of non-conditioned rooms. The degree of air contamination can be reduced by proper ventilation, but recontamination of the air by occupants of the operating room prevents reduction in the bacterial level to a point adequate for the prevention of wound infections[8]. Research is in progress on the use of filtered air flowing through a system of complete mechanical barriers which would protect the patient completely against infection by attendants and bacteria-containing air in the corridor or ward[9].

Operations may be postponed on allergic patients during asthmatic manifestations through fear of complications. The removal of air-borne allergens, therefore, is in some cases an important function of the air conditioning system in preparing patients for operation.

Central system air conditioning plants and unit air conditioners prove satisfactory in operating rooms when producing between 8 and 15 air changes per hour of filtered and properly conditioned air without recirculation during the course of anesthesia. A separate exhaust fan system is usually necessary 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: (1) to reduce the concentration of the anesthetic to well below the pharmacologic threshold in the vicinity of the operating personnel, (2) to remove the great amounts of heat and sometimes moisture, from sterilizing equipment if inside the operating room, from the powerful surgical lights, from solar heat, and from the bodies of the operatives, and (3) 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.

A very common complication presumably traceable to operations is pneumonia. The difference in conditions between the operating room and the final hospital destination of the patient, including corridors and elevators, is conducive to post-operative pneumonia. A suggested remedy is a recovery ward in which conditions closely approximate those of the operating room and in which the patients remain from one to four days. Satisfactory conditions in the recovery ward not only hasten convalescence, but dispel the fear frequently found in patients who must undergo operations during the hot seasons[10].

Sterilization of Air in Operating Room

The role of light in deterring the spread of respiratory infection is extremely important. Direct sunlight, diffuse daylight from a blue sky and even light which has passed through window glass are all bactericidal in varying degrees[11]. Hence extensive window space is desirable in operating rooms and hospital wards. The ultra-violet range of the

[8]Unexplained Infections in Clean Operative Wounds, by Deryl Hart and S. E. Upchurch (*Annals of Surgery*, 114:936, 1941).

[9]The Control of Cross-Contamination by the Use of Mechanical Barriers, by J. A. Reyniers (*Aerobiology, American Association Advanced Science Symposium*, 17:254, 1942).

[10]Report of the Committee on Air Conditioning (*The American Hospital Association*, p. 2, 1937).

[11]The Transmission of Certain Infections of Respiratory Origin, by L. Buchbinder (*Journal of the American Medical Association* 118:718, 1942).

spectrum is the most potent for the sterilization of air. Results reported[12] would 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 are being reduced subsequent to the installation of special ultra-violet lamps. In the use of ultra-violet radiation it is important to use the most efficient part of the spectrum with an intensity great enough to render the air relatively sterile and yet not injure tissue for the period of time it will be exposed[13]. The Council on Physical Therapy of the *American Medical Association* in a recent action voted acceptance of ultra-violet lamps for disinfecting purposes[14]. A subcommittee of the Council on Hospital Planning and Plant Operation of the *American Hospital Association* has recommended that the installation of ultra-violet light equipment should be considered when new contagious disease or surgical operating units are built[15].

The idea of employing bacterial mists as a method for controlling air-borne respiratory infection is not new, but until recently no one has succeeded in producing a sterile or relatively bacteria-free atmosphere by such means which could be tolerated by human beings[16]. The mists consist of droplets (liquid aerosols) 1 to 2 micra in diameter dispersed in air. Aerosol solutions of sodium hypochlorite (1 gram in 40 million cc of air), a mixture of hexylresorcinal (10 per cent), and an alkysulfate (*lorol* 0.05 per cent) in alkaline propylene glycol (1 gram of the mixture to 4 billion cc of air) have been reported to sterilize contaminated air samples. Other compounds tested have been either inactive as aerosols or too toxic to be used. Recent work indicates that propylene glycol aerosols in concentrations as low as 1 gram of glycol to 50 million cc of air produce marked and rapid bactericidal effect on atmospheric micro-organisms in droplet form. Atmospheres containing propylene glycol are invisible, odorless and non-irritating. Intensive research in the search for more potent aerosols is in progress. A recent paper[17] reports the use of triethylene glycol mists which prove to be bactericidal in a dilution of 1 gram of glycol to 100 million to 200 million cc of air. Thus far, few data are available on the practical use of germicidal mists and vapors.

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 their heat regulating systems are not fully developed; the

[12]Effect on Wound Healing of Bactericidal Ultraviolet Radiation from a Special Unit-Experimental Study, by Deryl Hart (*Archives of Surgery* 38:797, 1939).

[13]Considerations in the Use of Ultraviolet Radiation in Operating Rooms, by C. J. Kraissl, J. G. Cimiotti and F. L. Meleney (*Annals of Surgery* 111:161, 1940).

[14]Acceptance of Ultra-violet Lamps for Disinfecting Purposes, by Council on Physical Therapy (*Journal of the American Medical Association* 118:298, 1942).

[15]Ultra-violet Rays as a Sterilization Agent in Hospitals, by the Council on Hospital Planning and Plant Operation (*American Hospital Association Bulletin* No. 203, 1940).

[16]Bactericidal Action of Propylene Glycol Vapor on Micro-organisms Suspended in Air, by O. H. Robertson, Edward Biggs, Theodore T. Puck and Benjamin F. Miller (*Journal of Experimental Medicine* 75:593, 1942).

[17]The Lethal Effect of Triethylene Glycol Vapor on Air-Borne Bacteria and Influenza Virus, by O. H. Robertson, T. T. Puck, H. F. Lemon and C. G. Loosli (*Science* 97:142, 1943).