Some Observations on Infective Diseases in Russia

KARL F. MEYER, M.D., F.A.P.H.A.

Russian experience in the large-scale use of a wide variety of vaccines not employed in Western countries will prove of interest to all in our field, as will the story of the mushrooming growth of disciplines that older sanitary services tend to neglect.

Under the Czarist regime, cholera, typhus, typhoid fever, smallpox, dysentery, malaria, and sometimes plague broke out in large epidemics and the morbidity and mortality rates were exceptionally high. Contributing causes were the poor social and economic state of the population, the lack of development of medical services, the lack of medical personnel, hospitals and clinics, and the very low standard of sanitation in the country. There was no unified public health department, and there were only one state bacteriologic institute and a few private and public scientific institutes. The government took little interest in the health of the people and did not organize a central health agency with the authority necessary to stamp out endemic foci and to control epidemics. Nor did the people concern themselves about these matters. A vast portion of the area was sparsely populated by nomads, and the rural population was largely illiterate and ignorant, living under primitive conditions and holding fatalistic beliefs.

It is not surprising that when the demoralization incident to World War I was followed by revolution and famine the epidemics that took place in Russia were as extensive as any recorded in history. After the outbreak of that war, the incidence of infective diseases increased; but despite dislocation of large sections of the civilian population before the advancing enemy and the inevitable invasion of large areas by infections, the Russian military and civilian sanitary service proved quite effective. But after the 1917 revolution the whole structure of Russian life was being profoundly and almost instantaneously changed. Conditions favoring the propagation and spread of disease became almost ideal: temporary paralysis and then complete reorganization of all government functions, greater concentration of the population due to nationalization of industry, poverty resultant to prohibition of trade, deficit of government funds, economic blockade, exhaustion of reserves, scarcity of food, devastation and destruction resulting from military operations between conflicting Russian armies.

Professor L. A. Tarasevich, who studied these experiences thoroughly, estimated the typhus morbidity at 20 to 30 million between 1917 and 1922. The mortality rate is not known, but the estimate is 8 to 20 per cent. When typhus was complicated by paratyphoid the rate rose to 14 to 17 per cent. Conservative estimates of the incidence of relapsing fever from 1918 to 1922 exceed 15 million cases. Malaria (mortality rate, 3 to 20 per cent) became

Dr. Meyer is director emeritus, George Williams Hooper Foundation, University of California Medical Center, San Francisco, Calif.

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the most important disease in Russia and spread during the famine throughout European Russia and as far north as Archangel. The greatest reservoir was in Turkestan and the Caucasus. Over six million cases were reported in 1923. In 1921 there were 205,000 cases of cholera, always endemic in southeastern Russia, particularly in the famine area of the Volga Basin; and the case mortality rate for all Russia was 50 per cent. Cases of typhoid fever doubled and trebled, and in 1920 the reported figure was 424,487 cases. Over 166,000 cases of smallpox, with a mortality rate of 10 to 20 per cent, were reported in 1919. During the famine years of the early 1920's, caused mainly by draught, the acute food shortage affected 60,000,000 people; and it was reported that 10 million died from starvation despite the liberal relief contributed by America and England and by the German, French, and Swedish Red Cross. Agencies from outside Russia vigorously attacked the epidemics there with the known sanitary procedures, but it was discovered that many plans could not be carried out because the existing measures against vermin-borne diseases were not being employed due to the inertia of the authorities and a shortage of fuel and even water.

Mass vaccination materially reduced the magnitude of the cholera epidemic in 1922 and protected large numbers of the four million people vaccinated against smallpox. Accurate statistics on comparative morbidity and mortality rates among the inoculated and uninoculated population were not collected. The main purpose—to limit the incidence of smallpox and water-borne disease among famine-stricken people—was accomplished. The example had a marked effect on the medical profession in Russia and stimulated new efforts.

