temperature as the air. For instance, an air condition has an effective temperature of 65 deg when it induces a sensation of warmth like that experienced in a saturated atmosphere of 65 F in still air.

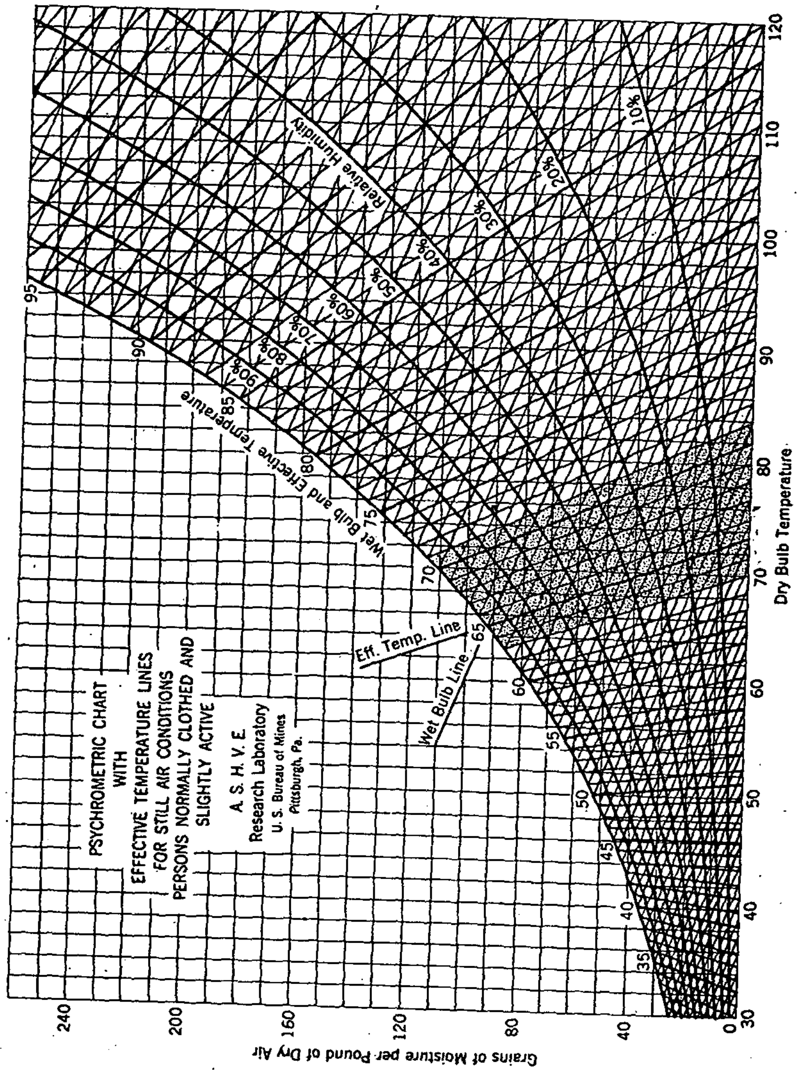

FIG. 2. PSYCHROMETRIC CHART WITH EFFECTIVE TEMPERATURE LINES FOR STILL AIR (SHADED AREA INDICATES THE COMFORT ZONE)

A series of tests has been carried out in the psychometric rooms of the A.S.H.V.E. Research Laboratory, Pittsburgh, in order to determine all the equivalent conditions met with in general air conditioning work. Reports of these studies for both still and moving air are given in A.S.H.-

V.E. TRANSACTIONS, Vols. 27 to 36, inclusive. Fig. 1 shows the results in a single chart (the so-called thermo-metric chart) which applies to persons at rest and normally clothed. The equivalent conditions or effective temperature lines are shown by the short cross-lines.

The difference between the effective temperature for still air and for moving air, of any velocity, represents the cooling resulting from that air velocity.

Example in Use of Chart (Fig. 1)

Example 1. Given dry-bulb and wet-bulb temperatures of 76 F and 62 F, respectively, and an air velocity of 100 fpm, determine: (1) effective temperature of the condition; (2) effective temperature with still air; (3) cooling produced by the movement of the air; (4) velocity necessary to reduce the condition to 66 deg effective temperature.

Solution (1). Draw line *AB* through given dry- and wet-bulb temperatures. Its intersection with the 100-ft velocity curve gives 69 deg for the effective temperature of the condition. (2) Follow line *AB* to the right to its intersection with the 0 velocity line, and read 70.4 deg for the effective temperature with still air. (3) The cooling produced by the movement of the air is 70.4 − 69 = 1.4 deg effective temperature. (4) Follow line *AB* to the left until it crosses the 66 deg effective temperature line. Interpolate velocity value of 340 fpm, to which the movement of the air must be increased for maximum comfort.

OPTIMUM AIR CONDITIONS FOR COMFORT AND HEALTH

No single comfort standard can be laid down which would meet every need. There is an inherent individual variation in the sensation of warmth or comfort felt by persons when exposed to an identical atmospheric condition. The state of health, age, sex, clothing, activity, and the degree of acquired adaptation seem to be the important factors affecting the comfort standards.

Since the prolonged effects of temperature, humidity and air movement on health are not known to the same extent as their effects on comfort, the optimum conditions for health may not be identical with those for comfort. On general physiologic grounds, however, the two do not differ greatly since this is in accordance with the efficient operation of the heat regulating mechanism of the body. This belief is strengthened by results of studies on premature infants over a four-year period[9]. By adjusting the temperature and humidity so as to stabilize the body temperature of these infants, the incidence of diarrhœa and mortality was automatically decreased, gains in body weight increased and infections were reduced to a minimum.

Comfort Line and Comfort Zone

That range of effective temperatures over which the majority of people (50 per cent or more) feel comfortable, is called the *comfort zone* and is shown in Fig. 2. That particular effective temperature at which a maximum number of people feel comfortable is called the *comfort line.*

The *winter comfort zone* as determined at the A.S.H.V.E. Laboratory ranges from 63 deg to 71 deg ET. While at rest, 97 per cent of the experimental subjects were found to be comfortable at 66 deg ET and this

[9] *Application of Air Conditioning to Premature Nurseries in Hospitals*, by C. P. Yaglou, Philip Drinker and K. D. Blackfan (A.S.H.V.E. TRANSACTIONS, Vol 36, 1930).