

C.H./E.P.S./136.

Geneva, March 26th, 1928.

LEAGUE OF NATIONS

HEALTH ORGANISATION

COLLECTIVE STUDY TOUR

organised by the

Health Committee of the League of Nations

IN THE BALTIC AND NORTH SEA PORTS

from September 12th to October 13th, 1926.

GENERAL REPORT

BY

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Publications of the League of Nations

III. HEALTH

1928. III. 7.

Introduction.

The second study tour for port medical officers¹ which was arranged by the Health Section of the League of Nations in virtue of a resolution adopted by the Health Committee, took place from September 12th to October 13th, 1926, and included visits to a number of the largest ports in the North Sea and the Baltic.

In order to facilitate the study of the various problems, the Health Section of the League had prepared in advance detailed questionnaires, which had been forwarded to the competent administrations and provided a useful basis for the enquiries and observations of the members on their arrival.

The ports visited were :

Riga	Hamburg	Havre
Libau	Bremen	Southampton
Danzig	Rotterdam	London
Stettin	Amsterdam	Liverpool
Copenhagen	Antwerp	

As only one day was available for each of the ports visited, with the exception of Bremen, Hamburg and the English seaports, to which two to two and a-half days each were allotted, it was obviously impossible to make an exhaustive survey of the health institutions and sanitary services in the different ports. It would be a mistake to compare these ports with one another on the strength of such imperfect knowledge, especially as the economic and local conditions in the ports visited are too different to offer any satisfactory basis of comparison. Clearly the big ports in the North Sea, at which many ships arrive directly from plague-infected ports, or others with heavy passenger traffic, call for more extensive measures of protection and supervision than some of the ports of Eastern Europe, where traffic is comparatively light and consists mainly of vessels coming from plague-free ports. The health organisation of a port can only be judged in connection with the health services of its hinterland, between which and the port relations are many and close.

Nevertheless, the impressions gained on this tour allow of the general statement that each of the ports visited had taken account of the nature of its traffic and of the dangers that traffic involved and made arrangements which must be regarded as adequate to its requirements, and it was particularly gratifying to note the effort everywhere made to ensure that the necessary measures of protection should interfere as little as possible with trade. In places where any conspicuous defects may still exist, the member of the tour in touch with the port in question will have had an excellent opportunity of comparing its conditions with those in other ports visited and of obtaining the necessary data on which to base any improvements that may appear desirable.

The following remarks, which are based upon observations made during the tour, relate to certain general questions that would appear at the present time to be of special importance to the organisation of the health services in ports.

¹ For the list of participants, see Annex on page 17.

Organisation of Port Medical and Quarantine Services.

The fact that the form of administration of the ports varies, according to whether the State, the municipality, or, as is frequently the case, autonomous and independent bodies, are mainly responsible for administration accounts for the marked differences in the organisation of the medical services in the ports we visited.

In only a few of these ports is the port medical service in the hands of medical officers appointed by the State; more frequently the municipality has taken over the medical services of the port together with its administration. In others, again, the medical service is entrusted to an independent port sanitary authority. In order to judge of the efficiency of the port medical service, it is essential to bear in mind that, even where it is not in the hands of State medical officers, the State authorities of health rightly have retained a large share of influence in the supervision and organisation of the port medical service, in view of the grave danger the introduction of infectious diseases by sea represents for the whole of the interior of the country.

According to our information there is one arrangement which has proved very practical: the union under one head of the port medical and quarantine services and the public health service of the harbour town in question. The relations between the port and the vessels calling at the port and the rest of the population of the town are so close and so numerous that the result of making a single authority responsible for health supervision can only be beneficial.

For the same reason it would seem undesirable to separate the quarantine service proper from the port medical service or—as sometimes happens—to entrust the measures against so-called pestilential diseases (plague, cholera, smallpox, etc.) and those against other infectious diseases on board ships to two different medical departments.

Quarantine Service.

What is known as the quarantine service continues to be of fundamental importance to the health of ports and of their hinterland as well as to overseas shipping in general; but under the influence of international health conventions this service abandoned a great many of its former restrictions and measures of isolation, which frequently seriously interfered with shipping. We were very glad to note that all the ports we visited endeavour to carry out examinations and other health measures with such despatch and in so practical a manner as to obtain a maximum of security against the introduction of infectious diseases combined with a minimum of disturbance to the free traffic of passengers and goods.

In its main features the quarantine service was essentially the same in all the ports, in that ships coming from infected or suspected ports or having on board cases or suspected cases of diseases mentioned in the International Health Convention are, whenever possible, medically examined and dealt with before entering the port. Here, again, interference with the personal freedom of suspects, apart from the isolation of sick cases or of persons suspected of having contracted a disease, is as far as possible avoided and is replaced by a more elastic system of medical supervision.