Immediately after the 1917 revolution scientific work almost ceased. Besides the deaths among the scientists themselves in the center of the intellectual life of the country, Leningrad, the hard times decreased the capacity and energy of those who survived. As fighting and famine ceased and order was restored, despite severe privations, science began its rise to a higher standard and it prospered as the Soviet government began its work to unify efforts to protect the public health. They organized the People's Commissariat of Public Health (Narkomzdrav) according to a single plan for the whole union. Soviet medicine from its beginning has stressed prevention. Specialized medical services were widely distributed to the population, and 50 medical institutes were eventually organized to promote sanitation and health protection. The Ministries of Health of the 16 union republics began a network of antiepidemic services to carry out measures to prevent and ultimately "liquidate" epidemic diseases. Exceptional attention has been given to microbiology and epidemiology. These undertakings began in 1922 and have developed slowly.

The Soviet government now grants generous amounts for the development of science. This whole-hearted support, genuine pride, and interest in the scientific institutions has elevated medical science there to new levels. In fact, deification of the natural sciences fully harmonizes with the materialistic ideas of Marxism.

A new generation of well trained workers appointed to positions in the institutes according to merit is growing up and is doing worth-while research work. Very few public health workers or epidemiologists and microbiologists outside the U.S.S.R. have had an opportunity to learn the extent of research conducted there during the past 35 years. Serious difficulties in learning the nature and scope of the Soviet scientific work continue. It is described in their professional journals, monographs and books written in Cyrillic

characters with—but more frequently during the past 10 years without an English, German, or French summary. Except for summaries mostly in two French abstract journals (Bulletin de l'Institut Pasteur and Bulletin de l'Office international d'hygiene publique) there has been little information on infective diseases in the U.S.S.R. Critical summaries and translations of monographs are rare and can be secured only with difficulties. A proper synthesis of the available records is time-consuming and outrageously expensive. Politics has also dammed the flow of the mainstream of new ideas and facts. The U.S.S.R. belonged for only a short period to international health organizations. Between 1934 and 1939, when Russia was a member of the League of Nations, the Weekly Epidemiologic Reports and a few summaries in the International Health Yearbook reflected some of the progress between the 1917 revolution and World War II. Shortly after World War II publications such as "Microbiology and Epidemiology," dealing with "the achievements of Soviet medicine in the patriotic war" gave some information about their control of infective diseases.

When the cold war began the strong ideologic orientation of the U.S.S.R. against cosmopolitanism created an atmosphere in which it was again almost impossible to remain in touch with the scientific advances there, but this isolation has been partly fissured recently. The United States and the Soviet Union have been exchanging scientific information much more freely in the last year. The arrangements for one of the medical research exchanges early this year were handled by the U. S. Public Health Service at the request of the Department of State. A group interested primarily in poliomyelitis and virology —M. P. Chumakov, M. K. Voroshilova and L. I. Lukin of Moscow and A. A. Smorodintsev of Leningrad—came to the United States and visited laboratories in Boston, New York, New Haven, Baltimore, Pittsburgh, Cincinnati, Cleveland, Minneapolis, and Bethesda. The group from the United States visited the Soviet Union under the auspices of its Ministry of Health, and the visitors were men working in microbiology and epidemiology—Dr. Colin M. MacLeod and Dr. Richard E. Shope of New York, Dr. John R. Paul of New Haven, Dr. Michael B. Shimkin of Bethesda and I. We were privileged to confer with over 200 Soviet medical scientists in Moscow, Leningrad, Kharkov, Kiev, Rostov-on-the-Don, and Sukhumi and were given opportunities to become acquainted with their research and concepts of epidemiology and with their preventive measures against infective diseases. Impressions gained from interviews were often sketchy, but the Soviet scientists did supply the mission with many reprints, monographs, and textbooks.

The sources of the information that follows were observation, conversation, and reading, and for the most part the information will be presented as it was given. Personal interest, experience, and time limit this review to a few significant contributions of Soviet medical science and to a few points of general interest to the public health worker in the United States.

