

Continuous records of air velocity and air temperature were taken by means of the hot-wire anemometer and the thermopile respectively. Vane anemometers to determine the directions of the air currents were also used, as well as the katathermometer for direct estimations of the cooling power of the air. The following may be considered the criteria by which a heating and ventilating system should be judged. The room should feel comfortably warm and fresh, yet be without draughts, the temperature at head level should be cooler than that at the level of the feet, and the incidence of sickness and ill-health should be a minimum.

The ideal temperature appears to be about 60° F.-63° F. The cooling power should be 7.0 in winter and about 6.0 in the hot weather, the difference being due to the acclimatisation of the body to the different seasons. These cooling powers can be attained with air velocities of 30 ft. per min. in winter and 50 ft.-100 ft. per min. in summer. The room feels 'too warm' when the temperature rises 4° F. and the cooling power falls one unit, and 'too cold' under the reverse conditions.

An important index of the actual temperature conditions is the temperature gradient from the floor level to the region of the head or higher. It is greatest when the heating system is placed above the heads of the workers: in fact, such a system is roundly condemned as leading to cold feet and hot heads and their accompanying discomforts, and should only be used in conjunction with a heating system at a lower level, when it is desired to avoid down draughts from skylights. The lowest gradient was found when the heating system was placed *under* the floor, and when at floor level it was nearly as

satisfactory. The temperature used should not be too high, else the air currents induced become too rapid. It is important that these should be directed upwards, since expired air travels upwards, being lighter than room air, and hence with a down draught there is danger of the workers having to breathe each other's expired air, with the attendant risks of possible infection.

The system of ventilation which gave least draughts and yet most freshness to the air was one of natural ventilation by means of windows, with fan exhaustion in addition if necessary; the outlets for the latter should be situated 7 ft.-8 ft. above the floor. If a plenum system is installed, it should deliver the warm air near the floor from small inlets, and not from inlets situated above the heads of the workers; the latter leads to discomfort and is wasteful of energy. A plenum system delivering *cool* air above head level in conjunction with floor warming gives the most satisfactory type of heating when natural ventilation cannot be utilised.

The efficiency of any given system can be determined from the cooling power and its velocity and temperature components, together with a knowledge of the available window area and the extent to which it is utilised. The latter should be considered relative to the floor area and not to the cubic capacity of the room, since the ventilation is slightly better in a higher room than in a lower one with the same window and floor area.

Evidence is adduced in the report to show that the incidence of sickness is less in workrooms with a good ventilation and a satisfactory mean temperature. The report should, indeed, be studied by all who take part in the designing of modern factories.

International Agreements affecting Port Sanitary Work.

SIR GEORGE BUCHANAN gave a valuable address upon the above subject at the conference of Port Sanitary Authorities during the recent London congress of the Royal Sanitary Institute. He had recently attended on behalf of the British Government the fourth International Sanitary Conference at Paris, at which seventy nations were represented; and he considered that some good results had been achieved. The conference was held with the object of revising and bringing up-to-date the International Sanitary Convention, 1912, under which the various signatory governments agreed upon mutual action and common standards for dealing with the diseases liable to be carried on ships, including cholera, plague, typhus, smallpox, and yellow fever. The conference laid down some new lines of international action which are of great importance to British port sanitary authorities, on whom rests the daily burden of protecting their ports, as well as the rest of the country, from the risks from the importation of these diseases.

The deficiencies of the 1912 International Sanitary Conference have been obvious for many years. To take one example: a ship was only held to be 'infected' with plague when human cases of the disease had occurred during the voyage; but the most dangerous ship of all, with swarms of rats among which plague is prevalent, was not so classified and therefore came under no regulations.

In the new Convention an effort is made to increase the measures whereby countries may obtain all possible intelligence regarding the prevalence of certain infectious diseases. It gives further encouragement to the existing system of interchange of information regarding the incidence of infectious diseases by requiring the signatory governments to reply to

any inquiries addressed to them, from the Office Internationale d'Hygiene Publique, for information on any subject affecting the risks of transmission of infectious disease from one country to another. Thus the Office Internationale will discharge the duty of acting as a kind of clearing house for information; and it is authorised to make agreements which will avoid duplication of effort.

In reference to plague, the establishment of new definitions by which a ship with plague-infected rats becomes an 'infected' ship, and a ship with an unusual mortality among rats, a 'suspected' ship, was readily agreed to, as was also the authorisation of measures to prevent rats reaching the shore directly or through merchandise. In ports designated as sufficiently equipped to undertake effective rat destruction, systematic measures will be required to be undertaken once in six months, and a certificate that this has been done, specifying methods and results, will carry the ship on to the next half-yearly period. The inspection officer is authorised to exempt from systematic measures when circumstances permit, and to issue an exemption certificate, which is also valid for six months.

In case of other diseases the measures required by the new Convention have been made to conform to our latest knowledge and experience; and all those applicable to the ship, passengers, and crew have been made strictly reasonable, the aim being to make them more efficacious and, where possible, less burdensome. Seeing how much of the world's immunity from pestilence is due to the measures outlined above, and to the spade work of the port sanitary authorities and their officials, the public has reason to be grateful to the representatives of the seventy nations for the valuable work they have accomplished.