creases due to the expansion of the air in transit until it becomes 1.4 oz. and the multiblade fan falls off in its delivery, or else if it is installed for that pressure, it over-delivers a large amount at the lower temperatures.

Of course, in practice the fluctuation in temperature is not so extreme as I have stated, but when a compound contains light oils like benzoles and at the same time anthracene or creosote oil, it is a case of fractional distillation at several temperatures from 180 to 600 deg. fahr., and the most dangerous is the 600 deg. point at which there should be the maximum air delivery. To overcome this by multiple speed control of the fan is not advisable, as it introduces another element for the operator to look after.

Regarding the choice of fuels for this work, we have used wood, all kinds of coal, coke, producer, city and natural gas and distillate, kerosene, fuel oil and crude oil. Any gas or oil is easily subject to thermostatic control. Contrary to general belief, the easiest oil fuel to handle and control and the easiest on the heater and brickwork, as well as the cheapest, is the heaviest Tampico crude oil of 11 Beaume. When properly installed, and heated to 160 deg. before atomizing and when operated under thermostatic control, it gives a minimum of trouble.

In one plant where we installed such a system, and where the consumption of oil is something over 5000 gal. per day, they have replaced only 50 heater tubes in three years, though the total number of tubes in the heaters amounts to 6000.

It has been stated that in a water tube boiler with horizontal passes working under full load, the lower row of tubes sometimes carries 40 per cent of the total load. It might seem that in an air heater the same proportion or thereabouts would hold. This is not the case. When the gases of combustion are in sufficient quantity to fill the space between the tubes, or in other words, when the heater is working up to capacity, the proportion of the total load carried by the lower row of tubes is from 20 to 24 per cent as a maximum, there being eight rows of tubes in height above the fire. This is with the maximum combustion gas temperature of 2400 deg. fahr.

The transmission rate through the cast iron tubes from the hot gases to the air passing through the tubes, varies as the cube root of the velocity square of the air, and never exceeds 3 B.t.u.'s for velocities under 3000 ft. per min. So long as the hot gases do not exceed 2400 deg. fahr., very little tube replacement is necessary.

THE TEMPERATURE OF EVAPORATION

ITS PRACTICAL APLLICATION TO AIR CONDITIONING AND TO THE DRYING AND CONDITIONING OF MATERIALS

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THE customary method of determining the moisture content of the air by means of the psychrometer is familiar to every heating and ventilating engineer. In this method simultaneous readings are taken of two thermometers, one of the usual type known as the dry bulb thermometer, the other known as the wet bulb, having the bulb covered with a film of water usually through a covering of wet fabric. The temperature indicated by the wet bulb thermometer is usually known as the wet bulb temperature, but the writer has chosen to call it the temperature of evaporation, for reasons which will be developed.

The significance of the wet bulb temperature and the physical laws governing it are not commonly understood. It is generally assumed that the wet bulb depression is due to cooling by evaporation and is determined by the rate of evaporation. It is true that it is caused by evaporation, but it is not at all determined by the rate of evaporation. For example, the rate of evaporation of a wet surface is three and one-half times as great at 4000 air velocity as it is at 1000 air velocity over the same surface and under like moisture and temperature conditions, yet the wet bulb depression is for all practical purposes precisely the same in both cases. It is very evident, therefore, that the wet bulb depression is not dependent upon the rate of evaporation, as is commonly believed, but upon other factors. The lower the moisture content of the air the greater will be the wet bulb depression, which goes to show that the wet bulb temperature has a very definite physical relation to the temperature and the moisture content of the air. It is also influenced by the