been used. When the desired body temperature has been reached by electrical induction, the atmosphere of the enclosure is kept at saturation to prevent heat loss, thus maintaining the patient's temperature at the desired point. The two underlying principles in the production of fever by the hot, humid air cabinet are: (1) the transfer of heat by conduction from the circulating hot air to the body, and (2) prevention of heat loss. The latter is more important. In an atmosphere of high humidity, the heat loss by evaporation is markedly decreased.

COLD THERAPY

Cold as an anesthetic agent was advocated by Allen several years ago.[45] Freezing of the tissue must be avoided. For certain patients, in whom amputation of an extremity is indicated, the application of a tourniquet with cooling of the affected extremity down to near freezing (5 C or 40 F) is of value. The patient, following this procedure can be prepared for surgery without the handicap of absorption of septic products and severe pain. This procedure has proven especially valuable in the neglected diabetic patient with an infected gangrenous extremity. Time for treatment of coma and hydration of the patient is gained. However, if amputation of an extremity is not indicated, the application of a tourniquet and packing in ice are dangerous procedures, since loss of the limb usually results. An extremity with inadequate blood supply can be readily cooled without the use of a tourniquet, but such an extremity is also usually eventually lost. Theoretically, cooling is said to reduce the metabolism of the tissue with suspension of the vital processes. It also reduces the blood flow to practically zero, and few extremities with inadequate blood supply remain viable or recover.

Packing in ice, or use of low temperatures, is contra-indicated in the treatment of patients with frostbite, immersion foot or trench foot. The affected extremities should be exposed to the air in a cool room and not rubbed with snow or packed in ice. The lowering of temperature by packing the body in ice for treatment of cancer has not proven successful.

The methods used for refrigeration, depending upon available facilities, are as follows:[45]

(1) Cracked or shaved ice which is simple and has the advantage of not freezing tissues. However, it is cumbersome and sloppy to handle and is unsuited to prolonged treatments.

(2) Use of ice in a pail for immersion of local parts.

(3) Special boxes for holding ice with padded or curtained openings for the limb.

(4) Bare ice bags and cloth bags for iced wet dressings for prolonged treatments and convenience.

(5) A double chambered cabinet using dry ice has been constructed.

(6) Electrical refrigerating apparatus, consisting of a compact noiseless unit that pumps fluid to various types of applications, is available. The applicators may be in the form of blankets containing rubber tubes suitable for covering the entire body, or all or part of a limb. Special applicators are available for insertion into various body cavities, and for inducing dental anesthesia.

(7) An air chamber at regulated temperature for treatments of frostbite and immersion foot, and amputation stumps.

The electrical apparatus is costly, but has the advantages of thermostatic regulation, light weight, freedom of movement, and permits prolonged

treatments with heat, as well as cold over the range of temperatures therapeutically desirable.

ALLERGIC DISORDERS

Hay fever, asthma, eczema and contact dermatitis are classified as allergic disorders. The allergic individual responds to contact with a variety of substances, which are innocuous to a non-allergic person, with severe manifestations of hypersensitivity.

These substances are known as allergens and consist of airborne irritants such as dusts, molds, feathers, pollens, animal dander and others; of food protein such as milk, wheat, eggs, etc., or of simple chemicals brought in contact with the skin. They may enter the body by various routes of which inhalation is the most common type. Ingestion of offending food substances is not infrequent.

The offending substance reacts with the sensitized cells of the mucous membranes or skin. During this reaction, histamine or a histamine-like substance is released and causes (a) increased capillary permeability, (b) secretion of mucus and (c) muscular contraction. In the eyes and nose this produces itching, redness and lacrimation or rhinorrhea, in short, the symptoms of hay fever. In the lungs it causes, in addition to the secretory response, a contraction of the smooth muscles of the bronchi resulting in bronchial asthma.

It is commonly known that non-specific environmental factors such as dust, irritating gases, change of temperature and humidity may precipitate asthmatic attacks in allergic subjects, even in the absence of exposure to specific allergens. It is assumed that the presence of frequent allergic bronchial constriction renders the smooth muscles of the bronchi so sensitive to various non-specific stimuli that the threshold of their response to such irritation is considerably lower than that of a non-allergic individual.

Air Conditioning Apparatus

Of all the measures to relieve a specifically sensitive individual, elimination of exposure to the responsible allergen is the most efficient, though not always a practical, form of treatment. In recent years considerable effort has been made to accomplish such elimination by removal of respiratory allergens from enclosures by filtration or other air conditioning processes.

Paper or cloth filters, mounted in inexpensive window or floor units, prove quite satisfactory in many cases, but since dust and smoke frequently cause asthmatic attacks, it is desirable that an air filter, to be of full value in the treatment of asthma, should remove all possible dusts and pollens regardless of size or amount. Electrostatic air cleaners are more efficient than most commonly used types for capturing very fine dust.

Although the chief remedial factor in the treatment by conditioned air is the filtration of pollen, a certain amount of cooling and dehumidification appears to be desirable. A comfortable temperature between 70 and 75 F, and a relative humidity well below 50 percent proved satisfactory.[46] Direct drafts, overcooling or overheating are apt to initiate or aggravate the symptoms.

Limitations of Air Conditioning Methods

The results obtained with air filtration, or other air conditioning processes, in the control of allergic conditions, are fairly comparable to those ob-