average strength of the various years.

Age	Years of birth	Average strength of the year's growth of each age group (male and female) in millions
Under 8 years	1931-1938	3.93
8 - under 12 years	1927-1930	4.10
12 - " 15 "	1924-1926	4.44
15 - " 20 "	1919-1923	3.02
20 - " 30 "	1909-1918	3.06
30 - " 40 "	1899-1908	2.53
40 - " 50 "	1889-1898	1.52
50 - " 60 "	1879-1888	1.09
60 and over	1878 and before	-

The largest declination can be observed with the years of birth of participants of the war and civil war (1879-1898) who have during the period of 1914 till 1921 been in the age groups of 16-42 years; in the year of 1939 they only represented 1/4 to 1/3 of the strongest years. The times of war, revolution, civil war and starvation (1914-1921) left clear traces in the group having birth years of 1899-1908. The average number of persons born during these years was only 57 % of those born during the period between 1924 and 1926. The classes of 1909 to 1923 showed a decline by approximately one quarter of the normal figure which apparently was the consequence of the war casualties and the reduced number of births. Recently the extraordinary increase of the classes 1924 to 1926 seems to diminish under the influence of a widespread reduction of the number of births.

By the formation of groups consisting of persons "under eight years of age" the classes of 1931 and 1932 which still showed a high number of births and the prolific classes of 1937 and 1938 were counted together with the 4 weak classes of 1932 to 1936, so that we are not in the position to ascertain the extent of the decrease of births.

Soviet Russia, however, had clearly recognized the danger due to an insufficient progeny and as early as 1935 it accomplished a fundamental reformation of its birth and family policy. The most apparent expression for this new policy was the law of 27 June 1936 "On the prohibition of abortion, increase of the extra allowances for young mothers, the establishment of a government allowance for prolific families, expansion of the number of maternity homes, homes for children, and kindergartens, a more severe punishment for failing to pay alimony, and on the partial modification of the divorce laws." Thus one can explain the following survey which was given by ROUBAKINE at the International Congress for Population Theories in Paris 1937 without making reference to the true connections.

Number of births during the first half of the year
(January to June)

	1936	1937
Moscow city	36,107	68,297
Monthly average	6,017	11,380
Moscow rural district	127,681	169,146
Monthly average	21,280	28,191
Leningrad city	25,345	48,288
Leningrad rural district	63,129	79,261

The increase of the birth rate in Moscow by 89 % and in Leningrad by 81 % must be exclusively traced back to the sudden prohibition of abortion, and it confirms the importance of such a law, even though it was not possible to stop immediately the practice of abortion in rural areas.

Birth Rate of several Cities

City	Number of newly-borns	Birth per 1,000 persons
1938:		
Moscow	117.2	28.5
Leningrad	83.8	27.4
Kiev	22.5	27.4
Kharkov	22.4	27.7
Baku	26.9	33.9
1936:		
New York	99.4	13.5
London	56.3	13.6
Paris	32.5	11.5
Berlin	59.5	14.1
Rome	34.0	21.7

While the generation of school-children was observed to be reduced in numbers in the rural districts, - during the Eastern Campaign the curette was found in numerous rural dispensaries more frequently than the clinical thermometer - the large number of infants in the territories occupied by the German troops was striking. In addition wide areas were not involved in such an extensive reduction of the birth rate through abortion as was demonstrated in connection with the discussion of the density of population in the Transcaspian area.

Since the census of 17 January 1939 the territory and the population of Soviet Russia were considerably increased after the winter campaign against Finland and the delimitation of the spheres of interest from those of Germany.

Territory Conquered by Soviet Russia Since 1939

	Territory conquered Area in 1,000 sqKm[1]	Inhabitants in millions[2]
From Poland:		
Western White Ruthenia, Western Ukraine[3]	201.8	13.5
From Finland:		
Western Carelia etc.[4]	44.4	-[5]
From Roumania:		
Bessarabia and North Bucovina	50.4	3.7
Estonia	47.5	1.1
Latvia	65.8	2.0
Lithuania[6]	52.8	2.3

1) Including the lakes, for instance Lake Ladoga in the case of Finland
2) Official estimate of figures for 1939
3) Including the territory attached to Lithuania
4) Approximately
5) Originally 500,000, most of them were evacuated to Finland
6) Without the region of Wilno

The total population of Soviet Russia was given as 193.2 millions without considering the natural increase since the last census. After the reorganization of the administrative units - the number of the Soviet Republics was increased from 11 to 16 -, the following figures were valid:

Republics of Soviet Russia[1]	Area in 1,000 sqKm 1940[2]	1939	Population in millions 1940[2]	1939	Inhabitants per sqKm 1940[2]	1939
RSFSR	16,371.1	16,510.5	108.8	109.3	6.6	6.6
Ukraine SSR	556.0	445.3	40.3	31.0	72.4	69.5
White Ruthenian SSR	228.6	126.8	10.6	5.6	46.3	43.9
Azerbaidzhan SSR	86.0	86.0	3.2	3.2	37.3	37.3
Georgian SSR	69.6	69.6	3.5	3.5	50.9	50.9
Armenian SSR	30.0	30.0	1.3	1.3	42.7	42.7
Turkmen SSR	443.6	443.6	1.2	1.2	2.8	2.8
Uzbek SSR	378.3	378.3	6.3	6.3	16.6	16.6
Tadzhik SSR	143.9	143.9	1.5	1.5	10.3	10.3
Kazak SSR	2,744.5	2,744.5	6.1	6.1	2.2	2.2
Kirghiz SSR	196.7	196.7	1.5	1.5	7.4	7.4
Carelo-Finnish SSR	180.8	-	0.5	-	2.8	-
Moldavian SSR	32.7	-	2.4	-	73.4	-
Lithuanian SSR	59.8	-	2.9	-	48.5	-
Latvian SSR	65.8	-	2.0	-	30.4	-
Estonian SSR	47.5	-	1.1	-	32.2	-

1) Names and succession according to Article 13 of the Soviet Russian constitution in the modification of 7 August 1940
2) Preliminary figures. In the figures the natural increase since 17 January 1939 is not included

Except for the Carelo-Finnish SSR which has a large surface but a very sparse population, the 5 new republics range within the category of the small republics. The comparatively very high importance of the conquered territories was due to their dense population. A certain part of the Wilno district was attached to the Lithuanian SSR and Wilno was designated as the capital. In accordance with the small possibilities of settlement in the Asiatic part of Soviet Russia which exceeds the total area of Europe by 2.8 million sq.Km. the mean density of population in Asiatic Russia amounts to only 1.47 and for the majority of the territories it is even less than 0.5 persons per sqKm.

The cartographical presentation of the density of population in the eastern territories was accomplished according to the same principle as in the preceding studies

(Transcaspian territories, Atlas countries, Baltic area). The principal data were quoted from the Soviet Atlas (Bolshoi Sovietski Atlas 1940, Mira, Density of Population in the Near and Middle East, vol. II, map # 11). This presentation of the density of the rural population as well as the classification of the towns probably relies already upon the results of the census in 1939. The accumulation of the rural population in the zone of the black earth is very impressively demonstrated. In the area of the black earth the density of population exceeds 50 persons per sq.Km. and in certain areas of the Ukraine the density of the rural population exceeds 200 persons per sq.Km. Contrary to that the Pinsk Marshes are almost deserted.

During the interval between the census of 1926 and the census of 1939 one of the greatest migratory shifts of population ever observed on the territory of a country had occurred within the borders of Soviet Russia. Almost all national territories of settlement received new elements or gave away parts of their population and some of them were completely evacuated. The formation of collectives, the evacuation from the border areas in the West and in the North, and the consequences of the famines of 1932, 1933, and 1943 caused a decisive change of the national structure of settlement in the country. A mass of millions of farmers was shifted. The first great wave of migration was due to the deportation of the so-called Kulaks. 5,469 millions of people were expelled from their villages and the majority of them were transferred to the labor camps in Siberia. Hundreds of thousands and even millions of people were evacuated for political reasons; attention may be directed to the transfer of whole Kossack villages of the northern Caucasus in 1932/33, to the evacuation of a wide zone along the entire extent of the western border of Soviet Russia, to the evacuation of eastern Carelia, to the transfer of the German population on the Volga river to the Kazak SSR, and of the German population from Volhynia to the central Ukraine. - A huge shift of population was released in 1933 through the famine which broke out in large areas of the country. During their flight from hunger the peasants chiefly wandered from the Volga and Black Earth area to the south to settle in the fertile border areas in the foothills of the Caucasus or in Transcaucasia. Later on, peasants from central Russia less afflicted by the famine migrated into the evacuated and deserted villages. All these shifts, particularly the migration to the towns and to the industry, were not systematic and sometimes they were opposed to each other. The excess of population in the rural districts was not eliminated by these famine migrations; yet the grain areas of European Soviet Russia as the principal areas of evacuation suffered a certain reduction of their population. This applies particularly to the area of Kursk in the Ukraine where the population was diminished by 10 % and the area of Poltava, where it was diminished by 15 %. More than 3 million persons left for the Ural mountains, for Siberia, and for the Far East, about 1.7 million for central Asia. Hundreds of thousands were evacuated to the northern part of European Russia (Murmansk).

The greatest importance must be attributed to the wanderings from the rural districts to the towns, which resulted in an increase of the urban population from 17.9 % in 1926 to 32.8 % in 1939, and which exceeded considerably the standard established by the Five Year Plan (see above).