In connection with this, and owing to the improved arrangements for dealing with infectious cases in the general public hospitals, the so-called seamen's quarantine hospitals established in seaports some years ago and intended for members of crews suffering from or suspected of suffering from infectious diseases have, generally speaking, fallen into disuse. Several of the ports we visited, some of them with an

important volume of traffic, have converted these institutions, which had only been intermittently used, for some decades, to other purposes, viz., convalescent homes, prisons, etc., without unfavourable results. It may, however, in certain circumstances, be necessary to maintain an institution of this kind, if only for the accommodation of contact cases.

On the other hand, the regular current supervision of ships lying in port and their crews and of the port population proper has increased in importance. With a very few exceptions the health supervision of ships lying in port is regularly carried out at all the ports we visited by health officials working under the responsible direction of the port medical officer. This supervision is directed to the discovery of any infectious diseases there may be on board and—a matter of special importance—to verifying sanitary arrangements on board and the sanitary conditions of the crews' quarters. This important branch of port medical work is made much easier and more efficient by the fact that these port health officials are, as far as possible, chosen from among the seafaring population. Under modern conditions, the port medical service is not only intended to protect the hinterland of the port against the introduction of infectious diseases but has also to ensure that the health conditions of the crews, who have to spend their days on board, are adapted to the requirements of modern sanitation so far as the peculiar conditions of seafaring allow.

General Health Conditions of the Ports visited.

The port medical officer must also, of course, pay particular attention to the general health conditions of the port. The health of the port population and of ships' crews will not be properly cared for except in ports where the sanitary equipment is up to date.

The latter includes, first and foremost, a proper supply of drinking water and the efficient removal of refuse. In the history of shipping and port sanitation, countless epidemics have occurred in which infected drinking water has proved fatal to ships' crews, and, through them, to whole countries.

The ports visited did not reveal any serious defects in this respect, but it was of course impossible in so short a time to make a sufficiently thorough examination for any final judgment. In some of the ports the members of the tour were able to assure themselves on the spot of the practical and hygienic nature of the water collecting and storing arrangements. In others, the fact that the water supply for the port was the same as the central supply for the town and was under regular supervision by the health authorities was a guarantee of a proper supply and of the purity of the drinking-water provided on board. The pipes were in most cases conducted as far as the port, and arrangements provided for tapping them under hygienic conditions at convenient places along the quays. In cases where drinking-water was supplied to ships by tank vessels or by private companies, these tank ships, the water carried in them and the personnel in charge, were subject to regular supervision by the health authorities of the port.

Especially important, from the point of view of health, is a proper supply of water for river-going vessels, which carry traffic into the interior along the big rivers flowing into the ports. As is well known, the crews of these vessels are little versed in hygiene, and have long been accustomed to take their drinking and other water out of the rivers upon which they are plying. In order to avert the dangers which threaten from these insanitary habits, most large towns have introduced a system by which excellent drinking-water is supplied by the port authorities free of charge or at low prices.

As regards the dangers to health from refuse, a very important question, from the point of view of hygiene, is the pollution of the water in the more or less enclosed port basins. This question was much discussed between the members of the tour, and, at the final Conference in Geneva, a short lecture was given on the subject, followed by a more detailed discussion; mention was also made on that occasion of the increasing pollution of water by the oil from oil-burning ships; as a result the water in ports is sometimes turned into a dark iridescent liquid undeniably dangerous to health. While most of the members regarded it as part of the duties of port medical officers to do what they could to prevent pollution of this kind, others pointed out, not without reason, that the practice of drawing up water from the ship's side and using it for human consumption will never cease until the very appearance of the water is so bad as to make every single member of the crew afraid to use it. Time did not allow of a compromise being reached between these two extreme views, but the whole question would appear important enough to deserve closer scientific investigation. Dr. Magnus GEIRSVOLD, Principal Medical Officer of Health for the city of Bergen, who is specially interested in this question, proposes to pursue it further, and invites any relevant observations or suggestions on the subject which other members might care to offer.

Institutes for Bacteriological Examination.

In their examination of polluted water in ports, some of the laboratories of hygiene and bacteriology which are established in all ports to discover infectious diseases, and more particularly to examine rats as a protection against plague, have made valuable observations. They were able to establish very interesting comparisons between the results of various analyses of port waters with reference to pollution by sewage or other dirt or refuse. Such examinations, if carried out in a larger number of port laboratories, would furnish exceedingly interesting comparative figures, and, in the interests of port hygiene, are therefore very much to be encouraged.

Arrangements for First-aid, Hospitals, etc.

In most ports, the care of the sick and injured within the port area is quite admirable, and at Antwerp, Amsterdam and Rotterdam, members of the tour were shown dispensaries for harbour workers and seamen, first class in respect both of staff and of material and maintained, some of them by the municipalities, some by the big shipping lines, and some by private life-saving associations. Here we found all arrangements for first-aid rendered by doctors in regular attendance, as well as ample and suitable means of transport for the sick and injured, including admirably equipped ambulance boats, which, being always at hand, are able to effect necessary transports with all possible speed. In addition, most ports had a number of smaller life-saving stations at various points where port traffic is busiest, at which first-aid could be given by qualified assistants.