Control of Rickettsial Diseases, Cholera, Smallpox, and Typhoid Fever

Haunted by the history of epidemic and endemic typhus, relapsing fever and other infections, one might have a lingering concern that the recent optimistic reports from the Soviet Union are propaganda, but this concern is not warranted. In a well illustrated talk Professor P. F. Zdrodovsky at the Gamaleya Institute, one of the major institutes, while reviewing the position of the rickettsioses [1] emphatically stated that epidemic typhus (under the name "Rick-

ettsiosis epidemica pediculosa") has been eradicated. This success was repeatedly described by others whenever the subject was discussed. With pride they emphasized that Russian investigators had already in 1876 proved, by self-experimentation, the infectiveness of the blood of typhus patients. They had anticipated Nicolle and knew that bloodsucking arthropods disseminated the infective agent. Today only sporadic cases of wholly benign typhus are encountered. These illnesses are interpreted as relapses. Their origin has not been fully established; lice usually are not found, and seasonal occurrence has not been noted.

According to Professor Zdrodovsky, rickettsia serologically similar to Rickettsia prowazekii have been isolated from a number of patients and experimental studies on animals have yielded parasites cytomorphologically and by cross-immunity tests indistinguishable from Rickettsia mooseri. Improved living conditions, education in sanitation, and control of lice according to rigorously tested scientific principles are credited in the "liquidation" of typhus. Immunization with vaccines prepared from artificially infected lice or mouse lungs or from embryonated eggs according to the method of Cox is well understood there, but is not practiced at present.

Typical murine typhus is found on the Black and Caspian Sea coasts during the fall and winter. A disease similar to rickettsialpox, disseminated through Allodermanyssus sangineus and attributed to a rickettsia described as Dermacentroxenus murinus, is observed in the same areas. Q fever is quite prevalent. It behaves epidemiologically like brucellosis and is connected with an analogous infection in cows, goats, and sheep.

Several tick-borne rickettsioses have been studied. Of interest is the observation that the parasite of tick typhus isolated from patients, from six different species of ticks and from several species of local rodents is indistinguishable from the rickettsia causing tick-borne spotted fever in the Old and New World. This genetic kinship is deemed important in the realm of medical geography.

With keen satisfaction and pride the Russian investigators reported that cholera has been eliminated from the Soviet Union for more than 30 years.

Compulsory vaccination, introduced in 1920, gradually reduced the annual morbidity of smallpox to the extent that by the middle 1930's only a few cases were reported. In a book [3] published in 1945 it was claimed that in the foregoing 10 years not a single case of variola had been observed there. Official printed statistics are not available: the last Weekly Epidemiologic Record of the League of Nations for 1937 reported only four cases of smallpox in the Asiatic part of the U.S.S.R.

Stable lyophilized calf-lymph vaccine of high potency against vaccinia is manufactured in large quantity in all of the serum and vaccine laboratories of the 16 republics. The success of their freeze-drying method depends on the use of such stabilizers as 10 per cent sucrose and 10 per cent egg white. The vaccine is reconstituted with glycerine and applied according to the so-called Grothe method, which consists of four superficial incisions and the spreading of the diluted vaccine culture over the scarified area. Professor V. D. Soloview and his staff have planted the vaccinia virus on 12-day-old embryonated hen's eggs and harvested it on the third day thereafter. They observed that by the 319th passage the LD_{50} for rabbits and guinea pigs by the intraocular route and for mice and rabbits by the intracerebral route had increased. Egg-adapted vaccinia virus in the 320th passage, properly lyophilized with egg albumin and saccharose, remained active for one year at 20° C. The immunogenicity has been tested on many thousand children. According to

these tests, six months after revaccination with calf-lymph virus, 89 per cent of the children were immune, and five years after revaccination, 63 per cent were still immune. This type of vaccine has not yet been officially approved by the Ministry of Health.

According to Soviet epidemiologists the morbidity rate of typhoid fever has decreased by 85 to 90 per cent since the disastrous postrevolution days. The disease has not been completely eradicated because even the special anti-epidemic measures have not succeeded in revealing the carriers, nor in rendering them harmless. The epidemiologists emphasized that the infective agent is easily and widely disseminated by flies and other vectors in rural areas. Early isolation of the patients in hospitals is deemed important, and this step is apparently assured by the ready accessibility of medical services to the population. Those in contact with the sick are vaccinated.

