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THE DESIGN OF CENTRAL HEATING SYSTEMS

PART I.

STATIONS TO SERVE BUSINESS AND RESIDENTIAL SECTIONS HAVE MANY ADVANTAGES. ECONOMICAL AND AESTHETICAL FEATURES OF CENTRAL STEAM OR HOT WATER PLANTS.

By A. G. CHRISTIE, M.E.,
Assistant Professor of Steam Engineering, University of Wisconsin.

A LEADING consideration in discussing heating problems is the duration of the season in which heat is required and the degree of cold experienced during such periods. Experience with several heating systems in the State of Wisconsin has shown that the average season during which heat must be maintained on the distribution service extends from October 1 to June 1, a period of eight months.

Table I. shows the normal and mean monthly temperatures for Madison, Wis., over a period of years.

Table I.—Normal and Mean Monthly Temperatures at Madison, Wis.

Month	Normal Temp.	1906-07	1907-08	1908-09	1909-10	1910-11	1911-12
October	48.8	50	47	51	47	54	48
November	34.2	36	36	38	43	30	29
December	22.7	25	27	23	15	21	29
January	16.5	17	22	20	17	19	1
February	19.6	21	21	24	16	26	14.6
March	30.1	38	35	30	45	36	23
April	44.5	38	46	40	49	44	47
May	58.	49	57	55	53	63	58
Average	34.3	34.2	36.4	35	35.6	36.6	31.2

It can be seen that the year 1906-07 might be taken as approximately a normal season as far as heating demands are concerned.

Residence and Other Isolated Heating Systems.—In order to maintain comfortable living conditions in residences, offices, factories, stores, etc., during these cold months, it is obviously necessary to provide some means of artificially heating such rooms or shops. Usually this has been done in the past by providing individual heating apparatus for each building, which generally consisted of either a hot air furnace, a hot water heater, or a steam boiler, each with its accompanying heat distributing apparatus. Anthracite coal has been principally used, until recently, as fuel for burning in the furnaces of such heaters, largely on account of its cleanliness, its small ash content and its freedom from smoke. But the price of anthracite coal suitable for domestic purposes has now reached $9.50 per ton at Madison, Wis., and similarly high prices prevail in other cities and towns throughout the state. On account of this high price many householders and others are commencing to burn bituminous coal in their furnaces. Such coal can be successfully burned without smoke on only a few specially designed grates. It is therefore to be expected that as the price of anthracite is increased, the smoke nuisance in cities and towns will be aggravated by this increasing use of bituminous coal in domestic heating furnaces.

In a report on the work of the Smoke Investigation Committee at Pittsburg, Pa., it was pointed out that smoke not only results in losses to the coal consumer from the escape of unburned volatile matter, but also to the community as a whole through increased house cleaning bills, increased laundry bills, and damage to stocks of goods in stores and warehouses. Smoke limits plant growth, augments the persistency of fogs, decreases daylight and increases the prevalence of lung, throat and nose diseases among citizens of smoke-producing districts. In small cities these evils, though present, are not apparent to so marked a degree as in the large cities. Nevertheless, there are substantial reasons, as indicated above, for an active campaign for smoke abatement in any community, and such movements are now in vogue in all parts of the country.

In many cities steps have already been taken to minimize the smoke nuisance. Ordinances prohibiting chimneys from smoking more than a given number of minutes per hour have been passed, and smoke inspectors have been appointed to enforce these ordinances. Their attention has been principally directed towards the chimneys of large users of coal and to the locomotives on the railroads. Up to the present time little or no attention has been given to the chimneys of private residences. A short time ago the writer spent an early morning on a mountain top overlooking a large American residential city. The atmosphere was particularly clear that morning at daybreak and the homes of the city could be distinguished without difficulty by the naked eye. Just about sunrise coal fires were started in the furnaces of these houses and in an hour the whole city was obscured by a dense smoke cloud. The citizens of this city point with pride to their fine streets, beautiful homes and clean atmosphere, and are justified in doing so, while at the same time a long distance view of their locality showed that they made much smoke that they were not aware of.