Classification of the Population as Urban and Rural Population in the Republics 1939 and 1926

	Urban Population 1939 in thousands	Urban Population 1939 % of total population	Urban Population 1926 % of total population	Rural Population 1939 in thousands	Rural Population 1939 % of total population	Rural Population 1926 % of total population
RSFSR	36,658	33.5	18.0	72,621	66.5	82.0
Ukraine(USSR)	11,196	36.2	18.5	19,764	63.8	81.5
White Ruthenia (WSSR)	1,372	24.7	17.0	4,195	72.5	83.0
Azerbaidzhan (AzSSR)	1,161	36.2	28.1	2,049	63.8	71.9
Georgia(GSSR)	1,067	30.1	22.2	2,476	69.9	77.8
Armenia(ASSR)	366	28.6	19.0	915	71.4	81.0
Turkmen(TurkSSR)	416	33.2	13.7	838	66.8	86.3
Uzbek(UzbSSR)	1,445	23.0	22.2	4,837	77.0	77.8
Tadzhik(TadSSR)	252	17.0	10.3	1,233	83.0	89.7
Kazak(KazSSR)	1,706	27.8	8.5	4,440	72.2	91.5
Kirghiz(KirgSSR)	271	18.5	12.2	1,189	81.5	87.8
Soviet Russia total	55,910	32.8	17.9	114,557	67.2	82.1

Since 1926 the number of towns was increased from 709 to 922, that of the urban settlements from 125 to 1,448. The number of the cities was increased since 1926 from 31 to 82; in 1939 16.1 % of the total population lived in the cities as compared with 6.5 % in 1926. The fraction of the middlesized town population, however, was increased by only 2.8 % to a total of 3.9 %. The shift of the population from the country at first turned towards the well known cities, but later also to those provincial towns which due to the Five Year Plans increased in economic importance and finally it streamed into the new industrial centers. Within the same period the rural population was diminished by 24.3 millions. This total is composed of 18.5 million people migrated to the towns and of 5.8 million who formerly lived in rural settlements which through the systematic incorporation of suburbs and border settlements were included in the urban population in 1939. As the natural increase of the rural population was only 18.1 millions, the country population was actually diminished by more than 6 millions. The policy of industrialization and herewith of urbanization was continued without any restriction during the third Five Year Plan. At the Congress of the Communist Party in March 1940 Stalin announced that the rural population annually would have to give up a further 1.5 million youths to the industrial centers. The increase of industry is accompanied by a simultaneous reduction of the population of the open country which is the zone from which the workers required for the development of industry are recruited.

The displacement of the Russian industry and the evacuation particularly of the male population before and in the beginning of the Russian campaign released additional shifts of the population the extent of which cannot be estimated even approximately. A considerable fraction of the population of the occupied territories is working in Germany as laborers or they trecked still farther to the west.

Notwithstanding the high Russian losses due to war and the consequences of the reduced birth rate a further considerable increase of the population in the eastern territories must be counted for which is due to the structure of the population as regards age.

Age	1926 %	1939 %
under 20	48.6	45.0
20 to under 40	29.5	33.0
40 to under 60	15.1	15.4
60 and over	6.8	6.6

Contrary to that in Germany the proportion of the 20 year olds amounts to 30.9 % only. Only one fifth of the population is found among the older classes of the veterans of World War I and of the prewar generation. With every estimation of the vigorous development of population in Soviet Russia one must bear in mind that about 78 % of the population had not attained the fortieth year of age. The increase of population which began among all western and central European nations in the 19th century through the decrease of the mortality and the increase of the actual span of life is probably to be expected for Russia independent of the development of its birth rate on the basis of its favorable age structure alone.

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EPIDEMICS OF ACUTE ANTERIOR POLIOMYELITIS IN THE BALTIC COUNTRIES

(1930 - 1941)

(With 1 map)

Translation prepared by:
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I. Incidence of Poliomyelitis in the Baltic Countries before 1938.

The Baltic countries not only were the first where poliomyelitis was observed, but from the very beginning attention was also attracted by the epidemics in the Scandinavian countries which were more frequent and more severe than occurred in the Central European and South European countries. Therefore one was correct in saying that poliomyelitis is particularly inherent in the Baltic territories. Since the geomedical method of research emphasized the comparable investigation of the progress of epidemics throughout large areas of the earth it is permissible to assume certain analogies between the disease caused by brucella organisms in the Mediterranean basin and poliomyelitis throughout the Baltic region.

The most impressive studies of poliomyelitis begin in the year 1887 with MEDIN's investigations of its first epidemic appearance in Sweden. These studies revealed that an epidemic gradually developed with this infectious disease which probably had occurred sporadically and only in small foci for many centuries but whose epidemic appearance is recent. At that time the number of cases (43) still was very small. Even though around the year 1900 reports repeatedly became known about the increased incidence of poliomyelitis in various countries of the European continent, one must nevertheless take notice of the fact that the Baltic countries took a special part in the increasing rate of morbidity as compared with other countries.

The extensive epidemiological investigations of MEDIN, WICKMANN, and WERNSTEDT give us detailed information on the course and the distribution of poliomyelitis in Sweden which is the classical country of infantile paralysis. The year 1905 during which the first great epidemic in Sweden with 1199 and in Norway with 981 cases occurred is a turning point in the epidemic history of poliomyelitis since it has occurred as an epidemic in Europe from this year on. During the further progress the morbidity curve in Sweden as well as in Norway at first remained comparatively high with about 450 cases in Sweden and about 450, later 200 cases in Norway in each of the following years and then the curve decreased gradually. During the years 1911 to 1913 large epidemics occurred almost simultaneously in both countries which were much more extensive in Sweden than in Norway (see Table I).

Table I. Number of Cases of Poliomyelitis 1911 - 1913.

	Sweden	Norway
1911	3646	1820
1912	4112	425
1913	1220	543

Before 1918 no noteworthy epidemic occurred in the two countries but in 1919 there was an increase to 800 cases in Sweden. In Denmark there was an incidence of almost 400 cases during that year. Except for a small increase of the morbidity in Sweden during 1924 and 1925 accompanied by a simultaneous increase in Norway tò more than 500 cases, the Baltic countries were relatively free from poliomyelitis epidemics before 1929. During this time interval one can only speak of a frequent occurrence of infantile paralysis. During the year 1929 the number of cases in Sweden again reached a climax with 1000 cases and, after a short break, the annual number of cases increased to more than 500 from 1932 on and to more than 1000 from 1934 on. In 1936 there was a real epidemic with 3068 cases. In the years between 1934 and 1938 the number of cases did not drop below a value of 2000 or 1500. Thus, these two neighboring Nordic countries show a substantial increase of poliomyelitis, particularly since 1934.

In Denmark, too, according to the recent investigations of BALLOWITZ (1943) the year 1905, during which for the first time 100 cases were recorded, is of particular significance for the epidemiological distribution of poliomyelitis. The first reports of a quasi-epidemic occurrence of infantile paralysis are available in the year 1903. After 1905 the number of cases was small until 1910. As in Sweden and Norway, the years 1911, 1912, and 1913 showed a pronounced increase of the morbidity rate. During the following years however, the morbidity rate revealed relatively small changes, except for the year 1919, when, as mentioned above, 400 cases were recorded.

Even though there is no really high epidemic climax during the years 1920 to 1932 in Denmark, nevertheless a certain parallel to the epidemiological course of poliomyelitis in the neighboring countries of Sweden and Norway can be drawn during this time as well as during the preceding and the following years. Thus, the small increase of the morbidity rate in Sweden and Norway in the years 1924 and 1925 is con - current with an increase of the number of cases, by double the amount, in Denmark.

With a considerable increase of the cases of anterior poliomyelitis in 1933 a period commenced during which not only a considerable total increase of poliomyelitis with a pronounced climax in the years 1934 (4711 cases), 1937 (1243 cases), and 1942 (1280 cases) was found, but which was also accompanied by simultaneous severe epidemics usually in a very limited area. This period of severe and extensive epidemics in Denmark may be compared in the same measure with the epidemiological conditions in the two neighboring countries. In addition to the considerable total increase of infantile paralysis, we found in

Denmark that the interval between the epidemic climax becomes distinctly less (see Table II). BALLOWITZ also observed that this epidemic almost regularly invaded those areas only where no cases had occurred during the preceding years.

Table II.

Poliomyelitis in Denmark from 1910 to 1942.
(according to BALLOWITZ)

1910 = 80	1921 = 70	1932 = 73
1911 = 287	1922 = 59	1933 = 354
1912 = 318	1923 = 76	1934 = 4711
1913 = 191	1924 = 152	1935 = 398
1914 = 146	1925 = 113	1936 = 79
1915 = 30	1926 = 61	1937 = 1243
1916 = 43	1927 = 34	1938 = 566
1917 = 70	1928 = 86	1939 = 98
1918 = 28	1929 = 164	1940 = 23
1919 - 389	1930 = 79	1941 = 581
1920 = 66	1931 = 30	1942 = 1280

In Finland only sporadic cases were found in the years 1919 to 1928 which were increased during the years 1929 and 1930 to 100 and 300. After that the year 1934 showed a pronounced increase of the morbidity rate to 400 after an average of 150 cases in all the previous years. In the following two years it dropped to the usual number of cases which had occurred during the years previous to this epidemic year while it was increased to more than 600 cases of infantile paralysis in 1938. Among the German provinces on the Baltic situated in the southern part of the epidemic area Schleswig-Holstein, Stettin, Koeslin, and Mecklenburg are remarkable through an increased occurrence and through epidemic foci of poliomyelitis. However, the average of the morbidity rate and the frequency of epidemics are distinctly smaller than those of the Scandinavian countries, except for the province of Schleswig-Holstein directly bordering on Denmark.

According to the material available poliomyelitis heretofore played no part in the Baltic States . Reports of KROLL and CHASANOFF revealed that an increased frequency of poliomyelitis was observed for the first time during the years 1923 and 1925 in White Russia. No observations are known of epidemic outbreaks of infantile paralysis throughout this area at a later time. The observations of von STOCKART are worthy of note. He found that a certain number of poliomyelitis cases occurred there during 1941 after German troops had passed through this country. These cases were remarkable for their particularly severe character.

II. The Period from 1938 to 1941.

The result of every attempt to demonstrate the epidemiological progress of poliomyelitis within a large period of time throughout the area where the epidemic is inherent depends, as with no other disease, on the selected method yet to be elaborated. In spite of extensive investigations, particularly of the Scandinavian countries, the epidemiological course of poliomyelitis up to the present day has remained unknown to such a large extent that for the medico-geographical as well as for the geographico-medical registration and demonstration data with decisive factors could hardly be found.

