

these at frontiers and other places; but having regard to the uncivilised nature of the countries and peoples in question it is hardly likely that anything material will be done along many of these routes for the prevention of disease and for the maintenance of proper sanitary conditions amongst the pilgrims. The conclusions relating to land traffic and land frontiers and to the practices of disinfection which are advocated in the Convention have a somewhat closer concern and interest for us. The frontier between European and Asiatic Russia has always been a source of anxiety when cholera has travelled northward and westward from British India, and it has become still more so since the railway was laid down from Turkestan to the shores of the Caspian. Should plague move in that direction, the danger will be much the same, and though we may think some of the regulations as to land frontiers excessive in their requirements, we must remember that there are none that we are obliged to impose ourselves, and that as regards some land frontiers great public health interests are involved. But it has fortunately been decided that there are to be no more land quarantines. When exotic disease is prevailing, the worst thing that can be done is to aggregate people together under conditions which alone are available on most land frontiers. Hence it is laid down by the Convention that whilst land quarantines are abolished, their place should be taken by modern methods, such as medical inspection, disinfection of infected and suspected articles, &c. Where railways run across frontiers this will be practicable, but there are other frontiers where it would be impossible to establish the necessary organisation at the several points where land traffic and movements of people take place. Hence the Convention meets such a case by permitting any country to close its land frontier either at specified points, or altogether, when plague is prevalent in an adjoining state. This, in our opinion, is preferable to resorting to the antiquated and often cruel system of land quarantine.

The principles of disinfection laid down by the Convention are fairly modern ones. But in their application they are largely permissive, and it is quite possible that action that *may* be taken by one or another country goes beyond anything that we deem necessary or shall ever take in this country. The fear of infected linen as a vehicle of disease is great on the continent, and since every article that has been worn is looked upon as soiled and hence possibly infective, very harassing restrictions may come to be imposed on travellers. But whilst this country cannot impose its views on other ones in this matter, we have at least the satisfaction of knowing that, with very few exceptions, disinfection is purely permissive and not obligatory, and that we, though adhering to the Convention, can have none of these excessive measures forced on us to be adopted in our own country. Indeed, almost the only articles the disinfection of which on admission to a country is compulsory on the contracting Governments are articles of clothing travelling by parcel post. With us these are often the clothes of English soldiers and sailors who have died in India, and they are admittedly so dangerous when plague is about that our Post-office regulations for the moment altogether prohibit their dispatch from India. The question of merchandise may also be regarded as satisfactory. Contracting Governments are not obliged to prohibit the importation of any single article; but there are certain things that any country may prohibit if it chooses, such as rags, sacks, carpets, &c. that have been in actual use, fresh and untanned leather, and the debris of animals, such as hair, hoofs, &c. In this country we have very little belief in danger even from these articles, and we have as yet placed no prohibition upon their importation. But we cannot force this view on others, although we may deplore that Indian merchandise of the sort referred to should be refused entry into other countries, even though plague may prevail in the port of shipment or in the country whence the articles are derived. Happily it is laid down that all letters and postal correspondence are to be altogether unhindered, and thus we avoid the silly practice of fumigating sacks which hold letters and which have in advance been made impenetrable to any fumigating material by reason of their having been coated with tar. Many similar trivial practices are condemned by the Convention which exhibits a very distinct stage of advance in the direction of modern opinion based on increasing scientific knowledge.

With the results of the Convention, in brief, the British public health administration has distinct reason to be

satisfied. It, of course, contains provisions, the application of which is permissible, which we in this country have long since discarded; but it imposes on us nothing that we hold to be undesirable or unnecessary. Some countries can, under the Convention, take action which we shall regret, and which, whilst affording them no real protection, will tend to hinder new commerce; but it is clear that previous Conferences have done much to educate retrograde advisers of other States up to a standard which approaches much nearer to our own than we could have anticipated; and we may reasonably look forward to a time when the repeal or further ratification of existing Conventions comes round, at which even further advance will be made in the only direction that has an intelligibly scientific and practical basis on which to rest.

THE USE OF INCUBATORS FOR INFANTS.

