from the use of the steam generated to develop electric power. With such rates, reasonable profits will be assured irrespective of whether live or exhaust steam is used.

The rates to be charged for service will be dependent on: (1) the cost of coal; (2) the first cost and operating cost of the distribution system, and (3) the extent of the service and the number of customers. The rates in effect in cities throughout this country are very variable, as shown by the data presented in the "Report of the Committee on Rates" at the National District Heating Association's meeting in Detroit in June, 1912. From this report it can be seen that the average season on which heat is maintained on the distribution systems is 8.5 months. About 60% of the steam used in low pressure heating systems is exhaust steam, the remainder coming direct from the boilers through reducing valves. In almost every system reported the meters, where used, were installed by the operating company, though the taps were usually supplied by the consumer. The condensation is returned to the central station in about 20% of the plants. On steam systems customers are, almost without exception, required to install economizer coils at their own expense. About 50% of the companies charge the customer for service connections. The cost of coal ranged from $1 per ton to $8 per ton. The flat rates for low pressure steam ranged from 18 cents to $1 per sq. ft. per season. The flat rates, based on cubical contents, ranged from $2.50 to $8 per 1,000 cu. ft. per season. In meter rates there was an almost infinite variety from which no general conclusions of value can be drawn. In many hot water heating systems the rate per sq. ft. is limited by ordinance. The charges for hot water services on flat rates ranged from 10 to 30 cents per sq. ft., the average charge being about 20 cents per sq. ft.

DUNMORE IS RAILWAY TERMINUS.

Dunmore, Alta, is the eastern terminus of the Crow's Nest Railway. Starting at Dunmore, the Crow's Nest line opens up Southern Alberta country, and is the main thoroughfare to the rich Kootenay district, whose development in metals, timber and fruit is in its infancy.

Traffic increased to such an extent along this railway that the Canadian Pacific Railway decided to establish a station, round-house, and extensive yards at Dunmore, and the Canadian Pacific Railway estimates for 1913 show additional trackage and shipping facilities.

Dunmore is situated in easy access to raw material required for the manufacture of brick, pottery, tile, and terra cotta work; glass factories, iron plants, cement works, etc.

Mr. C. R. Ross of the Dunmore Development Company, Medicine Hat, will supply manufacturers interested with any information.

In his oxy-acetylene welding of copper, which is proving successful in German works, Carl Canzler has developed a process somewhat different from iron welding. Larger torches are necessary, and a liquid welding paste is employed, with a special copper welding wire. Formation of oxide is prevented by the paste. Copper plates an inch in thickness have been welded without difficulty, and the strength of the weld —which is not affected by acid—is found to be quite equal to that of solid copper in a continuous sheet.

ACTION OF SALTS IN ALKALI AND SEA WATER ON CEMENTS.

In a recently issued bulletin of the United States Bureau of Standards, a paper is published containing results obtained from an investigation into the effect of alkali and sea water on concrete. The paper contains a good deal of experimental data which has been obtained during the past three years, and which is conclusive with respect to a number of points that have long been under discussion. The investigations were started in the structural materials testing laboratories of the Technologic branch of the United States Geological Survey, Mr. Richard L. Humphrey being in charge. They were transferred three years ago to the Bureau of Standards and the work continued by P. H. Bates, chemist, A. J. Phillips, assistant chemist, and R. J. Wig, associate engineer physicist, Bureau of Standards, under whose names the article appears. It is 157 pages in length and contains numerous illustrations, tables and diagrams. A few explanatory paragraphs, and the results which have been obtained to date, are given as follows:—

The disintegration of cement structures, when placed in contact with sea water, is a phenomenon which has attracted the attention of cement manufacturers and cement users almost from the first time that such material was used for marine construction. There are cement structures which have withstood the action of sea water for years and probably will continue to do so, yet there are structures which have failed; and it is also possible in the laboratory by artificial solutions to destroy almost completely a briquette, or cube, or cylinder made of cement mortars or concrete. The cause of this disintegration is not certain, though it is almost universally believed that it is the reaction of sulphate of magnesia of the sea water with the lime of the cement (formed during the setting) and the alumina of the aluminates of the cement, resulting in the formation of hydrated magnesia and calcium sulpho-aluminate, which crystallizes with a large number of molecules of water.

The other constituents both of the sea water and the cement are usually considered of little effect, though lately attention is being drawn to the fact that both sodium chloride and magnesium chloride rapidly attack the silicates.

Concrete structures have been made (especially in this country) which are resisting the attack of sea water to a marked degree. It is therefore not surprising that many engineers attribute the disintegration when it does occur to poor workmanship or materials, or to the abrasion of the sand or floating bodies in the water, and to the mechanical action of waves and frost action (as the disintegration usually takes place at or near the water line) rather than to any chemical reaction or crystallization due to such reaction.

It is not surprising that when cement structures were first placed in our arid regions this disintegration was not considered, though it was well known that these regions contain large quantities of magnesium sulphate, which, together with the sodium sulphate, forms the principal salts of the so-called "white alkali" in distinction from the black alkali, which is largely sodium carbonate. However, a short time after these structures were placed it was noticed that there was a softening of the mass along the water line and in due time this attracted considerable attention. It was investigated first by the Colorado State Agricultural College in the case of some dis-