When the most appropriate measures to be selected for showing the progress of infantile paralysis during the period from 1938 to 1941 were considered, the necessity arose above all to distinguish or to classify the epidemic manifestation of poliomyelitis according to the severity of the syndrome. Doing this one must bear in mind that "epidemic" always is a relative concept and that, as a result, itis not possible to give generally valid figures for every disease in determining its epidemic character. In addition the resulting values depend on two numerous factors and conditions which always require an accurate consideration. This applies particularly to poliomyelitis. Starting with the consideration that a difference doubtlessly exists whether the determination of corresponding values as a basis of certain epidemiological occurrences encompasses an entire country or merely small administrative districts of the country, and considering that the same morbidity rate in the one country or area should indicate an epidemic, while it may be a minimal value in another country or area; one may take the following estimation of the morbidity rate calculated for 10 000 inhabitants as a basis for the epidemiological progress of poliomyelitis in the Baltic area during this period: All areas with a morbidity rate below 1.0 are classified as one group regarded as significant for the sporadic occurrance of infantile paralysis. A morbidity rate of about 0.5 to 1.0 must even be considered as an incipient accumulation of cases. For the purposes of cartography the latter is disregarded. In all cases with a morbidity rate of 1.0 to 3.5 one speaks of a quasi-epidemic accumulation of poliomyelitis, in which case, however, the degree of accumulation is not expressed by the value of the figures added together. In addition a difference is made between "epidemics" with 3.6 to 5.5, "severe epidemics" with 5.6 to 7.5 and "very severe epidemics" with more than 7.5 cases.

With this method of classification certain differences and connections of the epidemic manifestation of poliomyelitis during this period are revealed. In 1938 the areas of Sweden, Jaemtland, and the adjacent coast areas of the Gulf of Bothnia with particularly severe epidemics are distinctly marked. Infantile paralysis also occurred to a considerable degree in several districts of Latvia during that year. There were simultaneous epidemics of greater extent in south Finland, in Sweden, in the southern part of the Gotland Peninsula, and in the northernmost part of Denmark. In the whole remaining area during this year only sporadic or quasi-epidemic accumulations of cases are to be recorded in general.

During 1939 only Sweden showed a severe focus of a poliomyelitis epidemic in the northwestern part of the Gotland Peninsula. Other than an increased frequency of infantile paralysis closely resembling epidemics in the southwestern area of Finland, in the central parts of Sweden and to a small extent in Norway on the northwestern coast of the Atlantic Ocean, only sporadic cases occurred during this year. The province of Schleswig-Holstein shows values quite different from all other German coastal provinces during this period of time as it suffered from an epidemic with a morbidity rate of 4.17 on an average. Adjacent Denmark suffered a particularly severe epidemic two years before which was not entirely finished even in 1938.

In 1940 it was the eastern part of the epidemic area which showed an epidemic distribution of poliomyelitis. It appeared as a particularly severe epidemic in Finland, throughout the coastal area of the Gulf of Bothnia at the mouth of the Torne River. The remaining part of the country shows an accumulation of the disease closely resembling an epidemic throughout the large area of the entire southwestern coastal area. The same applies to central Sweden where an epidemic was widespread at the same time.

There was quite another picture in 1941 during which year particularly severe epidemics occurred throughout the entire Norwegian coastal area along the Atlantic Ocean which were simultaneously found in Denmark around Viborg and nowhere else. The severe epidemics were exclusively restricted to the western part of the epidemic area during this year, while contrary to former years of this period of time the morbidity throughout the entire remaining area did not exceed values resembling an epidemic.

Map 1.
Epidemics of Poliomyelitis in the Baltic during the years 1938 - 1941 with more than 3.5 cases of disease per 10,000 inhabitants.

The hatching shows the years of occurrence.

"Map 1 demonstrates only the epidemic occurrence of infantile paralysis. In this map a morbidity of 3.5 per 10,000 inhabitants is shown among these the "severe" and "very severe" epidemics with 5.5 cases per 10,000 inhabitants. This reveals with particular clarity the varying epidemic character of poliomyelitis in this area during the various years and in the various areas. One sees that in the beginning of this period of time (1938) severe epidemics prevail in the eastern part of the area studied, while later on (1941) predominantly the western parts along the Atlantic and the North Sea coast are heavily attacked by infantile paralysis. In addition the epidemics confined to a certain area occurring in the remaining territories and during the other years are distinctly recognizable".

The period of time studied is still too short to establish general rules for the epidemic incidence of acute anterior poliomyelitis throughout the Baltic countries. To do this extensive investigations are required which shall be made at a later time.

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THE DISTRIBUTION OF THE BORNHOLM DISEASE (Myalgia acuta epidemica SYLVEST)

IN THE REGION OF THE BALTIC SEA.

Translation prepared by:

United States Fleet,
United States Naval Forces, Germany
Technical Section (Medical)

I. PATHOGENESIS.

The Bornholm disease occurs chiefly in the Scandinavian countries. It is an infectious disease which is presumably caused by a virus. The disease was named after the Danish surgeon E. SYLVEST who, as he then thought, observed it first in 1930 on the island of Bornholm. The scientific name of "Myositis acuta epidemica" is little known by the public. SCHLEISNER as early as in 1849 mentioned Myalgia epidemica for the first time which he observed in several cases on Iceland. These observations were followed by other reports on this disease from Norway, Sweden, North America, New Zealand, Portugal and Yugoslavia. Local epidemics were even reported in Switzerland and it was believed that the disease was introduced there by Danish tourists. The disease made its first knwon appearance in Germany (Munich) in 1930 as reported by ROMMEL. Reports on the occurrence of the disease were received in the following years especially from countries on the fringe of the Baltic basin, namely in the Regierungsbezirk Schleswig, Stade and Stettin. It is, however, not absolutely certain whether or not we have to deal in these cases with a genuine Myalgia epidemica since the differential diagnosis is rather difficult.

ZEISS has the merit of having introduced the disease into the German literature. Geomedical considerations have played an important part from the very beginning. It was the special object of his investigations, in which he followed a suggestion of HEIDE, to determine in a scientific manner by means of a differential diagnosis which cases had to be definitely considered as Bornholm disease and how these cases fit into the geomedical picture. The practical importance of these investigations will be quite obvious if one takes into consideration how close the relationship is to influenza and that the whole complex of influenza, common cold, sweating sickness and Haff disease possibly had to be approached from a new angle (ZEISS). These conditions made it necessary for the general practitioner to devote more attention to this seemingly unimportant infection to assure that the epidemic character of the disease be recognized and properly recorded in the health statistics. In this connection it is worthwhile mentioning that cases of Bornholm disease were observed when German troops entered Norway in 1940.

Bornholm disease is characterized by abrupt onset after an incubation period of 2 to 4 days accompanied by an intense myalgia of the muscles, the back, the belly, the thoracic space, and the diaphragm. The pain is the most striking feature of this disease.

It is characteristic for the disease that the pains are accompanied by fever of relative intensity which lasts for several days at 39° and 40° C. and intense sweating begins with the onset of the fever. Intense headaches are frequently associated with the disease. The prognosis is usually favorable. Relapses are very frequent and especially onerous to the patient.

Individuals of all ages are susceptible, especially children and juveniles. The mode of spread is more or less rapid and culminates according to HEIDE in June to September which is diametrically opposite to influenza. Sporadic appearance of the disease is not infrequent. The infectious character of the disease is certain and secured by the epidemiologic experience gained by SYLVEST and HEIDE. Transmission is probably due to direct contact and it must be supposed that healthy individuals act as intermediate carriers. All examinations to determine the nature of the virus have been unsuccessful so far. The theory that was often assumed of a relation with the virus of poliomyelitis is refuted by the majority of the scientists. It cannot be denied, however, that there is a certain resemblance in a clinical and epidemiologic respect.

II. Epidemiologic and geographic distribution.

Just as for Poliomyelitis, the focus of the geographic distribution of Bornholm disease lies in the countries of the Baltic Sea. HEIDE has defined the boundaries of the disease area as follows: In the North by the Arctic Circle, in the South by 38° north latitude, in the East by 30° east longitude, and in the West by 25° west Greenwich longitude.

According to numerous reports, a landscape in the southeast part of Norway by the name of "Bamle" or "Bamble" mentioned as a typical and geographically limited area where the disease has been endemic for at least 60 years. This explains the name of "Bamle disease". The landscape of "Bamle" is part of the Norwegian forest district and is characterized by deeply cut-in river valleys and an abundance of lakes.

From among the more recent epidemiologic observations we wish to mention a report by JOSEPHON and HUSS of the year 1931, when the disease was said to have spread from the city of Marstrand, located on the west coast of south Sweden, then following the shore shouthwards by leaps to spread rapidly northwards along the east coast. As set forth in the cartographic presentation of this report, the epidemic occurred in many single cases as well as in foci along the shore without penetrating to any remarkable extent into the hinterland. In between we observe blank spaces which have not been invaded by the disease and which do not find their explanation by the density of the population. The cities of Varberg, Halmstadt, Angelholm, Stockholm, Gotenburg do not show an increased percentage as could be expected since there was a considerable traffic between the invaded areas and these cities. HUSS has pointed to this peculiar behaviour of the epidemic with regard to the density of the population. The densely populated islands of Oedland and Gotland showed only a few and widely spread cases, the north of Oedland even being free from the disease, whereas there were distinct foci in the north of Gotland.

The Bornholm disease did not spread that year beyond Nörrköpping. Stockholm and its environs remained absolutely free from the disease and there were only two limited foci in two districts northwest of the city in the area of the mouth of the Dalelv river.

In connection with the itinerary of the spread of the disease, which is very instructive for geomedical research, the following details will be of interest: In 1931, the year of the epidemic, two training ships of the Swedish Navy had cast anchor in the harbour of Marstrand and the sailors had been ashore frequently. Three days after leaving the port, the ships touched the south Norwegian port of Larik, which is located in the endemic area of Bamle. Two days later many apprentices were suffering from Bornholm disease. It was at first supposed that the sailors had been infected at Marstrand and the fact that several cases had been reported shortly after leaving the port seemed to confirm this supposition. No new cases were reported during the stay in Larik where the sick members of the crew were hospitalized. It could be observed that the disease spread in a direction which was opposite to the itinerary of the training ships as was described above.

So, the origin of the epidemic in the year 1931 in Sweden remained fully unknown and lead to the remarkable conclusion that Bornholm disease favored lower altitudes, so that communities at the large lakes and rivers were especially exposed. It was very striking that invaded areas alternated with areas where not a single case occurred. No cases of Bornholm disease were reported in that year in Norway. In the following years, 1932 and 1933, there were only a very few cases in Sweden.

Denmark which was always in close connection with the two countries reported only in August 1931 an increased occurrence of the disease. The disease reappeared there in the following years and, especially Sjaelland and Juttland, down to the German frontier reported many cases.