At most of the seaports visited, the large modern hospitals receive seamen and port workers, and not only provide excellent medical attendance but also dispose of the necessary premises for isolating infectious cases at any time. Of the hospitals we visited—some of them fitted up luxuriously—we were particularly interested in the Fazakerley Hospital for Infectious Diseases at Liverpool, where, for a number of years, the medical officer in charge has made the experiment of treating patients suffering from different infectious diseases in the same wards without their infecting

one another. By placing the beds a certain distance apart, and employing a highly trained nursing staff, it has been found possible to put cases of all possible infectious diseases in the same ward without causing fresh infection, except in a quite extraordinarily small number of cases.

The question whether it is necessary or desirable to provide special hospitals in harbour towns for seamen and other port workers was discussed at the final conference at Geneva by the port medical officer at Antwerp. Most of the members of the tour were of opinion that, despite the expediency from many points of view of placing seamen and the port population together in special hospitals, it is unnecessary where there are accessible first-class general hospitals in the town with up-to-date special departments for the various branches of medicine, since it is impossible for any special hospital with its more limited accommodation to guarantee the same excellence of treatment in all these branches. This opinion does not, of course, in any way reflect upon the extraordinarily valuable services performed by the various special seamen's hospitals, among others, those at Hamburg, Amsterdam and London, which at the same time conduct scientific research into certain tropical and other diseases associated with shipping, and whose scientific work is famous all the world over.

Health Supervision of Emigrant Traffic.

The fact that the ports visited were also the most important ports of emigration in Northern Europe gave an opportunity of establishing comparisons between the way in which the health supervision of emigrant traffic is carried out in the different ports. Whereas before the war far the largest movement of emigration was to the United States of America, the American restrictions on immigration since the war have resulted in larger movements of emigrants to South America and Canada.

Nevertheless, the importance and the number of health measures taken in regard to emigrants in the ports of embarkation are largely influenced by the immigration laws of the United States of America.

In most of the ports visited, the measures of supervision and sanitation are carried out by the big shipping companies engaged in the overseas emigrant traffic, under the special direction of the port medical officers.

In most cases the emigrants are brought from their countries of origin to the ports of embarkation in closed transports, and are there medically examined as soon as possible after arrival, in order to prevent infectious diseases being brought by them into the port. Almost without exception they are accommodated in special emigrants' hotels or hostels—most of them established by the shipping companies—where contact with the native population is reduced to a minimum and health supervision is more easily carried out. In nearly all cases special first-class disinfecting plant and baths are available for carrying out the necessary disinfecting measures. In accordance with the most up-to-date principles, these establishments are strictly divided into two parts for use before and after disinfection. Here, too, the luggage is disinfected so as to prevent emigrants, after their persons have been cleaned, from re-infecting themselves through the luggage which they generally carry with them in large quantities.

After the cleaning of their persons and luggage, they are again medically examined, inoculated against smallpox and then transferred to other quarters set aside for those who have been cleaned and disinfected, and here they remain under medical supervision until they embark.

The stringency of the North American immigration laws, which impose heavy fines upon companies transporting emigrants if, on examination, they are found

to be suffering from a disease or to be verminous, has led to the introduction of exceedingly careful supervision of the health of emigrants in the ports of embarkation, and these measures have at the same time proved very valuable to the native population of these ports.

Another important point is that the different lines are gradually ceasing to herd emigrants together in large spaces between-decks and are more and more accommodating them in smaller separate cabins of three, four or six berths—an improvement which makes it easier to apply health measures. In the emigrants' hostels, too, at the ports of embarkation, large dormitories are being increasingly replaced by separate rooms for two or three persons or whole families.

A welcome result of these stricter health regulations for emigrant traffic is that the introduction of infectious diseases into ports of embarkation through emigrants is now a very rare occurrence, while the transmission of isolated cases of a disease to the local population of the port is now practically unknown.

Measures of Social Hygiene on Behalf of Seamen and Port Workers.

Particular attention was paid in the ports we visited to institutions of social hygiene, which serve to maintain the health and to improve the living conditions of ships' crews both on board and on shore, as well as those of port workers. In former years the port medical officers aimed chiefly at preventing epidemic diseases from being introduced into the ports and at ensuring the healthy condition of passengers and, particularly, groups of emigrants; it is only recently that they have begun to concern themselves more closely with the conditions of health of ships' crews and those employed in ports in loading and unloading, storing goods and in handling coal and fuel.

The reasons which have led to this increased interest are mainly the following:

The health of the population of a port area cannot really be satisfactorily controlled unless account is taken of the living conditions of the various groups of persons of which that population is composed. The investigations made to combat infectious diseases are continually revealing the close relations existing between the port population proper and the crews of ships, and a seaman coming ashore spends most of his time in the neighbourhood of the port and therefore comes into particularly close contact with a class of the population the health of which, in consequence of overcrowding and straitened circumstances, is by no means perfect, and consequently constitutes a danger to the health of seamen.

