

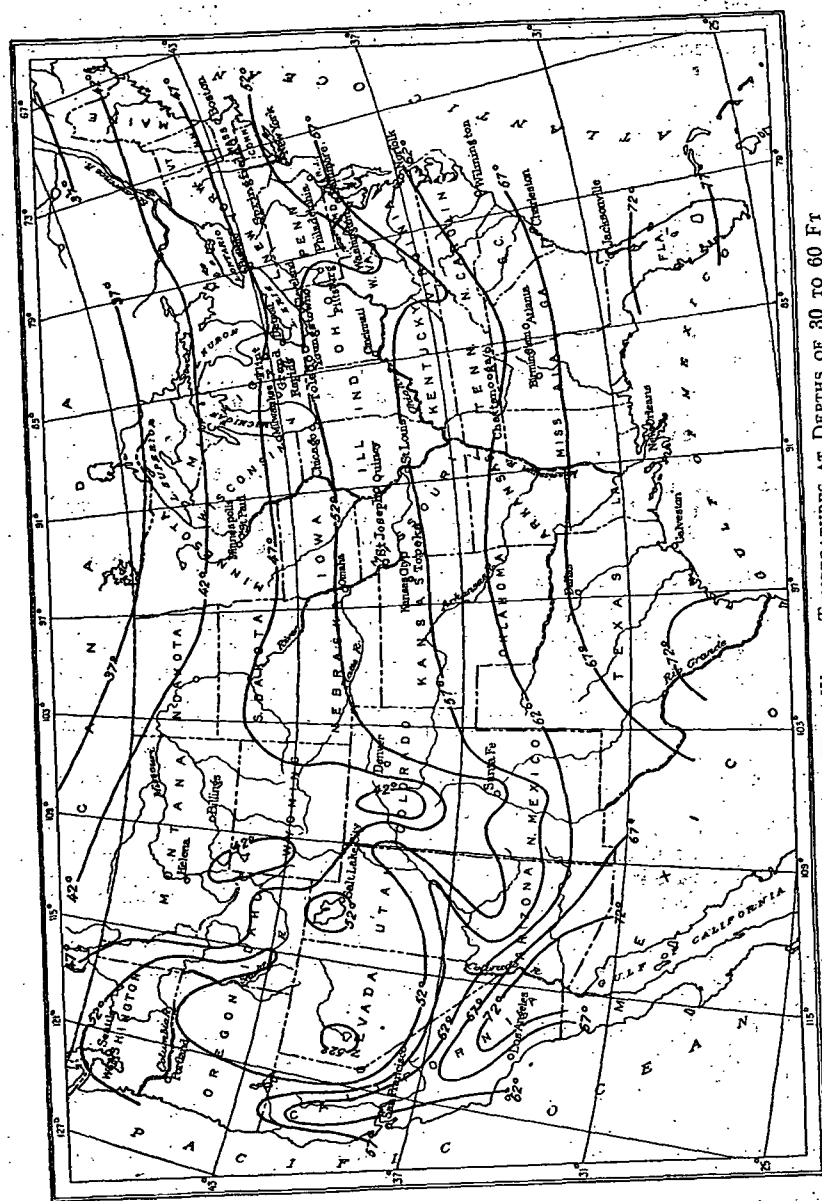


FIG. 4. APPROXIMATE WELL WATER TEMPERATURES AT DEPTHS OF 30 TO 60 FT

AIR DEHUMIDIFICATION WITH WASHERS

Moisture removal from an air-vapor mixture can be accomplished by use of an air washer so long as the temperature of the spray medium is less than the dew-point of the air passing through the unit. The final dry-bulb temperature and the percentage of the saturation of the air leaving a dehumidifier washer are dependent upon: the air velocity, the length of air travel through the sprays, the dry- and wet-bulb temperatures of the entering air, the spray temperature, the number of spray banks and nozzles, the quantity of spray medium handled, and the effectiveness of the nozzles in breaking the spray into a fine mist.

Both sensible and latent heat are removed in the process of dehumidification by cooling. Abstraction of sensible heat occurs during the entire time that the air is in contact with the spray medium. Latent heat removal takes place as condensation occurs. Therefore, the lower the spray temperature the greater the amount of moisture removal per pound of dry air all other conditions remaining the same. The spray temperature should be controlled to 1 or 2 F below the desired leaving dew-point temperature of the air. Washers with two or more banks of sprays are usually selected for comfort air conditioning installations. Such washers will cool the air to within 1 or 2 F of the spray temperature.

Where a limited supply of cold water is available multiple stage washers may be used to an advantage. The cool water is pumped through the multiple spray systems in series. By this arrangement the entering air is cooled first by the warmer water and finally by the cooler water which gives the maximum amount of cooling with the minimum amount of water. The approximate temperatures of water from non-thermal wells at depths of 30 to 60 ft are given in Fig. 4¹. Frequently the temperature of the city water main supply is low enough during the summer to permit an appreciable cooling effect. Table 1 lists the maximum city water main temperatures for various localities in this country and Canada.

Air washers using refrigerated spray media generally have their own recirculating pumps. These pumps deliver to the washer sprays a mixture of water from the washer sump, which has not been re-cooled, and refrigerated water. The quantities of each of the portions of the spray medium are controlled by a three-way or mixing valve actuated by a dew-point thermostat located in the washer air outlet.

An illustration of a cooling and dehumidifying calculation is given in Example 3 of Chapter 1.

ATMOSPHERIC WATER COOLING EQUIPMENT

In the operation of a refrigerating plant or a condensing turbine, one of the main problems is the removal and dissipation of heat from the compressed refrigerant or the discharged steam. This is accomplished ordinarily by first transferring the heat of the gas to water in a heat exchanger, from which water it may then be dissipated in a number of ways. If the plant is situated on the banks of a river or lake, an intake

¹Temperature of Water Available for Industrial Use in the United States, by W. D. Collins (U. S. Geological Survey, Water Supply Paper No. 520 F).