THE employment of incubators as a means of saving the lives of prematurely born or of very weakly infants has not yet become general in England. Yet it is notorious and obvious that the best, almost the only, means of saving such infants is to protect them absolutely from change of temperature and from cold. For such purposes children used to be wrapped up in wadding or in a sheep skin with the wool adhering. The peasants of Silesia and Westphalia sometimes placed infants in a jar full of feathers. In England the cot or cradle was put close to the hearth, and it was necessary to watch the fire day and night so that the temperature might not vary. The use of hardware hot-water bottles inserted in the bedding of the cot is also a very general practice, and this method is adopted in many maternity and other hospitals. But such devices are not uniformly reliable; their success depends upon the intelligence and assiduous care of the attendant, and the accidental opening of doors or windows, an unexpected and sudden gale, or a fall of temperature may defeat the effect even of the most elaborate precautions. Some sixty years ago, however, Dr. Crôdé, of the University of Leipzig, sought to effect an improvement on these primitive and unreliable methods. He constructed a sort of box with double metallic sides; the space between these walls could be filled with hot water so as to maintain the desired temperature within the box. The infant, covered with blankets and resting in a basket or cradle, was placed inside. Incubators of this description are still employed at the Charity Hospital, Berlin. In 1878 Dr. Tarnier, when visiting the artificial convalesces installed by M. Odile Martin at the Jardin d'Acclimatation for the rearing of poultry, thought that he might utilise a similar apparatus in the case of prematurely born children. M. Odile Martin was therefore requested to construct a convalesce sufficiently ventilated and large enough to hold one or two infants. This was done, and the first convalesces were introduced at the Paris Maternity Hospital in 1880. They constituted a noteworthy step forward in the right direction, but the apparatus had to be warmed anew three or four times a day, and its successful employment depended on the care and watchfulness of the attendant. Good results nevertheless ensued and many lives were saved. Dr. Vallin, in a report presented to the Academy of Medicine of France (Nov. 12th, 1895), said: "We are obliged to regard as prematurely born all infants who do not weigh at birth 2 kilogrammes 500 grammes (5 lb. 9 oz.), and they are numerous, for the proportion is set down at from 15 to 30 per cent. of the births. The minute and delicate care which these weakly infants require, especially in winter, to protect them from cold is so great that till now most of them have died"; but Dr. Vallin added that "since Dr. Tarnier introduced at the Paris Maternity Hospital the ingenious contrivance called a 'convalesce,' a large number of these infants have been saved. This apparatus, however, cannot be readily employed. It is necessary that a number of experienced persons shall be always in attendance, for a delay of twenty-four to forty-eight hours might result in the death of the new-born infant." Dr. Jules Rouvier, of Beyrouth, in his interesting paper on Infant Mortality, read at the International Congress of Hygiene held at Budapest in 1894, estimates that among the newly born debilitated infants are in the proportion of 5 per cent. Of these infants born in a state of enfeeblement.

only 20 per cent., according to Uffelmann, live twelve months, and 11 per cent. two years. The greater number die during the first day or the first week of their existence. Of 1961 children born at the Paris Maternity Hospital, in 1881—that is, before the introduction of the couveuse—641 were premature births. The mortality during the first two weeks of the prematurely born amounted to 32 per cent.; that of the other infants was equal to 8.62 per cent.

In England the question of incubators is of particular interest, for though the general death-rate of infants has decreased considerably of late years, the death-rate due to premature births has, on the contrary, greatly increased. This increase has been set down by some authorities as equal to 40 per cent. The London tables of mortality show that whereas the deaths registered as due to premature birth amounted to 1930 in 1886, this figure rose to 2534 in 1896. To this we should also add that a large though unknown number of deaths attributed to various diseases are indirectly caused by premature birth. Under these circumstances any successful attempt to improve the construction of incubators and to render this life-saving apparatus available to the general public must be welcome. That this has been achieved will, we are informed, shortly be rendered evident by a remarkable exhibit at Earl's Court. A structure is now in the course of erection just opposite the Welcome Club, where infants prematurely born will be nursed and kept in new and model couveuses. The main feature of this new incubator is the fact that it requires no constant and skilled care. It works automatically; both ventilation and heat are maintained without any fluctuations whatsoever, not only for hours, but even for days. The incubator need not be touched for these purposes, and the only attendance necessary is that needed for feeding and washing the infant. The heating is produced by hot water, which circulates in copper piping placed at the bottom of the incubator under the cradle or hammock. This pipe is fed by a water boiler, which stands outside the incubator, and may be heated by an oil lamp, by gas, or by electricity. The temperature is automatically maintained at the required heat by a specially constructed thermostat. This is made in the shape of a **W** composed of two metals, the one being quick to expand and the other to contract. One side of the **W** is fastened to the wall of the incubator. The **W**, thus standing out from the wall, widens with heat and contracts with cold. The loose end of the metallic **W** is connected with a system of levers. On the outside a very light chain hangs to the lever that comes through the wall of the incubator. When the temperature inside the incubator is beginning to exceed the limit for which the apparatus has been set—and this limit can be varied according to circumstances—the **W** thermostat expands and so works on the levers that the chain is drawn upwards, and by this action the gas or the lamp is turned down and the supply of heat to the boiler is decreased. The temperature within the incubator consequently begins to go down. The thermostat then contracts, the chain falls, and the gas or lamp is turned on again to the full. Thus whatever changes may occur outside the incubator the temperature within regulates itself. So delicate is the construction of this thermostat and the levers attached that the slightest variation of temperature suffices to set it in motion. Thus the heat within the incubator never varies more than two degrees Fahrenheit. Another system consists in having a hollow centre passing through the boiler, and the burner is placed in this aperture. The opening is closed at the top by a cone-shaped lid attached to the chain. When the thermostat expands it lifts this lid, so that the heat passes through and the water begins to cool.