As a mass preventive measure, vaccination is carried out every year according to a plan worked out beforehand for each city and district, and many millions of such vaccinations are performed. This measure is believed to be one of the most important causes of the sharp decrease in typhoid fever before, during, and after World War II. Sanitary measures to prevent the spread of infection by water, milk, and foodstuffs are realized on a wide scale because, as their epidemiologists emphasized, no expense is spared and time is taken to complete construction and extension of waterworks, sewerage systems and garbage disposal stations.

Newer Aspects of the Infective Diseases

The main lethal epidemics of the past have been either eliminated or probably reduced to somewhere near the low levels in western Europe. Many factors not readily discernible to the observer on a time-limited mission are responsible for the decline. The government policies seem to be based on predominantly preventive public health philosophy in medicine.

With the decline of the epidemic infective diseases in the middle of the 1930's, new problems arose: the problems of "natural foci" and endemic "nidi" of infections, as they are designated by Soviet epidemiologists and parasitologists. In districts where the inhabitants were otherwise healthy and relatively advanced culturally a number of infections made their appearance. In regions to be developed in order to feed the growing population or to exploit the natural resources required by the rapid development of industrial centers, tick encephalitis, tularemia, recurrent tick typhus, leptospirosis, pappataci fever, brucellosis, and hemorrhagic fever were discovered where cases had not been observed before.

Experience before and during World War II convinced the Soviet scientists and public health workers that rational and efficacious prophylaxis could not be developed without accurate knowledge of how the agent that causes the disease persists in natural foci and by which route it is likely to be transmitted to man. The study of regional epidemiology has, under the brilliant leadership of the zoologist and parasitologist, Academician E. N. Pavlovsky of the Zoology Institute of the Academy of Science in Leningrad, assumed a prominent and scientifically productive position in Soviet public health. Elaborate cooperative scientific research, guided by intriguing hypothesis and achieving striking results rarely reviewed outside the U.S.S.R., merits serious attention.

The existence of natural endemic foci of the zoonoses attracted the attention of Soviet investigators when encephalitis was diagnosed among people who ventured during spring and early summer

into the semidesert and taiga (coniferous forest) of the far eastern regions of the U.S.S.R. between 1932 and 1937. The sparsity of the human population spoke against man-to-man transmission. Therefore the cause of infection had to be sought among animals inhabiting the locality where the disease was found. Field investigations, called expeditions, and clinical and laboratory research conducted by Pavlovsky and by large groups of devoted colleagues recruited from the many institutes of the Academy of Medicine and Science and the Ministry of Health, enabled Academician Pavlovsky to develop his doctrine of natural nidi of the transmissive diseases of man.[2]

This doctrine has served as a powerful guide to Soviet epidemiologists for the past 20 years. Just as Pavlov's researches gave substance to Soviet neurophysiology, so the teachings of Pavlovsky and his school permeate present-day epidemiology in the U.S.S.R. The list of infections with nidi is constantly being supplemented, possibly overly elongated. Even the intestinal infections are included, not entirely with justification.

The views of Pavlovsky related to public health may be summarized briefly: natural enzootic foci of zoonoses may remain undetected or dormant for indefinite periods, in fact as long as human beings do not come into contact with them. They constitute a potential danger, and it is important that their existence and location should be recognized before man becomes infected. Such foci or biotypes are characterized by definite ecologic peculiarities determined by topography, climate, vegetation, and other environmental factors; and these can serve as indicators of the probability that certain diseases will exist there. A knowledge of what Pavlovsky calls "landscape epidemiology" is useful in determining the potential dangers of unknown territories into which man is about to settle for the first time. In desert areas inhabited by burrowing rodents the presence of leishmaniasis or Oriental sore might be suspected. In tropical Africa bush country with big game or river banks with thick vegetation might be expected to harbor trypanosomiasis. If the epidemic possibilities of such localities are anticipated, either they can be avoided or appropriate measures can be taken to protect human beings. Depending on the nature of the foci, the territory concerned may be freed by extermination of the reservoir hosts and vectors. Total destruction of the sources may be time-consuming and too difficult under certain conditions. Specific mass vaccination must then take the place of eradication of the foci. The influence of these concepts on the present efforts of Soviet public health may be illustrated in some examples.

