Overheating is the paramount evil. It is the thing to be carefully guarded against in the attempt to maintain comfort and good hygiene. It is not feasible to cool the naturally overheated air in summer, or to dry it when excessively humid. Fan motors and open windows are the available means by which the difficulties arising in hot weather may be most readily overcome. Carry away the body heat as rapidly as possible by a strong current of air.

Though the avoidance of overheating in winter would seem to be an easy thing, its accurate control to meet the rapidly changing conditions under which cars may be operated is a matter of great difficulty. Experience has shown that it is necessary to have in sleeping cars at least twice as much radiating surface as is demanded in common practice for heating the same space in houses; this in order to warm the large volume of air received and discharged so that it will maintain comfort to inactive passengers. To decrease this surface would be to fail to maintain a sufficiently high temperature on occasion.

A system is needed capable of being quickly and effectively controlled to meet rapidly changing conditions. Such a system is now being experimented with in which there are multiple units of radiating surface, each with a separate control. The results so far indicate that from this a more uniformly comfortable condition can be maintained.

DESIGNING A CONCRETE CONSTRUCTION PLANT.

Sanford E. Thompson, consulting engineer, and an associate of Frederick W. Taylor in the application of scientific management to construction plants, says of the designing of a concrete plant:—

"On all work of such magnitude as to make the use of a concrete machinery mixing and handling plant expedient, it is of great importance in the matter of speed and economy to have the entire plant wall designed and planned out to the best advantage. And this design must of necessity vary according to the nature of the work; the way in which raw materials can be brought to the plant; the natural features of the ground where the plant is to be located; the cost of materials delivered on the job for constructing the plant; the time in which the work must be completed; the amount of money there is in the job; and any special conditions that may exist in connection with the work. Even where the general features of the plant are practically the same for two different jobs, the details are usually more or less at variance. Therefore, it means careful and thorough study and efficient planning to effectively meet the conditions, so as to prevent waste of money and to decrease cost.

"The design of the plant for handling the raw materials for concrete and for conveying the concrete to place usually has more to do with economy in mixing than the particular type of mixing machine. As there are plenty of good mixers, engines and other machinery on the market, the particular make used, is, in a measure, a matter of personal choice, or is determined by what can be economically had at any given location, either new or bought from some previous job.

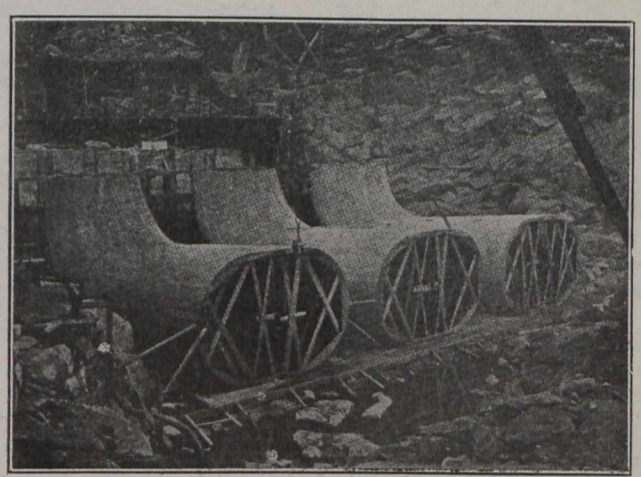
"The proposed plant should be drawn or sketched on paper, and the cost and expense of installation, as well as of operation, estimated as accurately as possible so as to determine whether the volume of concrete to be laid is sufficient to warrant the construction and operating expense. The authors have seen expensive machinery, which could be transported readily to another job, installed on a section of work where hand-mixing would have been actually more economical because of the small total volume of concrete and its distribution over a large area.

"Usually the important points to plan for are what shall be used for handling the machinery and the concrete; whether cableways; belt conveyors; elevators of various kinds; cars hauled by dinkies; by horses or by hand on level tracks; cars hauled by cable on inclines, or derricks; whether trestles shall be built and to what extent; whether the mixers can be so located that raw material can be dumped direct to bins from standard gage cars; whether the mixing plant shall be mounted complete on trucks or cars; or whether some special combination of a part or all these shall be used. The minimum amount of concrete that will make it advantageous to install a machinery mixing and handling plant is variable, depending on the nature of the work and local conditions to such an extent that it must be carefully figured out for each. On some jobs 500 cubic yards would be the minimum, while on others it might possibly be as high as 1,500."

CONCRETE IN A NEW HYDRO-ELECTRIC STATION.

One of the most recently completed hydro-electric power stations is that for supplying current to the Otis Company's Palmer Mills near Three Rivers, Mass. This development is located on the Chicopee River about 1,000 ft. below the mills, and Lockwood, Greene & Company, of Boston, were the consulting engineers. With the exception of a superstructure of brick, concrete was used throughout and it almost seems as if this was becoming standard practice.

The dam, which is of concrete masonry, stretches diagonally across the river and one end sets on a ledge on the north shore of the river, where the anchorage for the concrete is suitable, while at the other end is located the power house which is at right angles to the flow of the river.



Wherever practicable, the dam is ballasted with rubble and the face, crest and back have a uniform granolithic surface finish.

The wing walls, the abutments and the power house foundations and floors are also of concrete and of special interest in this connection are the forms used for the draft tubes.

These completed draft tubes are eliptical in shape with dimensions of 13 x 19, and the forms used were made up entirely of wood. The tubes are formed in the concrete foundations. They were designed to discharge the water from the wheels horizontally downstream and at a very low velocity. Under average conditions the discharge water emerges below the surface of the downstream storage pond at less than 2½ ft. per second.