The first official detailed reports on Bornholm disease in Germany are included in the Report of the Health Conditions in Prussia in 1933 as a result of a circular letter of the ministry to the respective health authorities of the Regierungsbezirke Schleswig, Aurich, Stade, Lueneburg, Stettin and Koeslin.

Whereas the cases reported in the Regierungsbezirk Stade, which are referred to as a disease similar to influenza, cannot be positively defined as Bornholm disease, it can be taken for granted that the cases reported by the province of Schleswig in the years

1930 to 1933 are clear cut cases of Bornholm disease. The disease crossed the Danish frontier in 1932 and especially in the Kreis of Sued Tondern there were many cases. Similar reports were made in the Regierungsbezirk of Stettin in 1931. Especially in the Landkreis of Greifswald there were distinct foci in three small villages, namely Levenhagen, Boltenhagen, and Heiliggeisthof located on the highway to Greifswald which were described in detail by STICKL and JAHN.

With regard to the geographical characteristics of the areas in which the Bornholm disease occurred in Germany ZEISS has pointed out that these areas, the same as in the Scandinavian countries, are characterized by low altitudes and the proximity of the sea and lakes.

The only report of the distribution of the disease in the eastern countries of the Baltic Sea, namely in Finland, was compiled by KERPPOLA. This report does not allow for an exact location of the distribution of the disease, but it results that the greater part of Finland is to be considered as an area of endemic distribution of Bornholm disease. East and northeast of Helsinki, foci were reported in the environs of Kotka, Lahti, Mikkeli and Lappeenranta in the north up to the area of Rühimäki, Hämeenlinna and Tampere. The disease was also observed in the area of Turku. The distribution of the cases of Bornholm disease (however only as far as they have been reported) is exactly limited to a space defined by 22 to 28° east longitude and 60 to 62° north latitude (HEIDE).

As pointed out by WOLTER, there were certain hypotheses with regard to a correlation of Bornholm disease with Haff disease which were made public especially when the latter raged in the years 1924 to 1928 and 1932 to 1933 and it was even supposed that Haff disease was a modification or part of Bornholm disease. WOLTER has furthermore maintained that there is a connection with the Sweating disease.

According to the investigations of ZEISS and LEMSER there seems to be a certain epidemiologic connection of this epidemic with influenza. But no proof could be furnished that the virus causing the four diseases (Bornholm disease, Haff disease, Sweating disease and influenza) is identical and it may be safely said with the words of ZEISS that much research work has still to be done to verify the assumption of WOLTER.

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LEPROSY IN THE BALTIC COUNTRIES

(With 3 Charts and 2 Illustrations)

Translation prepared by:
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Of all lepra foci on earth, the areas of distribution of the disease in Sweden, Finland, Esthonia, Latvia, Lithuania, and in the Memel territory (in addition to the occurrence in Norway and Iceland) are known more thoroughly than any other. In our days the records on the lepers are complete for Sweden, Finland, and in Esthonia. For Latvia they have to be considered as almost complete, while they are doubtful for Lithuania. In the Memel territory it is certain that all lepers were recorded. For the time being it is not possible to obtain any information on the leprous area around Leningrad and particularly on the conditions in the territory between the lakes Peipus (Peipsi) and Ilmen, since in the beginning of the war all lepers of this region were evacuated by the Russian authorities from the leprous asylum in Krutija Rutshij to the Caucasus and since no relevant records could be found.

Therefore, for every leper the place where he fell sick can be inserted as a point in the chart of the leprosy distribution in the Baltic countries and it is only for Lithuania that one may have to take the fact into account that in addition to the recorded cases of leprosy other persons are afflicted with this disease. No data can be inserted for the Leningrad area, as all lepers were evacuated. Concerning the occurrence of leprosy in the Baltic countries three different areas must be distinguished in accordance with its development, these are: 1. Sweden, 2. Finland, 3. the group of the Baltic countries and the Memel territory.

1. SWEDEN

In Sweden leprosy was found even during the early medieval period. It appears that it occurred in a varying frequency which, however, cannot be substantiated by numbers. A very small number of cases of endemic leprosy having its origin most likely in the medieval leprosy can be found in our days only in the provinces of Haelsingland and Darlecarlia. The only leprosy asylum with inhabitants is situated in Jaervsoe. Only 4 lepers lived here in 1937, as all the others had been transferred to their homes. The last fresh case of leprosy was observed in 1932. Since the still living lepers are very old, leprosy may soon be extinguished in Sweden. The first detailed investigation of leprosy in Sweden was made in 1760 and 1765. Importation of leprosy from overseas is rare. After a slight increase of the leprosy morbidity during the seventies of the past century there was a rather constant decrease of the number of lepers.

2. DENMARK

There is no endemic leprosy in Denmark. The lepers (5 or 10) living in Denmark acquired the disease outside the country, usually in Iceland or in some of the East Asiatic countries. Therefore, the places where leprosy occurred were not recorded in the map.

3. FINLAND

In Finland leprosy has not entirely died out since the medieval ages. However, there was a distinct increase towards the end of the past century, which shows a striking concurrence with the increase of leprosy in Esthonia, Latvia, and in the Memel territory. The maximum number of lepers was attained in 1906 with 96 patients. From this time on the number of lepers decreased constantly; 1943 only 13 of them were still alive, 8 of which were accomodated in the leprosy asylum of Orivesi which is the only asylum of that kind in Finland. All Finnish lepers came from the southwest of the country. From the southwestern coast as a base, leprosy was distributed throughout the country. Like in the other countries of the Baltic all lepers in Finland are relatively old (the youngest of them is 41 years old). The last fresh case was observed in 1938. In Finland too, leprosy is almost extinct although no administrative measures have been taken against it.

4. ESTHONIA, including the adjacent Russian territories, LATVIA, LITHUANIA, and the MEMEL territory

More than in Sweden and Finland, here one must distinguish between two periods of the leprosy endemic: 1. the medieval leprosy, and 2. the leprosy of our time. During the medieval period leprosy was widespread in the Latvia of our days and in Esthonia. Most probably it was inherent in these countries before the German Order set foot there and it is uncertain whether it was imported from Sweden during the raids and counter-raids of the seasiders or whether it had occurred there for many centuries. At any rate in both countries leprosy became as frequent as the medieval leprosy in the North German territory. A large number of leprosy asyla existed which were mentioned in the documents. At about the same time as in Germany, the leprosy in the Baltic countries seems to have decreased. In the documents of the 17th and particularly of the 18th century hardly any mention is made of it. The last reference to leprosy in Reval was made in 1639. It appears that during the 18th century it had completely died out in the Baltic countries. However, this cannot be stated with an absolute certainty, since it is possible that leprosy was mixed up in these times with syphilis or scurvy, and therefore was not mentioned in the documents. In spite of this possibility it can be considered as established that during the 18th century the number of lepers was considerably diminished as compared with the medieval ages.

It was only during the twenties of the 19th century that leprosy came into prominence again in the Baltic countries. It is, however, likely that many cases of syphilis and other skin diseases passed for leprosy. One assumes that leprosy was imported again to the Baltic countries in connection with Bonaparte's campaign against Russia, as it is easy to find out that the oldest recognized foci of leprosy are situated in the vicinity of those places where Cossacks and other troops from the Caucasus and from South Russia were stationed. It is, however, not sure whether or not the first cases of leprosy of the recent times were observed during Bonaparte's campaign, as it is mentioned in two studies the material of which was collected in about 1810.

Some more cases of importation of leprosy through troops from the South Russian territories are proven by notes. These were troops quartered on the civilians in 1832 in connection with an uprising, in Poland in 1846/1847, because of an imminent peasant rising and finally in connection with the danger of a foreign invasion in Esthonia due to the presence of the British fleet in the Baltic during the Krym war (1853 to 1856) (Chart 1). An additional factor was that many Latvians and Esthonians served their military service in the Southern Russian territory and were contaminated with leprosy when they returned. At any rate it is certain that the fresh leprosy throughout the Baltic countries has to be attributed to the importation from southern Russia to a far higher degree than to the remnants of the medieval epidemic.

But not all leprosy foci are to be traced back to the billeting of the troops with the civilian indigenous population in Southern Russia. The particularly widespread distribution of leprosy in the second half of the past century may principally be attributed to an increased shift of the population within the boundaries of Russia. As a result of a change of the agricultural conditions in 1866 many agricultural laborers were compelled to look for new homes. By this way leprosy may have been imported to Oesel, where it was distributed particularly widely, although there were no troops of foreign origin billeted on this island. However, leprosy was also observed in Oesel during the first half of the previous century. The leprosy occurring in the Memel territory apparently has to be traced back to laborers immigrated from the adjacent Lithuanian territory. The latter probably had acquired their leprosy from Kurland.

As is shown in the map of the distribution of leprosy designed by HELLAT in 1887 (see chart 2), the position of the principal foci during the second half of the previous century is in accordance with the recent conditions. There is a widespread focus in Esthonia in the vicinity of Reval and a focus with numerous cases not far from Dorpat (particularly east of the Dorpat river) extending to Lake Peipsi. In addition there is a large area involved around Fellin with its center on the western bank of Lake Wuerz. The maximum of its distribution is attained on the island of Oesel where the peninsula Sworbe in the south of the island was particularly affected (chart 3).

Chart 1. The oldest cases of leprosy in Esthonia in the 19th century (after SPINDLER)
· leprosy cases ✦ Cossack billets

Chart 3. Leprosy on Oesel island (1942) ♙ isolated cases
· leprosy asylum

Chart 2. Distribution of leprosy in the Baltic countries 1887 (after HELLAT)

Between Oesel and the mainland opposite to it, the area of Pernau and Fellin, there was a regular and particularly extensive exchange of farm laborers so that the leprosy foci of the island and of the mainland intensified each other. Fresh cases in Esthonia: 1939: 5; 1940: 4; 1942: 7.

In Latvia two areas must principally be mentioned: The city of Riga itself in the so-called Moscow suburb of which numerous leprosy cases were recorded, and the rural area of the city. A second focus was outlined in Western Kurland involving the territory north of Talsen including Windau. The number of fresh cases in Latvia was: 1939: 12; 1940: 9; 1941: 4; 1942: 2.

