Style "d" is advocated by one reply as a good method on a double-track deck with long ties. The shim is 8-feet long and is well bolted to the tie.

5. Nine advocate shims under the ties (Fig. 5). Several object to these on account of their getting out of place, etc. Plan "b" was used by the Baltimore & Ohio R.R. when 16-inch timber was in style. Plan "a" does not give sufficient elevation and can hardly be subject to this objection.

Style "c" is advocated by some and objected to by others. It is a longitudinal timber as wide as the girder flange and bolted thereto.

Style "d" is used on solid plate-floor bridges without ties. It is objectionable on block signal lines, as perfect insulation is uncertain, which necessitates cutting the bridge out of the circuit, so that a car on the bridge or a broken rail on it would not put the signal at danger.

The scheme as portrayed in Fig. 6 received no support among the replies, except for temporary work.

All the schemes shown except No. 3 apply to metal bridges. It is well agreed that timber bridges of all kinds should have the stringers placed in a plane parallel to that of the rails. In the case of trestles, it is the opinion of the committee that there is no valid objection against framing the caps to the proper inclination to receive the regular standard straight-line tie. In timber stringer bridges resting on masonry, tapered wall plates should be used.

For metal bridges any of the schemes described will give good service, if the fitting of the ties to the bridge and of the bridge to the masonry is perfect, so that no movement will occur. The simpler these fittings are, the more certain it will be that good fits will follow. To secure favorable conditions of simplicity the masonry should be level, and the lower face of tie should be parallel to the plane of the top flanges of the stringers. These conditions reduce us to "b" of Fig. 1 or to Fig. 4. Our replies indicate that not over 4-in. superelevation should be obtained by scheme 1; hence, if more is required, it should be obtained wholly by 4 or by a combination of 1 and 4.

CREOSOTE TREATMENT FOR POLES.*

By George R. Ogier.

During a conversation recently with one of your members, it was suggested that I come here before this meeting and talk on the creosote treatment of our native lodgepole pine poles. Although I accepted this task, anticipating a great deal of pleasure, I am not quite sure that my paper will convince all of the full importance of this matter and subject. However, I have endeavored to set forth the most important phases of the subject, in order to have a paper of a limited number of words, and yet have the desired effect.

First, for the benefit of those not familiar with the general subject of wood preservation, I will relate something of its history. Wood preservation is an old art, and has been practised since the beginning of the 18th century. In 1705 Homberg soaked wood in an aqua solution of corrosive sublimate. In 1730 Job Baster saw the worth of this important subject when treating wood for shipbuilding purposes with an aqua of corrosive sublimate and arsenic. In 1740 Reed used wood vinegar. In 1756 the process generally used for preserving wood was by dipping it in boiling hot wood tar, and then later, about 1812, coal tar was first used by Cook for ships and ship timbers; and in 1838 dead oil of coal tar or creosote was first introduced as a preservative for timber by Mr. Bethell in England. Wood preservation began in the United States on a commercial scale in 1848, when James B. Frances established a cyaniding plant at Lowell, Mass. This plant is still in operation, although the amount of timber treated in it is comparatively small. About 1874 a creosote impregnating plant was established in West Pascagoula, Miss. This was the first plant of its kind erected in this country, and is still in active operation. Since the erection of this plant a number of others have been installed, the most rapid development being along the Gulf of Mexico. The gradual depletion of the timber supply, resulting in an increase in the price of the raw product, has more recently fostered the growth of wood preserving plants, especially throughout the central and eastern United States. In 1904 the total annual output of treated timber in the United States was approximately one-half billion ft. b.m. In 1907 the number of plants had increased to 60, with a total annual output of approximately one and a quarter billion feet b.m. New plants are being erected from time to time in various parts of the United States, and up to date, the timber treating plants number 72.

Up to the present time creosote has been recognized by our government, and those familiar with the good qualities necessary in wood preservatives, to be the best; it is the most costly and at the same time the most effective in preserving wood.

The preservation of wood from decay by treating it with chemicals which prevent the action of decay is of increasing importance in the United States. From the standpoint of the conservation of our rapidly diminishing forest resources, and the prevention of a possible timber famine, the preservative treatment of timber may be a most effective measure, because it lengthens the service of the wood which is used and therefore decreases the amount necessary to supply the demand. From this point of view wood preservation has a distinct advantage over measures for the growing of more timber, since these measures require years in order to show their effect, while preservative treatment is a remedy which can be applied immediately.

Wood preservation is especially important in the states of the Rocky Mountain region, because of the rapid decay of the most of the native timbers of this region when used in contact with the ground, and the necessity, which grows more pressing with every year, of using these native woods for telephone poles, railway ties, mine timbers and many other uses which expose the wood to decay.

The federal government, realizing the great importance of the subject as a protection against the possible rapid decrease of timber in the United States, actively engaged in educating the western timber users to the advisability of treating the different structural timbers, about 1906. In 1908 the government through the Office of Wood Preservation, erected a simple demonstrating plant at Norrie, Colo., for treating the timber on the national forests. The government's work there was to some extent experimental, inasmuch as it operated upon the fire-killed native lodgepole pine, standing in burned-over forest tracts. As the outcome of these experiments it has been conclusively proven and actually demonstrated that even this fire-killed timber becomes efficient and extremely durable when treated according

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