dicitis for instance, which sometimes come with summer heat waves, and develop dangerously unless promptly operated upon. Complete air conditioning of operating rooms would therefore seem to be a necessity in many sections of the United States.

Satisfactory Air Conditions: Although the comfortable air conditions for the operatives are not identical with those of the patient, a compromise is as a rule not difficult; with a relative humidity of 55 to 60 per cent, a temperature of 80 F in warm weather and between 72 and 75 F in cold weather will probably prove satisfactory. Additional heat may be furnished to the patient locally or by suitable covering according to body temperature in individual cases.

Central station air conditioning plants and individual unit air conditioners proved satisfactory in operating rooms when producing between 8 and 15 air changes per hour of filtered and properly humidified air, with full provision for summer cooling and dehumidification and without recirculation during the course of anesthesia. A separate exhaust fan system is as a rule necessary in order to confine and remove the gases and odors. Double windows are desirable and often necessary to prevent condensation and frosting on the glass in cold weather and to minimize drafts. The high air flow of 8 to 15 air changes in operating rooms is desirable for three reasons: (*a*) to reduce the concentration of the anesthetic to well below the physiologic threshold in the vicinity of the operating personnel, (*b*) to remove excessive amounts of heat and sometimes moisture from sterilizing equipment if inside the operating room, from the powerful surgical lights, solar heat, and from the bodies of the operatives, and (*c*) to provide extra capacity for quickly preparing the room for emergency operations. Much can be gained by careful insulation of sterilizing equipment and by thorough exhaust ventilation of sterilizing rooms adjoining the operating rooms.

It is generally believed that in addition to operating rooms, an adjoining ward should also be conditioned to provide for the treatment of post-operative fever. Such a post-operative ward may also prove valuable in treating patients with heat stroke, fevers, summer diarrhea and other cases affected by high temperature, when the room is not used for anything else.

Sterilization of Air in Operating Rooms: Of considerable significance to operating rooms and contagious wards is the use of ultra-violet radiation for sterlizing the air.[6] Results reported[7] would seem to indicate that the post-operative temperature rise of patients during the first few days is in most instances caused more by bacterial contamination of the operative wound than by the absorption of blood and traumatized tissues. Operating room infections, which were quite frequent before the installation of special ultra-violet lamps, are said to have practically disappeared.

NURSERIES FOR PREMATURE INFANTS

One of the most important requirements in the care of premature infants is the stabilization of body temperature. This is necessary because

[6]Air-Borne Infection and Sanitary Air Control, by W. F. Wells (*Journal Industrial Hygiene*, 17:253, 1925).

[7]Sterilization of the Air in the Operating Room by Special Bactericidal Radiant Energy, by Deryl Hart (*Journal Thoracic Surgery*, 6:45, 1936).

their heat regulating system is not fully developed; the metabolism is low and the infants generally exhibit marked inability to maintain a normal body temperature by their own efforts. The resistance to infection is low and the mortality rate, very high.

Air Conditioning Requirements

The optimum air conditions for the growth and development of these infants were determined by extensive research at the Infants Hospital, Boston, Mass.,[8] using four valid criteria, namely, stability of body temperature, gain in weight, incidence of digestive syndromes, and mortality. Wide variations were found in individual requirements for temperatures from 72 to 100 F, according to the constitutional state of the infants and body weights. The optimum relative humidity was about 65 per cent, and the air movement less than 20 fpm.

A single nursery conditioned to 77 F temperature and 65 per cent relative humidity was found to satisfactorily fulfill the requirements of the majority of premature infants. Additional heat for weak or debilitated infants may be furnished in the cribs or by means of electric incubators placed inside the conditioned nursery and the temperature adjusted according to individual requirements. In this way multiplicity of chambers and of air conditioning apparatus is obviated; the infants in the heated beds derive the benefit of breathing cool humid air, and the nurses and doctors need not expose themselves to extreme conditions.

Importance of Humidity: Although external heat is an important factor in the maintenance of normal body temperature, humidity appears to be of equal or greater importance. When the premature nurseries at the Infants Hospital were kept at relative humidity between 25 and 50 per cent for two weeks or longer, the body temperature became unstable, gains in weight diminished, the incidence of gastro-intestinal disturbances increased, and the mortality rose. On the other hand, continuous exposure to air conditions with 55 to 65 per cent relative humidity gave satisfactory results over a period of years.

The initial physiologic loss of body weight (loss occurring within first four days of life) was found to vary inversely with the humidity. In the old nurseries with natural humidity it averaged 12.4 per cent of the birth weight; in the conditioned nurseries it was 8.9 per cent with 25 to 49 per cent relative humidity, and 6.0 per cent with 50 to 75 per cent relative humidity. The number of days required to regain the birth weight was correspondingly maximum in the old nursery, minimum in the conditioned nurseries under high humidity, and intermediate in the conditioned nurseries with low humidity.

Maximum gains in body weight occurred in the conditioned nurseries under high humidity (55 to 65 per cent) in infants weighing less than 5 lb. The gains were less under low humidity (25 to 50 per cent) in the same nurseries, and in the old nurseries prior to the installation of air conditioning apparatus.

The incidence and severity of digestive syndromes, with diarrhea,

[8]The Premature Infant: A Study of the Effects of Atmospheric Conditions on Growth and on Development, by K. D. Blackfan, C. P. Yaglou and K. McKenzie (*American Journal Disease of Children*, 46:1175, 1933).