In Lithuania leprosy seems to be endemic only in the parts of the country which are situated in the coastal area of the Baltic, namely near Polangen and Krottingen. There are no cases in the eastern and southern parts of the country. In northwestern Lithuania, according to the literature, leprosy occurred regularly during the second half of the past century. However, all data are incomplete and the complete registration of all lepers in Lithuania is not yet established. The variations of the leprosy endemic in the Memel territory, to which it was imported from Lithuania in about the middle of the 19th century, is given in the graphic exhibition of Illustration 1. Here, too, leprosy is about to die out. An accurate survey on all details of the course of the epidemic was prepared by SCHNEIDER in 1942.

In all Baltic countries, including the Memel territory, leprosy attained its maximum at about the end of the century or during its second half, that means at a point of time at which the morbidity rate of leprosy was dropping considerably in Norway and in Iceland. A survey of the morbidity rate of the different countries is given in Illustration 2. The reduced number of the leprosy patients may be connected to a certain extent with their isolation which was accomplished to a considerable degree from the end of the past century on. Leprosy asyla exist in Nennal on Lake Peipsi, Muuli near Dorpat, Tarwast on Lake Wuerz, Kuuda near Maerjama, Audaku on the island of Oesel, Wenden, Riga, Talsen, Tuckum, Erwahlen, and Memel.

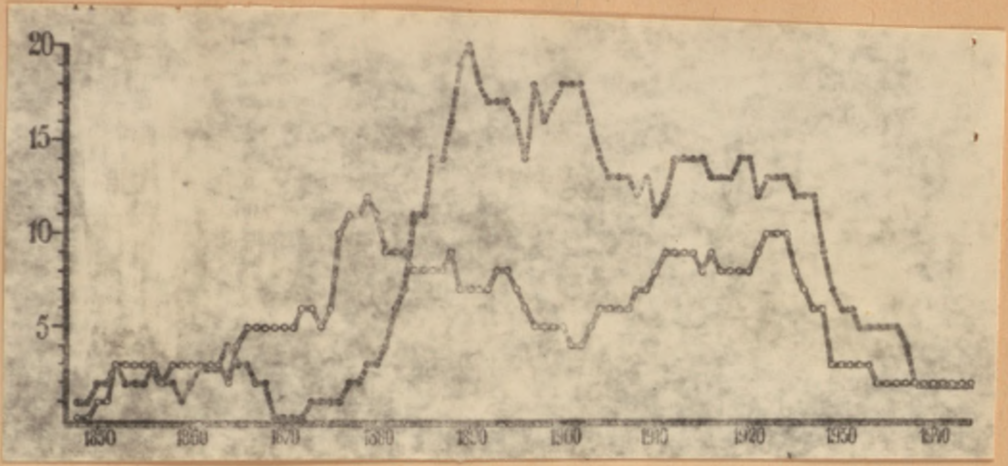

Illustration 1. Course of the lepra endemic in the Memel territory. ---- Women ——— Men

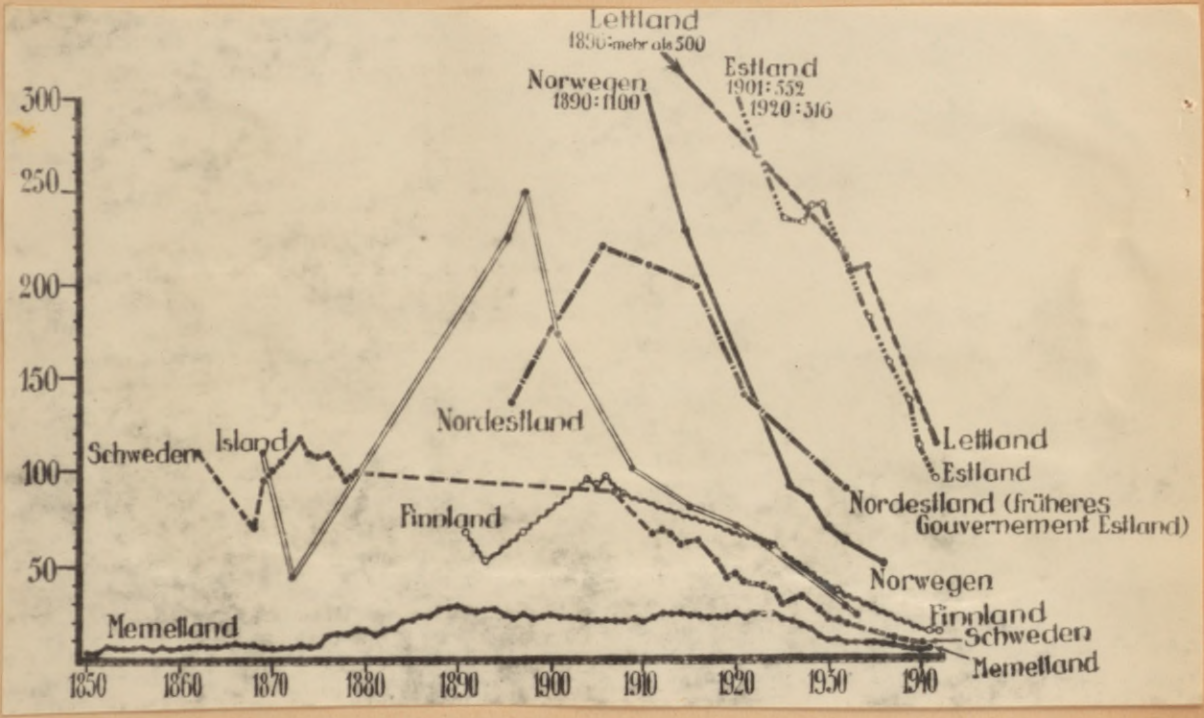

Illustration 2 Course of the lepra endemic in the Baltic countries.

Due to the considerable decrease of leprosy the majority of these asyla could be closed down. Recently only Muuli, Kuuda, Andaku, Talsen, and Memel accommodate lepers, the number of which is continuously diminishing. The leprosy asylum in Krutija Rutshji, 30 km. west of Jamburg, which principally admitted lepers from the area between Lake Peipsi and Ilmen was disbanded by the Russian administration in the beginning of the war. No details were available on the leprosy asylum which formerly existed in Leningrad.

In the Baltic countries leprosy principally occurs in the coastal area and in the vicinity of the large lakes. However, this relation is doubtful, as leprosy is also observed in the places far from the coast so that no causative relation could heretofore be established between leprosy and the place of living. Eating fish (or badly prepared fish) which is considered by some of the authors as the condition for the development of leprosy is by no means more usual in all of the areas where leprosy occurs than in other areas.

In the Baltic countries leprosy is of a special interest in connection with OBERDOERFFER's theory which indicates that the conditions for an infection with leprosy are established by eating food containing sapotoxin. For the northern territories the corn-campion the seed of which formerly was ground and eaten as a noteworthy admixture to the corn, must be considered as the carrier of the sapotoxin. In Latvia and Esthonia recently no admixture of the corn-campion to the grain can be found, as it is much restricted in its growth by the continuous supervision of the seed in the agricultural research institutes. In addition, the modern methods of cleaning the corn are so highly developed that the admixture of the corn-campion to the corn hardly ever occurs. Recently in Latvia and Esthonia home-ground flour is seldom used, as the requirement is exclusively supplied from industrial mills which produce flour entirely free of corn-campion. This was already the case in the period shortly after the establishment of the self-government of the Baltic countries, and it is permissible to assume that in 1925 the methods of cleaning the corn were the same as they are now. Therefore, the assumption that the fresh leprosy cases of the last ten years were due to the intake of corn-campion, is not acceptable.

This fact, however, can by no means be regarded as the refutation of OBERDOERFFER's theory, as one cannot exclude that the toxins demonstrated by OBERDOERFFER as the condition for the development of leprosy are not specific so that they are administered to man not only by the admixture of corn-campion to the corn, but also by other substances contaminating the food or by the foodstuff itself.

At any rate the conditions in Latvia and Esthonia indicate that in the north European leprosy territories under no circumstances can the intake of corn-campion alone be held responsible for the development of leprosy. It is absolutely necessary to make an additional search for other nutritive influences.

The Baltic leprosy also shows clearly that leprosy is developed on the basis of an hereditary disposition. However, the hereditary factor is not so obvious in the Baltic countries with their racial uniformity as in the tropical leprous countries where many races live closely together and where the individuals of the different races or nations show a most varying reaction to leprosy. The sometimes expressed opinion that in the Baltic countries the Germans do not fall sick with leprosy is wrong, as many cases are reported in the literature. Like in the other leprous countries, here too, the number of leprous Jews is large, and it was particularly the nomadic Jewish dealers who contributed to a high degree to the spread of leprosy during the past century. The majority of the leprosy cases was observed with the indigenous population, among which the farmers, agricultural workers, and fishermen were the largest group of persons afflicted with leprosy. But leprosy also occurs in the towns where the poor population living under inadequate sanitary conditions in the suburbs is principally affected. It is certain that the inadequate sanitary conditions and first of all dirt and filth in the dwelling places and in the clothing have to be considered as a very important cause for leprosy in the Baltic countries too. It hardly occurs that members of the wealthy classes fall sick with leprosy, but even this has happened.

The medical inspection of the lepers living in the above mentioned 5 leprous asyla in Esthonia, Latvia, and in the Memel territory revealed that they belong to the pyknic type of constitution. This is in accordance with the details given for the Caucasus area and for the tropical leprous areas which show that particularly those persons fall sick with leprosy who have a tendency to become fat. This connection, however, cannot be considered as proven for the Baltic countries, as here the average of the population shows the prevalence of the pyknic type. In addition, the general impression is influenced by the fact that the female sex prevails showing the pyknic habitus much more frequently than the male population among our lepers.

The numerical proportion of both sexes among the lepers in the beginning of the leprosy epidemic of our time in the past century was by no means the same as nowadays. Formerly, leprous men were more numerous than women. In 1893 33 men and 19 women suffered from leprosy in Finland, 1904, 57 men and 38 women, and in 1936, 13 women and 6 men. The same proportion is valid for the Memel territories (see Illustration 1). The large number of women among the lepers is considered as a sign for the epidemic being about to die out. The peculiarity that women prevail in number among the lepers may be brought into prominence slightly more by the fact that the period of time elapsing from the onset of leprosy to death on the average is longer with the women than with the men. The malady of the lepers of the Memel territory on the average extends over 12.33 years with the men, and 13.42 years with the women. When all the lepers are estimated on a certain day, the number of leprous women may seem increased compared to the number of the leprous men. This difference in the morbidity rate of the different sexes is also obvious if the number of the fresh cases recorded in each year is summed up. Therefore, for the time being, no causal relation can be given which would be sufficient to explain this difference.

