most importance; third, moisture, of the most difficulty, and of considerable importance; fourth, portability and simplicity, neither of which can be obtained unless at the expense of ventilation.

In addition to these, the incubator must be aseptic—that is, easily disinfected; must be handy to work with, and not exorbitant in price. To obtain all these qualities in one portable incubator is very difficult. The best model, I think, is the Lion system.

The body of the incubator is a box twenty-nine inches high, twenty-two inches deep, and twenty inches wide; it has two compartments—a lower, containing a water pan, and an upper for the infant, which lies on a cotton mattress swinging in a basket. The two compartments are connected by air flues only. There are doors in the front, through which the infant is handled, and a sliding door at the side, through which it is watched and fed. The lower front is removable for sterilising and cleaning.

The Heating System.

The heating system consists of a water pan inside the box near its floor, connected with a boiler on the right, outside the chamber. This is in all respects similar to any hot-water heating system. The premature infant requires a warm, moist atmosphere of a definite tension, and also a sure and constant amount of radiant heat. The air must be 86° to 93° Fahr., the bed must be 94° to 100° Fahr., and these must vary proportionately as the incubator is set at one or the other degrees of temperature. These figures were obtained by thermometric observations. The radiant heat is supplied from the top of the pan, and controlled by the distance between it and the bed. The air is heated by the under surface of the pan, as we shall see later. Both must be automatically regulated, which is obtained thus: In the upper right half of the chamber are three bi-convex hollow discs containing ethyl chloride; these expand and contract with heat and cold. The slight motion thus obtained is multiplied by a system of levers thirty times, and in this way the cover of the air flue of the hot-water boiler is raised and lowered. When the cover is raised the heat escapes, the water cools, and the temperature in the incubator sinks. When the incubator grows too cool, the discs contract, the cover falls, the hot air is confined, the water is heated, and then the temperature is raised. This regulator can be set at any degree from 70° to 100° Fahr.

The difficulties encountered with the heating apparatus were, first, to get a thermo-regulator that would work. This one is the result of some experiment, much study, and the investigation of the instruments in the practice of poultry-raisers. Mercury and gas regulators are not practical for infant incubation; metallic coils did not functionate regularly, or for any length of time; and electric thermostats were a complete failure. Second, the gas-pressure varied during the day. This is obviated by attaching a gas-pressure regulator to the burner; before we did this the work of preventing irregularities of the heat production and loss incident to height of flame had all to be borne by the thermo-regulator—now this is not the case. Third, changes in temperature of the room. A cold draught will cool the incubator before the regulator can supply the heat. This is obviated with this instrument by protecting it from such chilling. In a larger system which we are going to instal the incubators will be placed in a room, the temperature of which is to be even. Fourth, extreme changes of temperature outside. Of course, no one would expect any thermo-regulator to equalise the extremes of our Chicago temperature. A change of 50 deg. is not impossible here, and to anticipate these variations the hospital is supplied with the daily weather forecast, and a thermometer is placed outside the nursery window, which the nurse consults, and regulates the admission of cold air to the incubator by a damper. Even without such attention, this incubator took care of a change of 47 deg. For below zero weather we will instal a preparatory warming chamber for the air. To show how perfectly this thermo-regulator functionates, I have had hourly observations made during periods of two days. The incubator was set at 90° Fahr., and in two days did not vary more than three degrees—that is, from 88° to 91°—while the outside temperature given by the official weather bureau varied 16 deg., and the wind veered around the points of the compass.

The Ventilation.

This has given us a great deal of trouble, and those familiar with the difficulties attending the natural ventilation of houses will appreciate the obstacles met here. The changes in the room temperature, the extremes of outside temperature, the faulty construction of houses, the opening and closing of doors, the dry days, the wet, muggy days, the high and low barometric pressure, but especially the direction of the wind and its strength, have prepared for us no end of problems.

Without going into these difficulties, I will describe the system as it stands to-day, practically perfect. The air is taken from a low point outside, where there is some sunlight, and led to the incubator by a 3-in. pipe; it passes through a cotton filter at the side of the lower chamber, passes beneath the water pan, under which it is spread by a curved plate; it is heated, and therefore rises through the flues at the side of the upper chamber. It circulates downwards around the infant, is collected under the bed, drawing off the odours from the child, and ascends through the flue at the head, escaping through a chimney from the top of the apparatus. A glass cylinder placed in this flue allows one to see the ventilator,

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