Construction—Under Class A, two types of pavements will be considered. The most efficient type, as laid in America, has a mineral aggregate which will comply with the following requirements:—

All of the broken stone or broken slag shall pass a 1¼-inch screen; not more than 10% nor less than 1% shall be retained on a 1-inch screen; not more than 10% nor less than 3% shall pass a ¼-inch screen.

This aggregate, for small jobs, may be mixed with hot tar cement by hand methods. Usually, however, mechanical heating and mixing plants should be used. In a complete plant for the manufacture of tar concrete, the aggregate is carried by bucket elevators to rotary dryers, where it is dried and the dust exhausted. From the dryer the aggregate is raised by elevators to storage bins. When required the aggregate is drawn from the bins to a weighing device, and from there deposited into a mixer. Such plants are also equipped with tar cement heating tanks and weighing buckets. A plant of this type should have a capacity of from 800 to 1,000 square yards of 2-inch wearing surface per day. For the type of tar concrete under consideration, it has been found that the tar mixture should contain between 5% and 8% of bitumen.

An important detail of laying is thorough rolling. An even surface and adequate compaction, with thorough interlocking of the particles of broken stone, may be readily obtained by the proper use of a tandem roller weighing between 10 and 12 tons.

Many methods have been developed for the application of the seal coat of tar. It has been found that seal coats of from ½ to 1 gallon of tar cement per square yard are distributed most uniformly by the use of hand-drawn gravity distributors, followed by a squeegee.

The average cost of this type of tar concrete under normal conditions, when laid as a 2-inch wearing course, should be from 25 to 40 cents in excess of a waterbound broken-stone wearing course of the same thickness.

The second type of tar concrete of Class A is the two or three-course pavement in which each course consists of one product of a crushing or screening plant. The excellent tar slag concrete pavements which have been laid in England since 1903 are of this type. Although used by various municipalities, the largest yardage of this type has been constructed by Tarmac, Limited. One of the Tarmac plants is located at Wolverhampton, adjacent to that of a company producing large quantities of blast-furnace slag. The large molds of slag are transported by small cars from the iron works on a narrow-gauge track and dumped near the Tarmac works. These large blocks, while still warm, are broken by sledge-hammers to a size suitable for the crusher. After it is crushed and screened into sizes varying from ¼ to 2½ inches, it is mixed with a tar compound. Since the slag is warm even after it has been crushed, no heating preliminary to mixing is necessary.

Although in some cases two courses of tar slag concrete are used, usually more than two layers of tar-coated slag are employed, as was the case with tar slag concrete pavement laid at Brighton-on-Sea. The details of construction follow:—

On a well-compacted gravel foundation was spread a scattering of tar-coated slag chips. The bottom layer was composed of 2½ inches of compacted 1¼ to 2½-inch tar-coated slag. The second course consisted of 2 inches of compacted ½ to 1½-inch tar-coated slag. The third course was composed of a thin layer of ⅛ to ⅜-inch tar-coated slag chips, which layer was thoroughly rolled. The pavement was finished by rolling a top dressing of uncoated fine slag screenings.

Tar concrete pavements of Class C, with mineral aggregates similar to the modern Topeka grading, were laid in Pittsburgh, Pa., about 1890. The pavement laid on Lang Avenue has been in service, with only nominal repairs, for the past twenty-six years. Many similar pavements were constructed in several cities of New England as early as 1885. Since 1913, tar Topeka pavements have been laid in several States throughout the middle west of the United States and also in cities of New England. Some of the best examples of this type of tar concrete pavement have been constructed with about 8% of tar bitumen in the mix, and with a light seal coat of refined tar.

PRACTICABILITY OF ADOPTING STANDARDS OF QUALITY FOR WATER SUPPLIES*

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IN spite of the fact that the attempt to establish a so-called standard to serve as a basis for interpreting or classifying the quality of potable waters has met with but little success in the past, endeavors are still being made to standardize the consideration of analytical results so as to eliminate personal judgment as a feature of interpretation. The difficulties besetting these efforts, such as the undetermined significance of the bacterial test made by various methods, the importance of varying chemical content and the evidence of sanitary surroundings, are still present in probably a greater degree than in the past, on account of the development of the science of water bio-chemistry and the added confusion created by the ever-changing methods, media, temperature, and differentiations.

Before establishing a measure of the quality of a potable water, it is necessary to determine by what units such measurements are to be evaluated. In the case of water supplies, the choice of appropriate units becomes difficult, since the question immediately arises as to whether the bacterial count, the B. coli test, the chemical determinations, or the sanitary inspection, should be the sole criterion; or if a combination of these factors, as to what their relative importance should be in any proposed unit of measure. Manifestly, a standard in its simplest terms could be predicated upon any single one of the above-mentioned units, if we assume that such a standard would fulfil the requirements of a universal measure of quality. Even then the problem still remains of deciding what unit of bacterial content, for instance, shall be chosen as the basis for comparison.

A unit of measure must be found upon the existence of an absolute uniformity of condition and of material which can be made to serve as the immutable basis for future comparative readings. The unit of length, for example, is that distance between the ends of a bar of definite material, in a definite place, measured and corrected for predetermined conditions of atmospheric pressure and temperature. Such a unit immediately establishes a precise standard by means of which further measurements of length under all conditions may be carried out. The search for a "quality standard" for water should be first directed, therefore, towards determining whether there

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