The age of the patients on the average is higher in the Baltic countries than in the tropical zones. While here the children are particularly exposed to danger, in the Baltic territories leprosy usually occurs during the more advanced age only. More than half the number of all lepers fall sick after the 30th year of age. This difference to other areas is explainable by the fact that here leprosy is considerably less in number than throughout most of the other leprosy countries. In these, the majority of the persons who, on the basis of a hereditary disposition and alimentary influences are susceptible to leprosy, are exposed to the infection during their youth, while with the small number of leprosy cases, as is found throughout the Baltic countries, only some of the persons susceptible to leprosy are contaminated, which happens in a more advanced age so that the average of the age of leprosy incidence is considerably increased. Leprosy of children was rare in the Baltic countries during the past decades.

For the fresh cases of the recent years it is characteristic that they increasingly occur as sporadic cases and that the route taken by the infection cannot be found. Before their sickness many patients had not even seen a leper and no other contact was detectable with leprous persons who at that time were free from symptoms and only later had been subjected to the medical supervision for leprosy. This is in contrast to the usual assumption that leprosy exclusively is communicated during a prolonged and continuous contact with lepers. It rather seems to be sure that even a very transitory contact is sufficient for an infection with leprosy. It is possible that a latent leprosy also occurs which nevertheless is contagious and which may escape the attention of the physicians. These may be the origin of the sporadic infections.

However, leprous persons without open lesions of the skin and without bacteria discharged with the nasal mucus are not considered as infectious. Some of them even used to be discharged from the leprosy asyla as "cured". In Sweden, Finland, Esthonia, Latvia, and Lithuania, therefore, one fifth or one third of all lepers are living in their homes. Only in the Memel territory are all lepers billeted in the leprosy asylum. The percentage of the so-called spontaneous healing amounts to about 15 to 20 %.

Relations between leprosy and tuberculosis - OBERDOERFFER stated that in some of the tropical leprous asyla a large number of lepers died from a supervening tuberculosis - cannot be found with certainty for the Baltic countries, as a coincidence of the two diseases was seldom observed here.

F. STEINIGER

PRECIPITATION AND ISOTHERMS IN THE BALTIC AREA

Translation prepared by:
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Studies of the climate in Scandinavia and Finland must necessarily consider the location of these countries in relation to the large maritime and terrestrial surfaces. In the west there is the Atlantic Ocean, and in the east the most extensive land mass on earth. In addition to these geographical facts the location within the great atmospheric circulation system is of importance. Scandinavia extends from the moderate zone to the Arctic climate regions, and it represents a border area and an area of concurrence between the maritime currents originating in the ocean and the continental influences.

Depending on the predominance of one of these currents the character of the climate assumes more maritime or continental features. The winter in Scandinavia is mild if the maritime influence prevails, and the atmospheric lows pass over Great Britain and Scandinavia carrying warm masses of air from the subtropical regions to the north. Contrary to that in cold winters cold masses of air flow with prevailing southeastern winds from the areas of a high atmospheric pressure over the Russian continent to the Baltic, and particularly in the northern parts of the Baltic they cause a progress of the meteorological elements which is not very different from the Russian climate.

During the summer months the character of the weather is contrary, although the currents are similar. If maritime air masses flow into the Baltic, the climate is cool, and frequent, short rainfalls occur. The afflux of humid maritime air masses becomes particularly noticeable on the windward side of the mountains by an increased precipitation. If, however, a continental high controls the weather, the course of temperature and humidity is more excessive. During such weather conditions hot summer days occur even in the Baltic. They are the cause of discomfort particularly due to the fact that no cooling down takes place due to the long duration of the sunshine in the evening and at night.

There are few territories on earth in which the weather varies so much and where it is subject to such great seasonal variations as in the Baltic. Dependent on the currents the mean values of the climate for considerable periods may differ from the mean values found over the course of many years.

When studying the maps of the mean values of the climate one must always consider that, particularly in this area, they are the result of such a great number of meteorological influences.

The distribution of the precipitation approximately displays the orography of the territory. In consequence of the precipitousness of the western side the amount of precipitation is extraordinarily increased towards the interior, and with the altitude. The highest precipitation is found in the area south of the North Fjord (62° n.l.). Here even in the lowest altitudes a precipitation of 1,200 to 2,000 mm. is observed, while it amounts to 5,000 mm. in the highest altitudes. In the coastal stretch north of the fjord the precipitation ranges at about 1,000 mm. and is increased with the altitude to 3,000 mm. In the lee of the mountains the amount of precipitation gradually decreases towards the east, and in the Swedish littoral it attains the values of 400 to 600 mm. The smallest amount of precipitation is observed in Finmark and in the adjacent regions of northern Sweden and Finland, in which the total amount of precipitation is less than 400 mm. Contrary to that Finland shows a relatively equal distribution of precipitation. The mean annual value here varies between 500 and 600 mm.

The temperature conditions of the Baltic shall be demonstrated by selected isotherms. During the winter months the littoral areas up to the North Cape are absolutely under the influence of the Gulf Stream. The temperature on the coasts of Denmark in January slightly exceeds 0° C. From southern Sweden the 0° C. isotherm is continued to the north in a short distance from the coastline, and at 66° n.l. it attains the offshore islands. It touches the southern point of the Lofotes. The minus 4° C. isotherm passes along the Baltic coast of the Baltic countries, crosses the Gulf of Finland in the vicinity of Helsinki; from there it takes a northward direction along the western coast of Finland up to 63° n.l., takes a similar course southward along the Swedish coast, passes along the north of the lakes, and accompanies the 0° isotherm at a short distance up to the North Cape. The minus 8° C. isotherm starts from Viipuri and takes a similar course as the 0° isotherm with the only difference that it extends farther to the north. In the precipitous mountains the distance of the isotherms from each other is diminished as a result of the temperature decrease in a high altitude.

In the month of July, however, the temperature conditions are contrarious. In this month the water temperature is about 12° C. off the west coast of Norway which is the cause of the air temperature in this littoral exceeding this value only slightly. Contrary to that southern Sweden and a large area of Finland attain mean monthly temperatures of 16 to 17° C., as the course of the two isotherms reveals. Towards the north the temperature gradually decreases to 12 or 13° C.

The great meteorological contrasts between the western and the eastern side of Scandinavia is particularly noticeable if the annual course of the climate elements is considered. To clarify this fact the stations of the climograms are selected in such a way that the comparable stations in the west are located at approximately the same latitude.

Svolvar on the Lofotes has an entirely oceanic climate with a small amplitude of the annual temperature and humidity. The mean January temperature of this place is only ½° C. below that of Berlin. The July temperature, however, only attains 12.7° C. in contrast to Berlin where it is 18.0° C. The monthly mean value of the relative humidity varies between only 73 and 80 %. The maximum of precipitation of the entire western coast is observed during autumn. Karesuando, the station located east of Svolvar on the frontier between Sweden and Finland at an altitude of 332 M., shows an entirely different annual course of the meteorological elements. The January and February temperatures both range at about -14° C. In July there is no substantial difference between the coast and the mainland. Like the temperature, the relative humidity shows considerable variations at the continental stations with the minimum values in June and the maximum in December.

Farther to the south the change of the types from the west to the east side is not so considerable. This can be proved by a comparison between Svolvar - Karesuando and Floroe - Roeros. In Haernoesand on the eastern coast slightly higher winter temperatures are found than in Roeros. In July a summer maximum of about 15.3° C. is attained. In the climogram of Kuopio the annual course of the elements in the central parts of Finland is demonstrated. Here the winter is as cold as in the mountain regions of Sweden, while the summer is somewhat warmer. The 16° C. July isotherm which touches Kuopio in Finland is extended farther to the north than in Sweden as a result of the greater heating of the Russian continental mass. Farther to the south along the line from Oksoe over Karlstad to Helsinki where there are no dividing mountains no such great contrast in the annual course of the meteorological elements is noticeable. For comparison the climograms of Hamburg and Danzig show the annual course of temperature, humidity, and precipitation in northern Germany and on the Baltic coast.

Weather Forecast Service
(Air Force)

DENSITY OF POPULATION IN THE BALTIC AREA

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
Technical Section (Medical).

Bare rock, marshes and forests, a great number of islands, the sea cutting deeply into the coastline, large lakes and rapid water courses characterize the northern landscape and form the character of the population. In addition to multifarious historic and economic connections all these nations and small countries are subjected to the same destiny, as the northern corner post of Europe against the advance of the Big Eastern Power of the Soviet Union.

SWEDEN.

There are 6,371,432 inhabitants (31 December 1940) living in an area of 449,091.79 sq. km. The mean density of population, referred to the land area, is 15.5 inhabitants per sq.km.

Only about 47,500 sq.km. (11.6 %) of the country are tillable, 223,560 sq.km. (54.5 %) are covered with forest, while the naked mountainous areas in the northwest and the cold steppes - tundras - are estimated at about 60,000 sq.km. In south and central Sweden enormous marshes take up about 8 % of the surface of the country, and in Norrland about one quarter of it. Even in southernmost Sweden, which as regards agriculture is about equivalent to Pomerania, there are barren, thinly populated regions. The differing density of population in the 2353 rural communities which are included in 24 administrative areas (Laen) is shown by the following table:

CLASSIFICATION OF THE SWEDISH RURAL COMMUNITIES ACCORDING TO THEIR DENSITY OF POPULATION.