In comparison with the rapid progress made in the adoption of measures of social hygiene on behalf of workers on shore and other sections of the population, health measures for the protection of ships' crews are a comparatively recent development. This is due partly to the special nature of the seaman's calling and his roving life, which make it exceedingly difficult to carry out any regular measures for his welfare. Another reason, however, is to be found in the almost patriarchal relations which existed between shipowners and their crews throughout the days of sailing right down to the war, and which made any other kind of organised welfare measures appear unnecessary. In point of fact, however, the seafaring community requires special care, for, to judge by such statistics as are available, seamen cannot be considered by any means a healthy section of the population. Their average mortality, among the middle-age groups, is extraordinarily high compared with the general death rate, and so, too, is the percentage of accidents and infectious diseases; tuberculosis and venereal diseases figure largely among the diseases of seamen. The labour conditions

of sailors have entirely changed since the days when those on board sailing vessels were all or nearly all professional seamen, who had chosen the sailor's life as a career. In recent times the large demands of the modern steamship for human labour have reduced the number of actual sailors on ships to a comparatively small figure, so that those on board are for the most part workmen recruited from a variety of callings, such as we find among industrial workers in other spheres. This has naturally involved a change in the average physical characteristics of these workmen, especially, too, as the unskilled members of the crew include a comparatively large number of men in search of adventure or who have come to grief in other spheres of life.

An important factor in arousing interest in the health of ships' crews has been their incorporation within the large workers' organisations, and the results have been seen in the movement towards international co-operation through the International Labour Office. The latter has frequently placed upon its agenda the question of improving the social, economic and health conditions of ships' crews. Other organisations, too, have aimed at improving the health conditions of seamen ; for example, the League of Red Cross Associations, at whose international conference at Oslo between June 28th and October 5th, 1926, the question of hygiene on merchant ships was specially dealt with.

While it must be admitted that certain changes and improvements have been made in the accommodation for crews on board ship, and while in some countries these alterations have been laid down by special laws, it must also be said that these improvements have not kept pace with the increasing size of vessels and the corresponding increase in the size of crews. On the big passenger liners, in particular, the accommodation of the crews, who have to spend their whole life on board, is not infrequently far inferior to that of even the humblest class of passengers, whose time on board is comparatively short. Even allowing for the necessity of the ships in question to be run at a profit and to compete with other lines, the owners ought to realise more fully that money spent on improving the living conditions of their crews is well invested, since sickness and premature disablement frequently prove much more costly.

Owing to their experience, the port medical officers are the best experts in these questions, and they should devote closer attention to the seamen's health and working conditions on board and in the ports than they have hitherto done. By exchanging experiences, they should endeavour to obtain the greatest possible degree of uniformity between the different ports, so that crews may find approximately the same conditions obtaining in all the more important ports of the world and on the ships of the different nations.

Combating of Venereal Diseases among Seamen.

Among the diseases of ships' crews which cause the port health authorities the greatest concern are venereal diseases. Owing to the special conditions of life on board ship, members of the crew, when they land after a long sea voyage, seek their recreation in the many low places of amusement within the neighbourhood of the port, where they are faced with the twin dangers of alcohol and prostitution. The results are a considerable increase of drinking and a still greater spread of venereal diseases among the seafaring population—a danger all the more serious since sanitary conditions on board very often preclude proper treatment of diseases contracted in the ports. The effects of the International Agreement on the Combating of Venereal Diseases amongst Seamen concluded at Brussels in 1924 have in this matter been particularly beneficial. This Convention has introduced systematic co-operation

between the anti-venereal dispensaries in the different ports covered by the Convention, on the basis of an international treatment-card, and it also provides for the free distribution to sailors of preventive remedies. At Hamburg and in the Dutch and Belgian ports opportunity was given to visit some of these dispensaries, which, excellently equipped and working with good results, were being well patronised by sailors. Every effort should be made to provide facilities for free and effective medical treatment in as many ports as possible. The short time available in the different ports made it impossible to study exhaustively this important question of venereal diseases among sailors, and at the final conference at Geneva members expressed a wish that a thorough investigation of this question should be made on the basis of a specially prepared questionnaire.

Side by side, however, with these pre-eminently medical precautions, an attempt must be made to develop the sense of responsibility and the ethical standard of ships' crews by giving them opportunities to visit places of amusement in seaports where they will be offered better fare, and by enabling them during the periods when they have to be on shore between their different voyages to find living accommodation and food under decent healthy conditions and at moderate prices. In nearly all the ports visited the members of the tour were shown institutions of this kind in the form of Seamen's Homes, some of them maintained by charitable organisations (the Seaman's Mission), some of them by shipping companies or the port authorities themselves; here sailors find quarters at comparatively cheap rates, while lectures and theatrical performances are provided for them. The available accommodation, however, was everywhere insufficient, and the port health authorities should take their part in helping to increase the number and develop the work of these institutions. On board ship, too, more should be done by the provision of good books and possibly the organisation of sport and other profitable entertainment to relieve the tedium of long sea voyages and raise the ethical standard of crews. In this way, it is to be hoped, many a sailor will forsake the low places of amusement which he has been in the habit of frequenting, with correspondingly good effects upon his health. Nothing need be said here regarding the value of the prophylactic measures recommended in some quarters.

