

suggested by the University of Illinois. The principle underlying the eupatheoscope involves the measurement of the heat loss from a sizable body by radiation and convection, when the surface is maintained at some constant temperature. Through the use of this instrument and its calibration curve, non-uniform environments may be referred to uniform

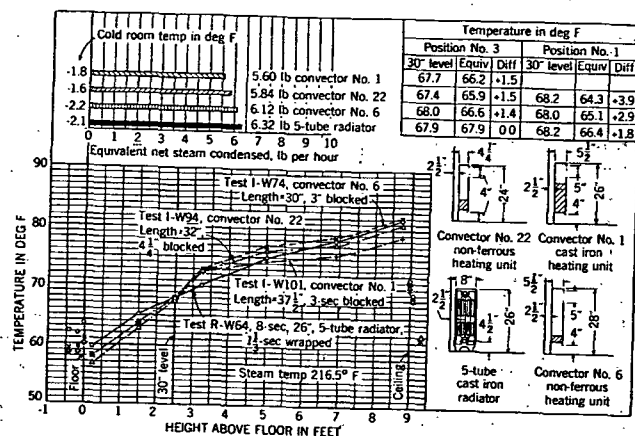


FIG. 2. TEMPERATURE GRADIENTS AND EQUIVALENT TEMPERATURES FOR RADIATOR AND CONVECTORS WITH COMMON 30 IN. LEVEL TEMPERATURE

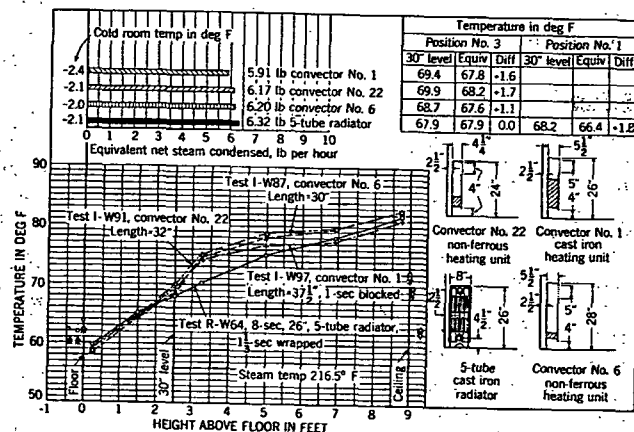


FIG. 3. TEMPERATURE GRADIENTS AND EQUIVALENT TEMPERATURES FOR RADIATOR AND CONVECTORS WITH COMMON EQUIVALENT TEMPERATURE

environments in which the air and all surrounding surfaces are at the same temperature. The temperatures of the uniform environments are referred to as equivalent temperatures.

Data given in Fig. 2 shows that while the air temperature at the 30 in. level is the same for the three convectors and the one large-tube cast-iron

radiator, in position No. 3 in the test room, the equivalent temperature is 1.5 F lower than the air temperature in the case of the three convectors, and the same as the air temperature in the case of the radiator. The difference between the minimum and the maximum amount of heat required to maintain the common air temperature at the 30 in. level is of the order of 13 per cent.

In Fig. 3 are shown the results of tests made with the same three convectors and the one large-tube cast-iron radiator, so adjusted in size that each gave approximately the same equivalent temperature in the No. 3 position in the test room. The difference between the minimum and the maximum amount of heat required to maintain the common equivalent temperature is of the order of 7 per cent.

The Kata thermometer<sup>11</sup>, the thermo-integrator<sup>12,13</sup>, and the globe<sup>14</sup>

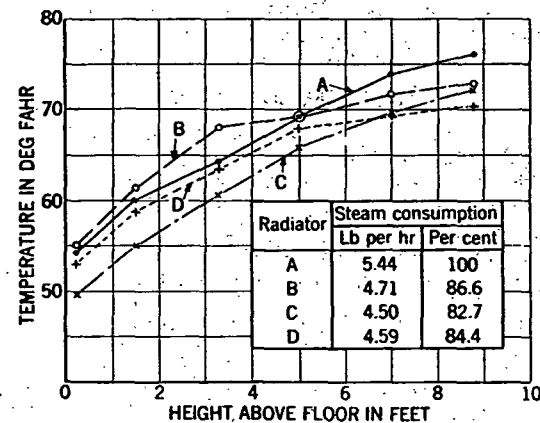


FIG. 4. STEAM CONSUMPTION OF EXPOSED AND CONCEALED RADIATORS

thermometer are other instruments which have been used to measure the influence of air temperature, air movement and radiation in an environment.

The following statements applying to the use of radiators are based on experience and test results:

1. The heating effect of a radiator cannot be judged solely by the amount of steam condensed within the radiator.
2. Smaller floor-to-ceiling temperature differentials can be maintained with long, low, thin, direct radiators, than is possible with high, direct radiators.
3. The larger portion of the floor-to-ceiling temperature differential in a room of average ceiling height heated with direct radiators occurs between the floor and the breathing level.

<sup>11</sup>The Kata Thermometer Its Value and Defects, by W. J. McConnell and C. P. Vagloglou. (Reprint No. 953 from U. S. Public Health Service Report, pp. 2293-2337, September 5, 1924).

<sup>12</sup>The Thermo-Integrator—A New Instrument for the Observation of Thermal Interchanges, by C.-E. A. Winslow and Leonard Greenburg (A.S.H.V.E. TRANSACTIONS, Vol. 41, 1935, p. 149).

<sup>13</sup>The Calibration of the Thermo-Integrator, by C.-E. A. Winslow, A. P. Gagge, Leonard Greenburg, I. M. Moriyama and E. J. Rodee. (The American Journal of Hygiene, Vol. 22, No. 1, July, 1935, pp. 137-156).

<sup>14</sup>The Globe Thermometer in Studies of Heating and Ventilation, by T. Bedford and C. G. Warner. (The Journal of Hygiene, Vol. 34, No. 4).