Tularemia—Since 1926, particularly during World War II, mass outbreaks of tularemia in agricultural workers and soldiers led to the organization of epidemiologic investigations. This undertaking was greatly aided by foregoing and thorough surveys of the distribution of rodent pests which destroy ordinary planted or sown food crops, thereby causing serious economic problems in the ancient open steppe and the cleared deciduous forest belts of an area covering eight million square miles.[3] The existence of tularemia in the U.S.S.R. was discovered when the inhabitants of a province of Astrakhan were encouraged to trap water voles with the idea of providing an extra resource in the form of fur during a severe agricultural depression. The immediate result was that more than 800 peasants caught tularemia and some of them died.

In the course of studies initiated on a broad front Soviet epidemiologists recognized that rampant epizootics of tularemia in rodent populations had invariably been followed by mass outbreaks of human illness. The clinical mani-

festations of generalized systemic tularemia were dominated by pulmonary and abdominal involvement. The mortality rate was estimated at 1 per cent. Latent and mild forms were seen, but 80 per cent of the patients required prolonged hospitalization if not treated with antibiotics. Thus tularemia in the Soviet Union differs from the primary localized types usually observed in the United States.

Inhalation of dust stirred up during the use of straw or hay polluted with the excreta of infected rodents or during the threshing of corn which has overwintered in the field is the basic mode of infection. Ingestion of water contaminated by carcasses of water voles has caused many attacks. The infection is dispersed primarily by the water rat and common vole, but not infrequently epizootics among other mouselike rodents such as lemmings and field mice and among gerbils, squirrels and even sheep, dogs, pigs, and camels serve as sources of infection. An interchange of the infective agent between rodents and from them to man is maintained by several species of Dermacentor ticks, mosquitoes, horseflies, and other gadflies.

Prophylactic measures concentrate on mass destruction of the rodents. Trapping and poisoning, building of ditches for catching the rodents, wide utilization of the natural animal enemies of rodents, protection of food products and water sources, substitution of pine and fir needles for straw bedding have all helped reduce the occurrence of tularemia. These measures have been quite effective, but even if certain rodents were continuously suppressed the infection chain in the arthropod vectors would not be broken.

Therefore in recent years elaborate studies under the direction of Professor N. G. Olsufyev [4] and other scientists have led to the development of active immunization with living attenuated strains of Bacterium tularense. Soviet scientists for many years have experimented with a vaccine prepared with killed organisms and injected in from three to even eight steps. The resistance afforded has been usually of a low order.[5, 6] Selecting attenuated, weakly virulent strains, they have prepared vaccines that induce a strong resistance in animals and man. A liquid egg-yolk vaccine has been replaced by a lyophilized preparation of two strains (No. 155 and No. 15). The organisms in this type of vaccine remain viable for at least two years at 4° C. Reconstituted with distilled water, the content of an ampule yields a suspension containing one billion bacterial cells. A drop of the vaccine is placed on the skin of the middle third of the upper arm and is introduced cutaneously by scarification with the aid of a vaccination stylus. The actual dose required to immunize ranges from 10 to 15 million. By the fourth or fifth day a local inflammatory reaction with vesicles the size of millet seeds appears at the site; by the 10th day the vesicles change to pustules surrounded by edema. Scab and scar formation terminates the reaction. Axillary lymphadenopathy and systemic reactions with fever have been encountered in isolated cases. The immunogenicity of the vaccine has been evaluated by means of serologic and allergic skin tests. In some series over 94 per cent of the vaccinated had a strong skin reaction to the tularense antigen three to seven years after a single cutaneous immunization. Numerous records in the monograph by Professor Olsufyev [4] tell convincingly that live tularemia vaccine, dry or liquid, has protected agricultural workers from the disease whenever vaccination was carried out at the very moment when an epizootic threatened to create an epidemic. Active immunization with live vaccine was added in 1951.