Treatment for Sick Members of Ships' Crews.

The same purpose is served by improvements in the treatment of sick members of crews, which by means of international agreements should be made as uniform as possible so that the sailor may be sure of finding good, regular treatment on all ships on which he serves, no matter to what nation they belong. The fact that in many countries responsibility for the treatment of sick sailors is still in the hands of the owners alone means that, particularly on small vessels, where the master is at the same time the owner, the health requirements of the crew are not infrequently subordinated to the economic interests of the owner. It is of the utmost importance that, when a sailor is taken ill in a foreign port and has to be conveyed to a hospital on shore, hospital treatment should continue until he has completely recovered, while every provision should be made to return the patient to his ship or otherwise provide for his accommodation.

The Canadian Shipping Law of July 1st, 1920, contains provisions of particular value and importance. This law requires that every ship entering a Canadian port shall pay a special due, and in this way a fund has been created by means of which ships' captains can at any time send their sick cases for free treatment to a seamen's hospital, or, if none exists, place them under suitable medical care. It would be an

inestimable advantage if the custom adopted by most shipping lines of having every member of the crew subjected to a close medical examination before signing on could be extended to all persons employed in shipping, so as effectively to prevent the taking on board of sick persons who endanger the health of the rest of the crew (tuberculosis, venereal diseases, etc.). The introduction of an international health-card, with mention of any previous illnesses and the methods of treatment applied, would be of the greatest assistance in cases of sickness, and would be especially valuable in the case of venereal and other infectious diseases (malaria, etc.).

As only relatively few ships provide medical attendance on board, it is important that very particular attention should be paid to the instruction of the ship's officers in matters of health and that they should gain a wider and more thorough knowledge of the necessary methods of treating the various diseases. For this purpose we would recommend the introduction of an international handbook, as simple as possible, on the treatment of the commonest diseases, for the use of ships' officers, similar to the excellent book introduced into the Norwegian mercantile marine, so that ships' officers may be able at any time to keep up or refresh their knowledge of health questions.

Supplies of medicaments, too, should be made as uniform as possible so as to simplify and facilitate the treatment. At the same time, there is no denying the difficulties which the different methods of medical treatment in the different countries of the world place in the way of any uniform organisation of the medical supplies on board ships. Further, medical supplies should be regularly inspected in order to prevent the use of medicaments which have become stale or have lost their efficacy.

While fully acknowledging the endeavours of the port health authorities in the ports visited to devote attention to all these questions, we must nevertheless observe that there is still room for improvement ; one of the great advantages of this visit by port medical officers is that the doctors participating were able to convince themselves of the necessity of devoting special attention to these questions in the future and of helping to effect improvements.

It is the duty of State administrations or seamen's organisations to provide for the old age and invalidity of the members of crews in such a way that the latter, whose exacting calling wears out the human frame prematurely, may have their future to some extent secured.

Destruction of Rats in Ships, Ports and Harbour Towns.

In view of the important part played by rats in carrying plague from one port to another, the methods of destroying them employed in the ports visited were studied with particular interest ; this was all the easier because, in nearly every case, the port authorities had prepared special demonstrations of the methods they used. At the final conference at Geneva the question was once again discussed in great detail. Opportunities were found to consider the following methods employed on board ships : (1) the use of hydrogen cyanide either alone or with the addition of an irritant gas affecting the respiratory organs or conjunctiva ; (2) the use of sulphur alone or mixed with carbon, and the use of bisulphide of carbon, the latter in the form of the commercial preparation " Salforkose " ; (3) the use of carbon monoxide by the so-called " Nocht-Giemsa " method.

Generally, it may be said that, in the ports visited, hydrogen cyanide is being more and more used, although the different ports employ different methods of producing the gas. In the English ports the gas is sprayed in the form of compressed hydrocyanic acid ; at Antwerp the " Bottich " process is used, in which the gas is

produced by combining a cyanide salt with an acid, while at Havre use has recently been made of a special apparatus constructed for the purpose. A much favoured method is the use of the commercial preparation "Cyklon B", a dried preparation enclosed in gas-proof tins and consisting mainly of silica, which is impregnated with hydrogen cyanide with the addition of a warning gas acting upon the respiratory organs. The use of this preparation has the advantage of great simplicity, since it only has to be scattered in the prescribed quantity in the rooms requiring fumigation.