To ventilate the incubator there is a pipe, which is conducted through the wall or window of the house or hospital. Only air taken outside the building is supplied to the infant within the incubator. When we consider how often private houses, and even hospital wards, are inefficiently ventilated, it is not necessary to insist on the advantage of deriving the air-supply direct from the street or garden. This pipe, about four inches in diameter, delivers the outside air into a box fastened to the side of the incubator. The air is first moistened and washed by being passed through a layer of absorbent wool suspended over a saucer containing water or an antiseptic solution. A little further on there is another sheet of wool, which, however, is dry and serves to retain the soot and other particles floating in the air. From this filtering box a second pipe delivers the air into the bottom and centre of the incubator. Just above

this inlet a disc is suspended, which breaks up the current of air and diffuses it in all directions and over the surface of the hot-water coils. Thus, the air is washed, filtered, and warmed before it reaches the infant lying above in the upper part of the incubator, and is uniformly distributed so that there is no sudden current in any one direction. On the top of the incubator a chimney about three feet long forms the outlet, and so that this should not accidentally become an inlet, admitting a downward draught, a revolving screw-fan is placed within this flue, which only turns to allow the outward passage of an upward current. Thus it will be seen that, so long as the lamp or the gas burns, the temperature and the ventilation within the incubator will be automatically maintained. The incubator is made of glass and metal, and, therefore, it can be washed and disinfected with the greatest promptitude and facility. It is so portable that it can be readily carried from room to room, or placed in a cab, and taken to any house wherever required. As no skilled attendance is needed it can be used in private families as well as in hospitals. So far incubators have been available only for the rich or the poor. For the great middle class, persons who are not rich, but who are not poor enough to go to the hospital, there are as yet no incubators available. It is proposed, however, to meet this difficulty. In London and in other large centres incubator stations will be established. In response to a message or a telegram incubators will be despatched immediately wherever they are required. This will not occasion any great expense, for the incubators need not be bought nor will it be necessary to pay for skilled attendants. The incubators will be let out on hire for the number of days they may be required, and thus it may be possible to save the lives of many prematurely born or particularly delicate infants.

HISTORICAL NOTES ON MEDICINE, SURGERY, AND QUACKERY.

IV.

AT the commencement of the present century St. Anne-street was the most distinguished thoroughfare in Liverpool, and was looked upon as a rival to Rodney-street. It so continued until 1835, when the tide of fashion began to sweep southward and afterwards extend towards Aigburth. In St. Anne-street resided Thomas Stewart Traill, M.D., an eminent physician and a ripe scholar, as did his brother-in-law, Mr. Sandbach, the merchant prince, who was mayor in 1831, and whose house was the first erected in the street. Dr. Traill was professor of chemistry in the Liverpool Royal Institution and lecturer in different branches of natural philosophy. He was physician to the Liverpool Ophthalmic Infirmary. Several valuable papers by him appeared in the memoirs of the Wernerian Society, in the *Edinburgh Philosophical Journal* and in other works. On leaving Liverpool he went to Edinburgh, where he became professor of medical jurisprudence and edited an edition of the "Encyclopædia Britannica." There is a fine portrait of this gentleman in the Royal Institution, Liverpool. There is also a bust of him extant. At a public meeting, convened with the concurrence of the leading men of all parties, held in the music hall, Bold-street, on June 8th, 1825, the subject of establishing a Mechanics' Institute in Liverpool was introduced by Dr. Traill in a clear and lucid speech. Other speakers addressed the crowded and enthusiastic assembly. An influential committee was formed, Messrs. John Gladstone, M.P., and John Moss, with Dr. Traill, being appointed vice-presidents. The institution was immediately organised, and flourishes to-day as the Liverpool Institute in Mount-street. The name of Dr. Traill appears among those of the gentlemen who cordially supported Mr. Sandars, when he projected the Liverpool and Manchester Railway.

At a public meeting, held in Liverpool on Dec. 14th, 1830, for promoting the cause of Reform in Parliament, Mr. Thomas Blackburn, surgeon, opposed the ballot, observing that a "man ought to vote openly and boldly, and if the right of voting were given to the wealthy and intelligent members of

¹ Nos. I., II., and III., were published in THE LANCET of March 6th, March 27th, and April 10th, 1897, respectively.