Plague—Soviet scientists in every institute reported with pride that plague has been eradicated from the southeast

of the European U.S.S.R. How has this been accomplished? Before this question can be answered the ecology of plague in this part of the world must be sketched. Since 1912 localized plague epizootics among newborn spermophiles have furnished the seed for bubonic and even pneumonic plague among nomads or agricultural workers in the steppe regions. Chronically ill rodents and infected fleas carry the infection during hibernation from one season to another. In the dry salt and semidesert Kirghiz areas epizootics among several species of mouse may forge complicated transmission chains in which fleas not only spread the infection among the voles, but also transmit it to rabbits, spermophiles, and gerbils. Late in the fall and winter infected fleas in feed and a variety of articles such as blankets infect inhabitants of farm houses and occasionally infect camels. The large carcasses offer excellent opportunities for the spread of plague to field mice.

Few scientists outside the Soviet Union are aware of the phenomenal growth of ecologic research of a high order that has furnished the methods of suppressing and controlling rodent populations. Primarily developed to reduce the damage by rodents to crops and the occasional outbreaks of disease the methods have been applied against plague. Extraordinarily extensive use of poison, aided locally by other devices, such as flooding, trapping, and gassing, have served their purpose. Over many years these eradicative measures have been extended to cover a territory of over seven million acres around Rostov-on-the-Don. Spermophile, or suslik, populations have been precipitously reduced. It was reported that in 1934 between 30 and 40 of these rodents could be counted per two acres of land, while in 1955 only one per two acres could be found. These antiplague measures are carried out on a gigantic scale. Over 10,000 persons treated the area with cyanogas; each man covered eight acres. In 1954 and 1955 planes distributed oats treated with zinc phosphide over 2,000 acres in the proportion of 1 kg of treated oats per two acres.

Despite thorough and widespread investigations no plague focus has been discovered since 1937. According to these observations the methods employed "liquidated" the susliks and eliminated the infected fleas known to attach themselves to burrowing animals such as voles and even to lizards. It is understandable that, at least in the European part of the Soviet Union, protective immunization with the avirulent plague strain Girard E.V. 76 is deemed unnecessary. They have observed that single-dose vaccination with live plague bacilli confers an inadequate protection. Two injections seven days apart and a single injection 10–12 months later is now recommended to maintain satisfactory immunity.

Brucellosis—The Soviet literature on brucellosis is extensive and was thoroughly reviewed by Zdrodovsky.[7] Little of the material reviewed is available in translation and thus is mostly unknown outside the U.S.S.R. The medical mission was told that enzootic brucellosis among sheep and goats constitutes a great health hazard to the people who take care of livestock and to the workers in meat combines. The incidence of ovine brucellosis may be judged from the following figures: on one farm 26.2 per cent of the ewes aborted, and subsequent serum and allergic tests proved that 40 per cent of the entire flock was infected.[8]

Strenuous efforts to eradicate bovine brucellosis by methods proved effective in other countries are in progress.[9] In addition to the customary agglutination test, the complement-fixation and allergic tests are used to detect the infection in animals. Supplementary to isolation or slaughter of the reactors since 1955, mass vaccination on a large scale

with BAJ strain 19 and other strains (3, 61, and 68) studied by Soviet scientists are practiced on adult cattle and calves. Observations are now being collected on the protective value of these four strains in the vaccination of sheep.[10] The Soviet shortage of animal products prohibits extensive use of the test and slaughter procedure. Moreover, epizootiologic studies influenced by the doctrine of Pavlovsky incriminate infected spermophiles and mice and have shown that particularly Ixodidae and Argasidae ticks serve as reservoirs of Brucella melitensis, creating and maintaining foci of infection.[11]

These ecologic findings and perhaps other interrelationships unique for the Soviet sheep and goat raising industry render ordinary prophylactic measures exceedingly complex, difficult, and frequently ineffective. To meet the public health problems, specific prophylaxis in the form of active immunization of all people at risk of contact with B. melitensis was approved for national use in 1951.