Of the ports visited, fumigation by hydrogen cyanide in the form of "Cyklon B" alone was employed at Danzig, Bremen, Bremerhaven and Rotterdam, while the same method was employed along with other processes at Stettin, Hamburg, Amsterdam, Liverpool and London. These methods have been found very satisfactory in every case. A disadvantage of this preparation, as indeed of all methods involving the use of hydrogen cyanide, is that the gas is absorbed in substantial quantities by liquids but more particularly by cushions, coverings and beds, and is slowly given off again after the fumigation is finished, especially on becoming warm, with the result that fatal accidents have repeatedly occurred in connection with fumigation by hydrogen cyanide. For this reason special care must be taken in making sure that the fumigated premises are free of gas when the operation has been completed. In some ports the use of gas masks is recommended or ordered.

Fumigation by sulphur dioxide alone is employed at Copenhagen and Havre and, in combination with other methods of fumigation, in the British ports and at Stettin, Hamburg, Bremen and Bremerhaven, and Antwerp. The apparatus generally used is the well-known Clayton and Marot apparatus, but at Hamburg, for example, the gas is produced in open buckets through the combustion of a mixture of charcoal and sulphur sticks; this method, which is both simple and cheap, is specially suitable for large cargo-holds. For smaller spaces, and for the purpose of destroying vermin alone, bisulphide of carbon or "Salforkose" is also burnt, but, owing to the high inflammability of this preparation, special care is required.

The "Nocht-Giemsä" method of producing carbon monoxide by means of special apparatus which can be installed on disinfecting vessels was shown to us at Hamburg. Stettin, too, has an apparatus of this kind, but the method is seldom employed, because the port health authorities find it dangerous, complicated and expensive.

In connection with the study of methods of fumigation, the attention of the members of the tour was frequently drawn to the question of the necessity of regularly fumigating overseas vessels. There was an almost unanimous opinion that fumigation at certain mechanically fixed and regularly recurring intervals, without previous examination on each occasion as to the necessity of such measures, was not advisable, because it often caused the shipping companies great inconvenience, unnecessary expense and waste of time. The cost of a compulsory measure of this kind often bears no comparison with the number of rats killed. Success is far more likely if the port medical officers decide in each case on the necessity for and extent of fumigation after satisfying themselves with the aid of an experienced staff that incoming ships are infested with rats. This is the admirable method in force at Liverpool, where a specially employed staff of rat-catchers regularly searches ships arriving from overseas for the presence of rats.

Again, when suspect rats are found, the question whether it is possible to fumigate the ship effectively while it is still in cargo was thoroughly discussed, and it was held by the majority of the members that a really effective fumigation of ships in cargo cannot be carried out by any of the available methods of fumigation. According to the experience of the port medical officer at Hamburg, the best method with ships

in cargo is to employ carbon monoxide, which is absolutely innocuous to every kind of cargo, and thus to ensure the destruction of any rats on board, the ship being cleared afterwards of its cargo with all usual precautions, as is done elsewhere. In this way the danger of plague-infected rats landing from ships is reduced to a minimum. In other ports ships in cargo are treated with hydrogen cyanide, and the results are said to be satisfactory.

Whether sulphur dioxide, which, according to one member of the tour, is regularly used, even on ships in cargo, in Egyptian and Greek ports, can be employed with safety and in sufficiently strong concentration without injury to cargo, was a question which most members thought should be determined by further experimenting, and it is very desirable that in those ports which have effective methods of using sulphuric acid, further experiments should be made with ships in cargo, since the extreme danger to operators and crews at present involved in the use of hydrogen cyanide points to the desirability of employing another means of destruction which, while fully effective against insects (rat fleas), is less dangerous in use. The advantage of carbon monoxide, owing to its inability to damage even the most sensitive cargo, is unfortunately largely counterbalanced by the fact that this gas, in the concentrations used, is without effect upon insects.

The fumigation methods employed to destroy rats are applied by the port health authorities themselves in only a comparatively small number of the ports we visited, *e.g.*, at Danzig, Rotterdam and Amsterdam. In other ports the necessary measures were usually entrusted to special contractors, who perform the work under the supervision of the port health authorities. In all cases detailed rules are issued for the carrying-out of fumigations, especially with hydrogen cyanide, which is particularly dangerous in use, so as to avoid as far as possible injury to persons and property, accidents of this kind having frequently happened in the last few years.

Members of the tour were particularly interested in some experiments in fumigation with hydrogen cyanide carried out on board a vessel by the port medical officer at Liverpool. In these experiments animals were exposed to the effects of hydrogen cyanide, some of them having been treated beforehand with a solution of glucose, and it was established beyond doubt that those animals which had been so treated had a greater power of resisting the gas than those which had not been so treated.

In connection with the destruction of rats on ships by chemical means, mention must also be made of the methods recently advocated by American authorities and known as "rat-proofing". This consists in providing the ships, while still on the stocks, with rat-proof piping and other connections between different parts of the ship, in such a manner as effectively to prevent the rats from multiplying or moving about the ship. At Liverpool an opportunity was given to inspect a steamer mainly employed in the fruit trade which had been made rat-proof in this way. Undoubtedly, the rat-proofing of parts of the ship most troubled with rats (kitchens and pantries, larders, holds for cargo specially attractive to rats) will be largely instrumental in reducing the plague of rats on board, and it would therefore be a very good thing if the shipyards would pay special attention to this question in the construction of new ships. Whether the results obtained will compensate shipping companies for the great expense of adding such arrangements to ships already built is doubtful. The American authorities, however, who have been accustomed to demand the production of fumigation certificates, have waived this requirement in the case of ships constructed with the necessary rat-proof arrangements.

