cumstances are somewhat different, however, on lines through territories where no towns have grown, and where there are no houses for employees to live in. For example, when building the Natron cut-off in northern California and Oregon through mountainous country where there were no towns, the Southern Pacific provided houses for employees, those for the signal maintainers containing four rooms and a bath. On desert sections of another western road living quarters are regularly provided for station agents, track foremen, water station attendants and track laborers. However, when signals were installed through this territory, no provision was made for living quarters for the signal maintainers, other than a couple of old box car bodies placed together to help keep them erect. These quarters are none too attractive and their squalid appearance is not mitigated by the ease with which rain finds its way through the roof. Apparently the policy of providing suitable living quarters for railroad employees at outlying points applies to every one but signal maintainers. As soon as the management of this road becomes convinced that it is out of step with other roads in providing quarters for signal maintainers, it is to be expected that the unsatisfactory conditions now existing will be corrected.

Modern Lubrication

IT is claimed that the ancient Egyptians lubricated the capstans used in hauling stones for the pyramids, by pouring melted animal fats through holes in the bearing caps. Practically the same method has been employed through the ages since the time of the Pharaohs for the lubrication of shafting, etc., and with the coming of interlocking and signaling during the last half century, the same method of lubrication has been followed.

It is quite true that oil has its place in the systems of lubrication, but for bearings operated at comparatively low speeds, as for example the cranks in the pipe line of an interlocking, or the shaft for a semaphore, it has been demonstrated that grease serves as a satisfactory lubricant, and is not only retained in the bearing but also serves to keep out water, dirt, sand and other foreign substances.

The advantages of using grease for the lubrication of spring shackles, brake shafts, wheel shaft bearings, and similar contact surfaces was recognized early in the development of automobiles, and grease cups were installed for this purpose for years. The possibility of using grease for certain parts of signal and interlocking equipment was recognized also, as for example for semaphore shaft bearings, which in some cases were equipped with plugs in holes, portable grease guns being used to lubricate such bearings once or twice a year. Grease cups were supplied to signal and interlocking equipment to a limited extent only, because of the expense for such a cup for every pin at a mechanical interlocking.

In the meantime, a simplified method of forced lubrication, using grease, had been developed in the automobile field. In experimenting with this system, one railroad found that it was adapted to the bearings in switch circuit controllers, the lubrication of which had for years been a serious problem, resulting in short life or improper operation of the equipment, and in some cases false operation, on account of the bearings being bound, because of a lack of lubrication. This method of forced grease lubrication was next applied to the shafts of semaphores, and then to the 7/8-in. pins on cranks and compensators of interlocking plants, which had never before been provided with means for proper lubrication, although innumerable gallons of oil had been poured over the top of the pins, only to run off without much of it getting to the bearing surfaces. The main crank pins, although drilled with oil holes, were often filled with dirt, thus preventing the oil from getting to the bearing. Excessive wear and early replacement were the result. The forced lubrication with sealed intakes keeps the dirt out.

The application of this method of lubrication has met with such success that it is being extended quite rapidly to signal, interlocking and car retarder apparatus wherever the type of bearing and operating conditions are adapted to the use of grease as a lubricant. The Signal Section A. R. A. recognized this development by adopting for approval a drawing of crank pins, revised to show changes to permit the application of forced lubrication. In other words, this is one more evidence of the progressive policy of the signal field in accepting equipment as rapidly as any other railroad or industrial activity.

What Is to Be Gained by Train Stop or Train Control?

IN considering the automatic control of trains, the questions of intermittent or continuous control, the advisability of cab signals, etc., have by no means been answered. For example, among the 45 roads on which the first order of the Interstate Commerce Commission is effective, the intermittent train stop is used by 25 roads, and the continuous train stop by 8 roads, while train control, in which the speed is held to either two or three limits, is used on 10 roads. Furthermore, on 45 roads, continuous cab signals are in use on 18 installations. Two of these 18 roads have eliminated the intermediate wayside automatic signals, and one road has eliminated all signals except those at interlockings. When making the installations required under the second order, two roads, the Louisville & Nashville and the Central of New Jersey, used the continuous stop rather than the train control, while the other roads affected by the second order used the same systems as under the first order.

In other words, there are two lines of thought on each of these questions. One school with the intermittent devices considers that an automatic brake application operating as a check on the danger indication of the existing wayside signals is sufficient and provides an advantage in the direction of safety without reducing the efficient methods of train operation as directed by signal indications. On the other hand, another school believes that such a procedure secures no added capacity for the road and that continuous cab signals without intermediate wayside signals offer the most desirable and efficient system from the standpoint of increasing track capacity and safety of train operation.

The wide diversity of opinion among experts in the signaling field demonstrates the complexity of the problem at present. However, the fact that similar systems are being used under different conditions of speed, traffic density and grades, will make it possible to arrive at more definite conclusions relative to the desirability of train stop or train control, intermittent or continuous; and cab or wayside signals will be possible after reasonable service of the installations now in operation or approaching completion. It is to be desired that these installations be watched intensively for results and improvements for several years before further extensions are required.