the heat capacity of a cubic foot of concrete above that of brick. The difference is not large, however,

It seems clear that for a time after the beginning of exposure to fire, the concrete and its reinforcement will expand at much the same rate, but that the further expansion of the surface will not proceed at so rapid a rate. This will tend to reduce the stresses which the expansion of the heated surface would otherwise set up in the cooler interior. It is perhaps because of the failure of the concrete to return to its original dimensions that the small amount of surface cracking found after a fire is due.

The experiments made with coal and cinder mixtures indicate the necessity of added care in the selection of cinders for this purpose.

Table 4 of thermal conductivities gives data as to the rate at which heat will travel through concrete. It is interesting to note the great difference between the tamped and the untamped concretes made from stone. The one was as porous as possible, and the other as dense. One transmits nearly twice as much heat as the other. The cinder concrete, as is commonly believed, is much better as a heat insulator than the stone concrete, being nearly three times as effective as the denser stone concrete in retarding the flow of heat. It may be interesting to call attention to the heat insulation afforded by other materials. The best of the commercial articles commonly used for this purpose is compressed cork, which is nearly 25 times as effective as stone concrete. Steel on the other hand, transmits heat from 75 to 100 times as fast as the densest of the stone concrete.

Table 5—Thermal Conductivities..

Material	B.t.u. per 24 Hours per 1 Deg. Fahr. Sq. Ft. per 1 In. Thick.
Agglomerated Cork	6.4 to 9.0
Linings or Quilts of Hair and Flax	10.0 to 18.0
Pine	13.0
Oak	26.0
Spruce	14.0 to 18.0
Magnesia	10.0
Asbestos Sponge	8.0

STEEL BRIDGE PROTECTED WITH CEMENT.

The Department of Public Works in Pittsburg has recently made use of an ingenious method to save from deterioration a footbridge on Pine Street that passes over the railroad tracks. This steel frame was becoming affected by the gases from the engines that passed beneath it. In order to save the bridge from ruin the board enclosed it in concrete, which was so attractively and effectively set in place that the bridge is now stronger and far more artistic than ever, and at the same time is protected from any further attacks by the deleterious fumes. The entire structure, including the stairways, the supports, the floor and railing, were covered with a layer of cement, and the viaduct is now a reinforced concrete structure, although such a thing was not contemplated at the time of its erection. The idea is so practical that it may be worth following elsewhere in the case of metal structures of various kinds that are subjected to disintegrating gases.

Escher Wyss & Company have moved their head Canadian office from the Canadian Express Building to the Coristine Building, Montreal.

HIGHWAY CONSTRUCTION WITH PAINT BINDER AND ITS SHEET ASPHALT SURFACE.

A type of construction not generally used in the building of interurban roads is being employed on one of the roads of the state highway system of California on the section lying between South San Francisco and Burlingame. The most unusual features of the construction are the thin asphalted binder coat, and the 1-in. sheet asphalt surface. The following description of the work on this section is abstracted from an article by Mr. A. E. Loder, division engineer, in the California Highway Bulletin, the official publication of the State Highway Commission:

The roadway is graded to a width of 40 ft., with a maximum gradient of 4 per cent. conforming with the rolling contour of the country. Long, easy, vertical curves connect all changes of grade, producing a pleasing profile. Flat curves are used at every deflection in the line.

The pavement is 24 ft. in width and has a crown of 4 ins. Earth shoulders containing gravel and old macadam extend to a width of 8 ft. along each side of the pavement with a cross slope of 1¼ ins. per foot. The pavement rests upon a thoroughly compacted sub-grade composed of old macadam and a sand-clay mixture resembling hardpan, which after rolling is in such condition that it is not damaged when the gravel and sand are hauled and dumped directly upon it without the use of planking, and it remains so compact that no dirt is picked up with the sand when loading it into the mixer.

Timber headers 2 ins. by 6 ins., nailed to stakes, line the pavement trench and are laid to a line flush with the finished surface. These protect the edges of the pavement while the shoulders are being settled by traffic, and provide a means by which the pavement may be readily brought to a true and uniform surface.

The pavement consists of a 5-in. concrete base composed of a 1:3:6 mixture, to which is bounded a standard sheet asphalt surface 1 in. in thickness.

The concrete is prepared in a portable mixer to a rather wet consistency and is delivered directly to its place in the pavement by means of a swinging spout. The surface is given a rough finish, suitable for binding bituminous materials, by sweeping across the line of pavement with a stiff house broom or warehouse broom before the concrete reaches its final set. The new concrete is watered daily, except in rainy or damp, cloudy weather, until about five days old.

The asphalt wearing surface being laid on this job is shown on the daily test sheets to be as near the standard grading and composition as is possible to obtain. Nothing unusual is noted in connection with its use, except that a greater density is obtained after rolling the one-inch sheet than is possible with a thicker city surface, and consequently better wearing qualities and more stability should be expected.

When the concrete is dry and at least one week old, it is thoroughly swept, removing the dust of traffic passing at the side of the road. The binder coat is then applied. This coat consists of 1 part by volume of melted asphaltic cement, of the consistency used in the pavement, to 2 parts by volume of engine distillate. The asphaltic cement is heated in a small portable kettle to a temperature between 200° and 325°. A measured quantity is removed to the spreading pail a safe distance from the fire and allowed to cool to about 250°. The distillate is then added and stirred for about one minute, when it is found to be thoroughly uniform and the temperature is reduced by at least 100°. The distillate can be added when the asphalt is at a temperature of 325°, but at this tem-