Much more important, however, is the rat-proofing of buildings on the quay, particularly the quay-walls and warehouses, which experience shows to be the favourite haunts of the rats infesting the port. In recent years an enormous amount

has been done in this direction by the use of reinforced concrete instead of wood in port and dockyard buildings, and also by constructing rat-proof granaries and warehouses. The mission had an opportunity of inspecting some excellent rat-proof buildings in German, Dutch and British ports, and of satisfying themselves of their efficacy in reducing the rat plague.

So far, comparatively few ports have undertaken the systematic destruction of rats in the ports itself and in parts of the town adjoining the port, although such measures are necessary to prevent the reintroduction of rats from the shore and thus to supplement the methods of destroying rats on board. At Riga we welcomed the opportunity of seeing a film, accompanied by a lecture by Dr. СHROM, Medical Officer of Copenhagen, showing the systematic methods adopted at Copenhagen. These are governed by special legal regulations and have, it is stated, proved very successful, the substance used being a bacterial preparation known as "ratin". The necessity for legal regulations will be readily understood, since preparations containing bacterial cultures must be used with the utmost caution. At Danzig, too, systematic destruction is carried out under a special police ordinance for several consecutive days every year. All municipal grounds are strewn with a preparation of thallium known commercially as "zelio paste", and this measure is said to have substantially diminished the number of rats. At Liverpool rats are regularly destroyed in the neighbourhood of the port and in the adjoining parts of the town by rat-catchers employed by the health authorities; these rat-catchers are very experienced and always know when there is any increase in rats in any part of the town.

For measures to be successful in combating plague, it is essential that there should also be well-managed laboratories, as near as possible to the ports, for the immediate examination of suspected rats. Rats caught or found should be bacteriologically examined not only when there is reason to suspect that they are plague-infected but also—and this is even more important—in normal times. Such rats should always be regularly examined, since in this way the port health authorities may sometimes detect cases of plague among rats which would otherwise remain undiscovered. In order that there may be no waste of time for the ships concerned, it is exceedingly desirable that these laboratories should not be too far distant from the ports. It is important, too, that in suspected cases the responsible port medical officer should be informed as quickly as possible in order that any loading operations that may have been begun should be stopped forthwith. Bacteriological examinations of rats were shown to members of the tour under excellent conditions in many laboratories and were discussed in detail at the final conference, when it was pointed out that for an experienced observer the general appearance of the animal, even without microscopic examination, was sufficient to detect plague. The important part, from the point of view of the spread of plague, played by chronic disease among rats which undoubtedly exists was also discussed in some detail on this occasion. The arrangements insisted upon in many ports, such as rat-guards, etc., which are intended to prevent the rats from coming on board from the shore or vice versa, were unanimously held by the members to be of comparatively little value. Experience shows that it is almost impossible in the case of ships lying along the quay to arrange communication between the vessel and the shore in such a way as to prevent the passage of rats from the land to the ship and vice versa with any certainty, and it has been observed over and over again that measures of precaution which are not practical or misapplied encourage a feeling of false security and therefore lead to the neglect of other measures of supervision and prevention. The majority of the members were of opinion that the demand that rat-guards should be fixed to the hawsers of ships simply imposed an unnecessary burden upon shipping companies. At the very best

they can only be of use when infected ships lie a certain distance from the quayside and when there are experts to make sure that the guards are properly attached and of an effective pattern.

Conclusions.

In the course of a few days, the members of the port sanitation study tour of 1926 were given such a rapid, almost kaleidoscopic, view of a large number of admirable health organisations and sanitary arrangements in the ports of the North Sea and Baltic, and such a host of varying impressions were crowded into their days, that it will have taken them many weeks to sort these impressions and pick out the points which will be of value in their future work.

A great variety of organisations were seen, but it is certain that on the whole the health services of the ports in the North Sea and Baltic which were visited fulfil the most modern requirements, and, above all—and this is probably of far greater importance to the safety of shipping—the medical officers responsible for these health services are well versed in the principles governing the care of health and the combating of diseases under modern conditions.

Is it then too much to hope that, in the interests of speedier international passenger and goods traffic, we may see even greater improvements in the measures of supervision than those which have already been effected during the last few decades.

International administration is following but slowly in the wake of science. Health certificates are still issued in ports and in many of them are demanded of ships although their contents are mostly out of date long before the ship enters the port. Frequently the lists of infected ports made out on the basis of diplomatic reports still play an important part in spite of the fact that they are most of them already incorrect on the very day on which they are compiled.