Laen	Number of rur. comm.	0-5	5-9	10-14	15-19	20-24	25-34	35-49	50-99	100 and more	mean dens. of rur. popul.	density of pop. of towns &country
Stockholm	108	2	9	37	19	9	11	8	5	8	31	38
Uppsala	85	-	6	27	26	15	6	2	2	1	18	26
Soedermannland	87	-	4	29	25	17	7	2	3	-	19	30
Ostergoetland	144	2	11	31	23	15	42	15	3	2	19	31
Joenkoeping	126	3	29	49	19	9	8	6	3	-	15	22
Kronoberg	82	1	15	31	23	6	5	-	1	-	14	16
Kalmar	101	-	12	36	29	12	6	6	-	-	15	20
Gotland	90	-	18	32	26	8	2	4	-	-	14	18
Blekinge	56	-	-	1	6	6	7	6	8	2	33	49
Kristianstad	141	-	1	6	18	17	24	37	32	6	35	40
Malmoehus	232	-	-	3	9	12	44	68	79	17	49	111
Halland	86	-	7	13	14	13	20	13	6	-	21	31
Goeteburg & Bohus	86	-	2	8	12	13	19	10	9	13	33	97
Aelvsborg	215	1	32	64	49	29	16	9	11	4	20	28
Skaraborg	255	-	6	33	55	63	63	24	9	2	23	29
Vaermland	86	9	27	28	6	4	7	4	-	1	12	15
Oerebro	57	-	10	11	11	11	7	3	3	1	17	26
Vaestmanland	64	1	5	28	14	8	2	2	4	-	17	26
Kopparberg	48	15	10	6	10	3	2	1	-	1	7	8
Gaevleborg	48	5	14	13	7	4	2	1	2	-	12	15
Vaesternorrland	63	14	22	6	9	3	2	3	3	1	9	11
Jaemtland	60	40	12	5	-	2	-	-	1	-	2,5	2.9
Vaesterbotten	28	15	7	3	1	1	-	-	-	1	9.5	3.9
Norrbotten	25	16	4	3	2	-	-	-	-	-	1.9	2.1
1940	2353	124	263	503	413	280	302	224	184	60		

66.28 % of all rural communities had a density of population of less than 25 inhabitants per sq.km. 36.62 % (1930-32.5%) of the population live in towns having more than 1,000 inhabitants. Stockholm, the capital of the country has 583,621 inhabitants.

Towns	Number 1910	Number 1940	Number of inhabitants	Fraction in % of urban population
less than 2000 inh.	18	10	13,734	0.6
2000 to 4999 inhab.	28	23	74,668	3.1
5000 to 9999 inhab.	25	35	236,475	9.9
10000 to 19999 "	12	28	369,294	15.5
20000 to 99999 "	12	18	666,850	27.9
100000 and more "	2	3	1027,296	43.0
	97	117	2388,317	100.0

NORWAY.

The area of this country is 322,598.7 sq.km.; 14,087.22 sq.km. of these are lakes and rivers, The census of 1 December 1930 revealed 2,814,194 inhabitants, which corresponds to a mean density of population of 9.12 per sq.km. referring to the terrestrial area.

Nearly three quarters of the total surface are dead country and naked rock without soil. The largest natural resources of the country are the forests which cover 25 % of the total surface. Only 3 % of the total area is tillable; the major part of the tillable area is found in the valleys of south Norway, so that the settlement is denser there. This includes the following communities:

Akerhus (46.69 inhabitants per sq.km.), Vestfol (40.69), Ostfol (31.46). The county of Oslo alone has a density of population of 40.16, while the city and the county of Oslo together show 70.77 inhabitants per sq.km.

However, the mild climate which is under the influence of the Gulf Stream, permits agriculture even in the northernmost parts. North of Trondheim oats, and north of Narvik barley will ripen.

At the times of the Vikings and the Normans the poor soil compelled the surplus population to leave the country and to cross the sea and even nowadays the sea (fishing, shipping and trade) must help to enlarge the insufficient economic basis.

The increase of the population during the 19th century was in its major part restricted to the towns. Since this time the proportion between the rural and the urban population has hardly altered.

Distribution of the rural and the urban population.

	Town	Country
1769	8.9 %	91.1 %
1801	8.5 %	91.2 %
1875	18.3 %	81.7 %
1900	28.0 %	72.0 %
1920	29.6 %	70.4 %
1930	28.5 %	71.5 %

Only Oslo with 275,000 inhabitants is a city in the proper sense.

DENMARK.

Denmark with a total population of 3,844,312 inhabitants (5 Nov. 1941) ranges between Sweden and Norway as far as the number of inhabitants is concerned. With an area of only 42,931 sq.km. the mean density of population amounts to 89.6 inhabitants per square kilometer.

The comparison of the density of population of the rural communities with the average density of settlement in 1860 (towns and country) shows a remarkable accord. The natural development of the population served principally to populate the towns. But nowadays the principal part of the population lives in the country (52.6 %).

The distribution of the urban population (47.4 % is as follows:

Rural towns with less than 10,000 inhabitants	6.2 %
Small towns with 10,000 to 20,000 inhabitants	6.7 %
Middle towns with 20,000 to 50,000 inhabitants	5.0 %

Density of population of the Danish Counties.

Area	sq.km.	inhabitants 1940	inhabitants per sq.kilomet. 1940	1930	total density 1860	rural comm. 1940
Sjaelland	7,518	1,576,959	209,8	186.2	76.5	74.0
Bornholm	587	46,542	79,3	77.8	49.8	47.4
Lolland-Falster	1,795	132,707	73.9	75.0	48.4	51.5
Fyn	3,477	364,804	104.9	100.0	62.5	64.6
	13,377	2,121,012	158.6	144.1	67.9	67.4
Eastern Jutland	7,330	622,370	84,9	79.1	39.1	49.2
Northern "	7,555	446,579	59.1	55.7	28.6	43.1
Western "	10,787	465,919	43.2	41.2	18.9	32.9
Southern "	3,882	188,432	48.5	45.8	37.9	36.0
	29,554	1,723,300	58.3	54.9	28.7	39.9
the entire country	42,931	3,844,312	89.6	82.7	40.9	48.2
1 July 1942		3,903,000	90,9			

1.1 million inhabitants live in the three larger to middle sized towns having more than 50,000 inhabitants and in the capital. This is almost three tenths of the total population. Urbanization is in progress (1935 - 27.2 %). Before 1940 the population of these three towns was increased by 75,000 persons (7.1 %), while the increase of the population in the other areas amounted to 2.4 % only. Nearly one quarter of the total population (1940 23.2 %; 1930 21.7 %) lives in the capital Koebenhavn which has 890,130 inhabitants if the suburbs are included.

FINLAND.

Its geophysical structure is very similar to the Scandinavian countries. The total area amounts to 382,801 sq.km. (at the beginning of the year 1942). About one third are marshes and swamps (130,000 sq.km.) and about 9 % are lakes (34,324 sq.km.). An intensive inner colonization increased the proportion of the cultivated soil (fields, gardens, meadows, pasture grounds) to 11.1 % in 1939 (1929 - 9.3 %). 70 % of the surface is covered with forests (mostly moors). As to the climate the confines of Finland belong to the temperate zone, which is displayed by the distribution of the density of the population.

Density of population of the Finnish rural communities (1930).

Laen Swedish name in brackets	Number of comm.	0-1	1,1-2	2,1-3	3,1-5	5,1-10	10,1-15	15,1-20	20,1-25	25-30	30-40	40-50	over 50
Uusimaa (Nyland)	43	-	-	-	-	1	12	14	6	2	3	1	4
Turku-Pori (Abo-Bjoerneborg)	109	-	-	-	-	2	25	40	25	7	6	-	4
Ahvenanmaa (Aland)	15	-	-	-	-	3	9	3	-	-	-	-	-
Haeme (Tavastehus)	60	-	-	-	-	5	19	15	9	4	3	1	4
Viipuri (Viborg)	64	-	-	1	1	4	11	24	5	3	8	2	5
Mikkeli (St. Michel)	29	-	-	-	-	5	20	3	1	-	-	-	-
Kuopio	47	-	-	1	1	17	19	6	1	-	-	-	2
Vaasa (Vasa)	88	-	1	-	4	22	35	14	9	1	1	-	1
Oulu (Uleaborg)	71	9	8	7	10	21	11	2	2	1	-	-	-
	526	9	9	9	16	80	161	121	58	18	21	4	20

Despite the most difficult wartime conditions the census based upon the ecclesiastical and the civil records was taken on 31 December 1940 as was usual every ten years. 3,884,217 inhabitants (1930 - 3,667,067) were counted. During the past hundred years the Finnish population has increased to 2.7 times its former number. The average annual increase by 0.58 % of the mean population is considerably higher than that of the other Scandinavian countries (Norway 0.48 %, Sweden 0.36 %). The mean density of population amounts to 11.1 inhabitants per sq.km., disregarding the area covered by lakes. The distribution of the population after this census is shown by the following table:

Laen	sq.km. (1942)	inhabitants	inhabitants per 1 sq.km.
Uusimaa	12,232	601,710	49.2
Turku-Pori	23,014	536,079	23.3
Ahvenanmaa	1,505	27,676	18.4
Haeme	21,645	420,438	19.4
Viipuri	35,769	628,300	17.6
Mikkeli	23,016	203,627	8.8
Kuopio	44,882	398,512	8.9
Vaasa	41,468	599,774	14.5
Oulu	62,988	327,422	5.2
Lappi (Lapland)	116,282	143,679	1.2

The development and the distribution of the rural and the urban population throughout the various areas is as follows:

Laen	1880		1920		1930	
	towns	country	towns	country	towns	country
Uusimaa	25.3	74.7	48.6	51.4	52.4	47.6
Turku-Pori	12.1	87.9	17.9	82.1	18.9	81.1
Ahvenanmaa	2.0	98.0	5.4	94.6	6.5	93.5
Haeme	7.4	92.1	17.1	82.9	19.4	80.6
Viipuri	6.6	93.4	9.8	90.2	14.3	85.7
Mikkeli	2.4	97.6	5.3	94.7	6.0	94.0
Kuopio	3.3	96.7	7.5	92.5	8.6	91.4
Vaasa	4.8	95.2	8.7	91.3	9.2	90.8
Oulu	7.2	92.8	9.3	90.7	9.9	90.1
	8.4	91.6	16.1	83.9	18.3	81.7

The increase of the town population revealed by this table continued during the following decade, as can be seen from the following data.

The Finnish population classified according to the number of inhabitants of the communities	Number	%	Increase or decrease (-) compared with 1930 in %
Communities with less than 10,000 inhabitants	3,116,287	80.2	- 2.0
10,000 to 100,000 inhab.	450,991	11.6	85.1
100,000 and more inhab.	319,939	8.2	31.4
TOTAL:	3,887,217	100	6.0
of these rural population	3,005,951	77.3	- 0.4
urban population	881,266	22.7	31.2

Most remarkable of all is the increase of the population in the towns from 10,000 to 100,000 inhabitants, as well as the considerable increase of the capital Helsinki with its 319,939 inhabitants (in 1940). This increase is principally due to the re-migration of nearly the entire population from the districts which had to be surrendered to the Soviet Union (460,000) (1940).

