

all cases the concrete cradle cracked along the centre line in the bottom, and often at about the lower $\frac{1}{8}$ points of the pipe, at the same time the pipe developed fractures. After the cradles were cracked in the bottom, the two sections revolved around the lower outside edges and the pipe would support practically no load.

The bedding of class 8 were very similar to the combined earth and concrete bedding of class 5, except that the earth was dug away from the outside of the concrete so as to reproduce as nearly as possible the conditions prevailing when this type of bedding is used in yielding soils.

The concrete used in these beddings was proportioned 1:9. It was poured in cool weather and had developed only a comparatively small portion of its final strength at the time the tests were made.

The pipe of this class had an average supporting strength only 18 per cent. larger than those of class 1. The concrete received no side support so that the load which developed the cracks in the pipe was the maximum. These tests indicated that this type of bedding would give but little side support other than that due to distributing the pressure over a larger area. In many soils this would result in a noticeable increase in supporting strength but in very wet soils the increase would be small.

The class of bedding still to be tested will be of the same general type as class 4, which is the "Concrete Cradle" for "Yielding Soils" of the "Standard Specifications for Drain Tile." The cradles of class 4 were made with the minimum dimensions specified, while the new type will be designed to safely support a 24-in. tile when cracked at the four $\frac{1}{4}$ points and receiving the estimated maximum load from ditch filling.

The data given above are from only one series of tests and can not be taken as final until they are verified by further work. There are, however, some very important general facts which are pretty definitely shown.

These results might be summarized in three general statements, as follows:—

1. The supporting strength of tile laid in the "Ordinary" method is practically the same as the "Ordinary Supporting Strength" shown by the standard tests.
2. The supporting strength can be increased 25 per cent. by more careful earth bedding and 80 per cent. or 90 per cent. by the use of concrete cradles.
3. The supporting strength after the pipe is cracked depends upon the bearing power of the soil at the sides of trenches, irrespective of the type of the bedding.

A SUBSTITUTE FOR PLATINUM.

An alloy for use in contact and spark devices to replace platinum has been patented by Mr. Paul R. Heyl, of New Rochelle, N.Y. (assigned to Commercial Research Co., of New York City). This alloy consists of silver and palladium, in varying proportions according to the conditions under which it is to be used. An alloy of silver with 2 per cent. of palladium has been found to give satisfactory results under many circumstances. When the contacts or spark points are exposed to sulphur compounds, 5 per cent. or more of palladium should be used. The alloy which was found to give the greatest resistance to spark erosion was that of 60 per cent. palladium and 40 per cent. silver. Additions of palladium to silver raise the melting point and lower the thermal conductivity. It has been found that, on account of the high thermal conductivity of silver, the heat from the spark will be conducted away fast enough to prevent melting of the silver. In view of this fact, silver-palladium alloys with very high percentages of silver can be used in a great many cases.

SHIPBUILDING IN CANADA

The Cunard Steamship Company recently bought three second-hand steamers, having failed to find builders able to quote for new tonnage. For the three boats, the company paid a higher rate per ton than they would have paid before the war for new vessels. Two years ago the little British schooner "Coquitlam City" was built on the Pitt River. She had her adventures and, becoming severely strained during a voyage, was laid up. The boat has just been chartered in San Francisco to load lumber for Australia next July. A \$200,000 cement order recently had to be refused by a Canadian firm on account of the shortage in tonnage.

These are but three incidents of a tonnage shortage which is daily becoming worse. It affects the conduct and the length of the war and the transaction of business during the war. Its most serious effect is likely to come after the war, when we will all be clamoring for tonnage during the big commercial campaign which will then be waged.

In the House at Ottawa recently Sir George Foster, minister of trade and commerce, said that the government had made efforts to have vessels built. In the first place, it had asked responsible persons what amount of tonnage subsidy would be required to encourage the building of wooden vessels of economical tonnage, say, from 2,000 to 5,000 tons. In reply it had received an offer to construct such ships if a subsidy of \$6 a ton were paid for 15 years, or \$90 a ton in all. He did not think that was reasonable.

The government had also received an offer to build steel ships at the rate of from \$125 to \$135 a ton with delivery in the latter part of 1917. Sir George said the price was high and that the time of completion was too far distant. Therefore, he thought that it would be necessary to consider first the period of emergencies and then the period following the close of the war. As far as the latter period was concerned, he held that a country with Canada's producing capacity should have a considerable and a growing merchant marine, and that government assistance might be necessary to that end.

It is doubtful whether this country will be able to build many ships for "the period of emergencies," but it is certain that if we are to enter the shipbuilding business, with any success, for the period following the war, we must begin at once. Sir George Foster intimated that the government might be willing to co-operate in a shipbuilding enterprise.

Walter J. Francis and Co., consulting engineers, Montreal, have moved to more commodious offices in the new Bank of Toronto Building, 260 St. James St.

The Acting British Consul-General at Moscow reports on Railway Development in his district as follows in "Railway Gazette," London: Between Vladimir and Moscow on the Nijni line there is a large and important manufacturing district, of which Oriechovo-Zuevo is the chief centre. The factories in this district receive their cotton and much of their food supplies from the south, the goods in question coming by the Kazan line. Owing to the 10 versts (about $6\frac{1}{2}$ miles) between Ilinski Pogost and Egorievsk, which would unite the Kazan and Nijni lines, not having been linked up by rail, the cotton for the Oriechovo-Zuevo manufacturing district has hitherto been compelled to travel up the Kazan line all the way to Moscow and then back by the Nijni line to Oriechovo-Zuevo. The connecting line between the Kazan and Nijni railways having recently been completed by linking up Ilinski Pogost and Egorievsk, and opened for traffic, it is estimated that the manufacturers of the latter town will be saved many thousand roubles yearly in freight charges. A similar project has been formed to connect the Yaroslav and Nijni lines.