The only reliable standard by which to judge of the health conditions of particular ports is through direct communication by the quickest means between one port medical officer and another or by the means recently introduced by the Health Section of the League of Nations in co-operation with the Office international d'hygiène publique at Paris.

Important as is the first examination of the ship on entering port, it can never alone furnish a full guarantee of its health conditions ; regular supervision, even during its stay in the port, in order to discover any new cases of sickness on board, is a much more important matter.

The better the conditions of social hygiene on board and in harbour towns, the fewer the dangers to health from international shipping. It is impossible to exaggerate the importance of a sound training of ships' doctors and captains in the care of health on board ship, and of their loyal co-operation with the port medical officers, or the necessity for constant friendly relations between medical officers of neighbouring ports or ports directly connected with one another through shipping. It would be much better were ships' captains no longer required to fill in long questionnaires for the benefit of the port medical officer on entering the port ; these questionnaires frequently fail to give any true picture of the state of affairs, as they contain no mention of what the medical officer wants to know. A much better purpose would be served if a truthful answer were given to the two questions whether any cases of sickness have occurred on board during the voyage and whether there are any cases on board when the ship enters port. If a truthful answer " yes " or " no " is given to these two questions, the experienced port medical officer will know what he has to do.

Ships which carry a ship's doctor should be required under international agreements to keep a medical log-book, as far as possible on uniform lines, from which the port medical officer can easily see whether the health of the crew and passengers at the time of leaving the foreign port or during the passage was such as to necessitate special measures of precaution or not.

The infectious diseases which can be spread by ships are more and more losing their terrors for the modern experienced port medical officer, now that he has learnt to combat them and that the chief seaports are provided with hospitals fitted up with all the devices of modern science for the isolation of infectious cases. The increasing use of reinforced concrete and stone in the construction of ports and docks, warehouses and granaries, is driving the rat—which, as a plague-carrier, is a dangerous enemy to man—away from the neighbourhood of ports; the extension of rat-proof construction to the ships themselves justifies the hope that these unpleasant rodents will be found in ever smaller numbers, even on board.

Economic life, even more than other branches of public life, is bound up with the care of public health, and especially health in ships and ports. How many of us realise that hundreds of thousands, even millions, of human lives are now saved which formerly fell victims to the inadequate sanitary supervision of shipping, not to mention the enormous economic gains due to improved quarantine arrangements and the consequent saving of time and general improvements in international traffic.

It is the particular merit of the Health Organisation of the League of Nations that it has for the first time brought these facts into the international limelight by means of practical studies made on the spot by experts, and there is no doubt that international co-operation, for which these port sanitation study tours have paved the way, will effect further progress in this direction.

The port medical officers, however, who took part in the tour of the North Sea and Baltic ports, will always remember with gratitude the opportunity given to them under such pleasant conditions of obtaining valuable practical experience in connection with their work.

Mention must finally be made of a wish expressed unanimously by the members at the conclusion of the tour, namely, that the exceedingly valuable relations which developed between them in the course of the trip should not be allowed to lapse, but that they might have a fresh opportunity at some not too distant date of exchanging further experiences with one another.

Annex.

LIST OF PARTICIPANTS IN THE COLLECTIVE STUDY TOUR IN THE
BALTIC AND NORTH SEA PORTS.

- Dr. I. APERS, Chief Inspector of Health Services in Seaports, Antwerp.
Dr. J. P. CHROM, Director of Health for the City of Copenhagen, Medical Officer to the Municipality.
Dr. Fridlof HISINGER, Port Medical Officer, Helsingfors, Finland.
Dr. E. ROBIN, Director of Municipal Health Services for the City of Nantes.
Dr. Ch. VIGNÉ, Director of the Second Maritime Health Area, Havre.
Dr. Karl SANNEMANN, Port Medical Officer, Hamburg.
Dr. W. DREYER, *Obermedizinalrat*, Port Medical Officer, Bremerhaven.
Dr. P. G. STOCK, Medical Officer, Ministry of Health, London.
Dr. Charles F. WHITE, Assistant Medical Officer of Health, Port of Liverpool.
Dr. Charles SCHANZBERG, Principal Medical Officer of the Health Administration of the City of Riga.
Dr. J. KIRVICKIS, District and Port Medical Officer at Klaipeda (Memel).
Dr. H. W. HOESEN, Port Medical Officer, Rotterdam.
Dr. Magnus GEIRSVOLD, Principal Medical Officer of Health for the City of Bergen.
Dr. WASSEN, Port Bacteriologist, Göteborg.
Dr. Maxime TRAKMANN, Head of the Health and Sanitary Administration of Transport Services, People's Commissariat of Health, Russian Soviet Republic, Moscow.

Representatives of the Health Organisation of the League of Nations.

- Dr. N. M. JOSEPHUS-JITTA, Chairman of the Netherlands Board of Health, Vice-Chairman of the Health Committee of the League of Nations, President of the tour.
Dr. C. STADE, Councillor of State, Director of the Health Administration of the Free City of Danzig, temporary member of the Health Section of the League of Nations, Secretary of the tour.
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