THE BALTIC COUNTRIES.

The areas of the three Baltic countries including the region of Wilno comprises 173,000 sq.km. in which in the year 1940 about 6 million inhabitants were living. This makes a density of population of 35 inhabitants per square kilometer. If the towns with more than 10,000 inhabitants are disregarded the density of population is increased rather constantly from the northwest to the southeast.

During the past thirty years the population of the Baltic countries suffered heavy losses through the varying political conditions, particularly through the invasion of the Soviet Union (1939/1940 and 1945).

ESTONIA.

In an area of 47,549 sq.km. the census revealed altogether 1,126,413 inhabitants on 1 March 1934, which makes 23.7 inhabitants per sq.km. (excluding the surface covered with water, 24.9). By 1 December 1941 the number of inhabitants was reduced to 1,017,811 inhabitants (21.4 inhabitants per sq.km.). The density of population of most of the rural counties in 1934 showed constantly the mean value of 16.3, except for the area of Petserimaa with 32.0 inhabitants per square kilometer of rural population - most of them being Russians. In 1934 67 % of the total population were living in the country and 33 % in the towns. The capital is Reval and it has 137,630 inhabitants (1940).

LATVIA.

In an area of 65,791 sq.km. 1,950,502 inhabitants were counted by the census of 12 February 1935; this means that the mean density of population is 29.6 inhabitants per sq.km. (estimate of 1 January 1939: 1,994,506 inhabitants, 30.3 per sq.km.). The density of population is greatest in Lettgallia with 36.2 inhabitants per square kilometer. Semgallia has a density of population of 22.0, Kurland of 22.2, Livland of 17.6 per sq.km. The two latter areas show a decrease of the population during the past years.

710,563 inhabitants (1935) were living in altogether 60 towns; among these were 7 towns with less than 1,000 inhabitants and 33 towns with more than 2,000 inhabitants. The portion of the urban population now amounts to 36 % (1935 - 34.6, 1920 - 23.5). At the present time Riga has 393,211 inhabitants (1940).

LITHUANIA.

The census of 17 September 1925 revealed 2,028,971 inhabitants in an area of 52,822 sq.km., which agrees with a mean density of population of 38.3 per sq.km. At that time only 14.9 % of the population lived in towns with more than 2,000 inhabitants. Contrary to Latvia and Estonia, in Lithuania the part of the town population is very small, while at the same time the density of population is very high in the rural districts. With the total population amounting to

2,441,741 (1940) the mean density of population was raised to 46.2 per square kilometer; the portion of the urban population amounted to 19 %. For the time being Lithuania also includes the Wilno region with 6,656 sq.km. and 457,500 inhabitants (1939). The capital is Kaunas which has 154,109 inhabitants. Wilno has 209,442 inhabitants (1940).

The development of the population of the Scandinavian and Baltic countries has been characterized for a long time by a dangerously low birth rate.

	Births		Deaths		Surplus	
	per 1,000 inhabitants					
	1930	1940	1930	1940	1930	1940
Sweden	15.4	15.0	11.7	11.4	3.7	3.6
Norway	17.3	16.3	10.4	10.9	6.7	5.4
Denmark	18.7	18.3	10.8	10.4	7.9	7.9
Finland	20.6	20.1*)	13.2	14.0*)	7.4	6.1
Estonia	17.4	16.4	14.9	17.0	2.5	-0.6
Latvia	19.8	19.2	14.2	15.5	5.6	3.7
Lithuania	27.4	23.1	15.9	12.6	11.5	10.5
Germany	17.5	20.4*)	11.1	12.6*)	6.5	7.8

*) Figures for 1939

As the maintenance of the population figure requires a birth rate of at least 20 births per 1,000 inhabitants, the prevalence of the birth rate over the death rate is exclusively due to the extraordinarily low death rate for all ages, particularly of the Scandinavian countries, combined with the peculiarity of their present distribution of the age groups. A real birth surplus is found only in Finland and Lithuania.

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DISTRIBUTION OF TRACHOMA IN CENTRAL EUROPE.

(With 1 Map.)

Translation prepared by:
U. S. Fleet, U. S. Naval Forces, Germany,
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In the sector of Central Europe represented on Map VI/1, the distribution of trachoma is most varied. In addition to countries with high trachoma-rates, the map contains also countries which are practically free from trachoma or only slightly infected. The boundary of the territories with endemic trachoma is especially marked - violet dotted line. In Central Europe and particularly in Germany, but also in France and other countries with few trachoma cases, a large proportion of the trachoma patients consists not of the indigenous population but of immigrants coming from the trachoma regions of eastern Europe. Only in exceptional cases may these patients be considered as infection sources for new cases. In the regions with endemic trachoma, however, the disease usually spreads among the indigenous population by family infection.

In Germany, endemic trachoma is numerically less frequent than the trachome imported from the trachoma territories. Thus, for instance the trachoma figures in Mecklenburg, Pomerania and Brandenburg, which are higher than the average in Germany, are chiefly caused by the non-indigenous population, while the smaller seats of endemic trachoma, which exist in the Eichsfeld in Hesse and the Upper Palatinate, are insignificant as contrasted to the figures of trachoma patients living there. Only in East Prussia, West Prussia, and Upper Silesia, the cases of endemic trachoma form the principal part of the total trachoma figures of those provinces.

As sources for statistical data on the frequency of trachoma in addition to works on single territories, above all the summary representation of WIBAUT and, as regards Germany, the reports on new trachoma cases published in the statistical annual registers have been used. On the map VII/12 "Trachoma in the Mediterranean Area", the difficulties of obtaining reliable figures have been described.

As regards Germany, we possess fairly reliable data of East Prussia only. In association with the trachoma control which has been executed there since the turn of the century, examinations concerning the frequency of trachoma in East Prussia have been published again and again. These show that the numbers of trachoma patients have considerably decreased during the last few decades (Table 1)

Table 1.

Numbers of the trachoma patients treated at the Ophthalmological Clinics of the Koenigsberg University.

Time	Numbers of the trachoma-patients treated per annum	proportion of the trachoma patients in the total number of patients in %
1877 - 1883	351	16
1891 - 1897	578	15
1917 - 1923	265	4
1924 - 1928	348	4
1932 - 1936	152	2

According to Table 1, the proportion of the trachoma patients in the total number of patients of the University Ophthalmological Clinics in Koenigsberg amounts to 2 % approximately at present. Using this figure as the basis of a computation for the trachoma rate which is to be expected among the total population of the province, one would obtain a trachoma frequency of 0,6 % by making use of the formula drawn up by WIBAUT (see text to map VII/12). For about 5 years, all trachoma cases in all stages diagnosed in East Prussia, that is to say not only the new cases in the Koenigsberg University Ophthalmological Clinics, are registered in cooperation with the Health Offices. According to these registrations, there are at present (1943) 2215 trachoma patients, that is about 0,1 % of the population in the old East Prussia, without the Government-District Zichenau and the district Sudauen. The actual trachoma figure for East Prussia can be estimated between the values 0,6 % and 0,1 %; in this work 0,3 % is estimated. The average figure of the officially reported new cases in the years 1924 - 1936 amounted to 510 cases per annum, i.e. 21.9 in 100000 inhabitants. Table 2 shows the distribution of the reported trachoma cases in the single administration districts.

Illustration 1 affords a synopsis of the residential districts of the province East Prussia infected by trachoma. The illustration shows that the infection decreases from east to west, a good demonstration that East Prussia is the border district of a larger trachoma seat situated towards the east. The neighboring countries of East

Table 2.

Trachoma cases reported in East Prussia in 1943.

	Trachoma cases	inhabitants	per 1000 inhabitants
Government-district Koenigsberg	671	1,011,969	0,66
Government-district Allenstein	696	565,917	1,23
Government-district Gumbinnen	848	620.319	1,37
Old-East Prussia	2215	2,198,205	1,00
Government-district Zichenau	1226	780.500	1,57
District Sudauen	1029	117,000	8,8
TOTAL:	4470	3.095.705	1,44

Prussia have a considerably higher trachoma rate, thus, AVIZONIS (1930) estimates the frequency of trachoma in Lithuania at 10 % of the population. According to ROSTKOWSKI (1936) 1,1 % of the population of the former Poland are infected with trachoma. But this figure is probably too low; it was obtained from the examinations of recruits and thus considers only the frequency of the disease among distinct age groups. As ROSTKOWSKI held, about one third of all trachoma cases was registered by the trachoma control action in Poland. The region of Wilna and Litzmannstadt (Lodz) and the district Sudauen (Suwalki), which is now part of East Prussia, were infected most intensely.

As regards the other territories of the German Reich except East Prussia, we depend on the official figures only. These statistics report on the numbers of new cases in each year.

Proportional figures as contrasted to those of East Prussia can be obtained from the figures of Table 3. In this work, those regions of Germany whose trachoma figure exceed the German average are especially marked, while the regions with trachoma figures below the average have not been considered as "poor in trachoma cases". The trachoma regions especially marked on the map have been subdivided

Illustration 1.

Trachoma - cases in East Prussia.

into three groups. The frequency of trachoma per mille of the population indicated for this purpose is based only on estimation with use of the official figures as drawn up in table 2.

Table 3.

Frequency of trachoma cases according to the official reports.

Administrative District	1924 - 1936 number of cases per year	in 100,000 inhabitants
Province East Prussia	510	21,9
City of Berlin	20	0,5
Province Brandenburg	70	2,6
Province Pommern	49	2,5
Province Grenzmark	17	5,2
Province Lower Silesia	87	2,7
Province Upper Silesia	93	6,5
Province Saxony	39	1,2
Province Schleswig-Holstein	34	2,2
Province Hannover	29	0,9
Province Westfalen	153	3,0
Province Hessen-Nassau	16	0,6
Rhine-province	63	0,2
Prussia	1182	3,0
Bavaria	54	0,7
Saxonia	20	0,4
Wurttemberg	4	0,2
Baden	22	0,9
Thuringia	10	0,6
Hessen	10	0,7
Hamburg	15	1,2
Mecklenburg	30	3,7
Oldenburg	1	0,3
Anhalt	2	0,7
Bremen	6	1,6
Lippe	4	2,5
Lubeck	1	0,7
Brunswick	8	1,6
German Reich:	1373	2,1

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