On the basis of detailed investigations of the immunity mechanism of laboratory animals, especially guinea pigs, Professors Zdrodovsky and P. A. Vershilova selected from the BAJ strain 19 a live weakly virulent variant identified by them as BA, or strain 68, which they have found to be of high immunogenicity and harmlessness.[7] The vacuum-dried vaccine manufactured at the Gamaleya Institute is inoculated subcutaneously in a single dose of 150 to 200 million organisms and this provokes only a slight local reaction. Their extended serologic observations on the vaccinated have shown that the immunity begins to decline between the first and second year after vaccination. Reimmunization by cutaneous scarification, similar to that used with the tularemia and vaccinia virus, restores the resistance.

During a five-year period among several thousand persons vaccinated before the spring brucellosis season and subsequently exposed on sheep or goat farms or in meat-packing plants only 24 mild illnesses were reported. Interestingly the illness developed three to nine months after vaccination, when the immunity evidently had begun to fade. The infection rate in the vaccinated was 0.5 per cent and in the unvaccinated from 5.6 to 29.7 per cent. In over 50 per cent of the vaccinated who contracted brucellosis the illness ran a mild course. On two farms on which 123 persons had been vaccinated 19 contracted brucellosis, eight required hospitalization for one month, and of this group in only one was the blood culture positive. The size of the group exposed to the same risk, but not vaccinated, is not reported; but the incidence of brucellosis was 2.3 times higher than in the vaccinated.[8] Other data are published in the monograph by Professor Zdrodovsky, and in a paper soon to be published in the Journal of Infectious Diseases.

Countries along the Mediterranean basin and in Latin America plagued by caprine brucellosis might profit from this prophylactic approach to ameliorate the ravages of these crippling infections among occupational groups when the usual methods cannot eradicate the reservoirs in endemic areas.

Other Infections—Phenol-killed polyvalent vaccines against leptospira are commonplace, since the basic reservoirs in mice and water rats cannot be eradicated.

Vector control is attempted whenever the ecologic studies warrant it. For example, field tests have proved that Ixodes persulcatus, the transmitters of the encephalitides prevalent throughout the Soviet Union, can be suppressed with "hexachlorane" (Lindane?). The ticks concentrate along the trails of the taiga and in the vicinity of human habitations. Annual and thorough treatment of these localities at the beginning of the period

of tick activity after dormancy with a variety of preparations containing "hexachlorane" is claimed to have completely destroyed the vectors.[12]

This recital of observations by the medical mission may be disappointing to many because it has failed to mention tuberculosis, influenza, scarlet fever, dysentery, and trachoma. If interest has been aroused it may be pursued if effective means can be provided to secure translations of the extensive Soviet literature on infective diseases and if analyses of this literature in English could be made available in concise critical reviews.

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Public Health Management Seminar in Minnesota

The fourth Seminar in "Business Management and Public Health" will be conducted by the University of Minnesota on its "vacation campus," Douglas Lodge, Itasca State Park, Lake Itasca, Minn., September 23–27, 1957. This management institute is sponsored by the Association of Business Management in Public Health. In developing the principles basic to organizational and structural relationships, communications, finances, human relationships, and management methodology in the broadest terms through the group discussion method, the seminar will seek also to meet the expressed needs for knowledge of procedures and technics of the registrants themselves. The faculty will include Thomas Hood, M.D., Kansas state health officer; Harald M. Graning, M.D., medical director, Public Health Service, Chicago office; George E. Williams, M.D., psychiatrist, St. Paul; and Earl O. Wright, chief, Division of Administration, Ohio State Department of Health. Application and information from the Center for Continuation Study, University of Minnesota, Minneapolis 14, Minn.