

is provided with a seat for the lead gasket, the face of which seat forms half of a dovetail, the object being to provide a greater thickness of gasket at the seat of the dovetail. This prevents the gasket being withdrawn when the pipe contracts or when the pipe is deflected.

The lead gasket consists of a lead pipe filled with compressed fibre and then flattened to an elliptical section, the proper length of gasket being turned to a circle, which is joined forming a ring. This ring is placed in the bell and the pipe is then ready to receive the spigot end of the next pipe to be laid. As the pipes are shoved home the lead gasket is changed from the elliptical section to a section which fills the dovetail space and the space between the dovetail of the bell and the outer face of the spigot. After this has been done a light rope of cotton or jute is placed and a weak joint filler of cement-mortar is applied, filling the calking space. This space is provided in the event it should be necessary to calk the lead gasket joint. Such calking is not expected to be necessary.

ACTION OF WATERS ON METALS*

By S. W. PARR

WATERS of this region have certain peculiarities which show themselves more especially in steam generation and steam heating appliances. For this reason their properties and behavior have been largely overlooked. These waters are classified as alkaline, meaning thereby that they have present free sodium carbonate or more than enough sodium to unite with the sulphate, chloride, and nitrate radicals or ions. There is left, therefore, only carbon dioxide, CO_2 , to unite with the remaining sodium and also all of the calcium, magnesium and iron. Such waters have only temporary hardness, there being no sulphates of calcium or magnesium.

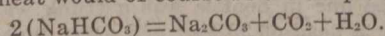
Now it so happens that the Champaign-Urbana water supply was the first water of this type to come into use or, indeed, to the notice of water chemists, who were at first rather reluctant to report free sodium carbonate in conjunction with carbon, magnesium and iron, as being an incompatible combination. However, it is seen at once that all of the carbonates are in the bicarbonate form and while readily soluble in the cold are readily decomposable on the application of heat.

This water supply for the two cities was brought into use about 1884. It comes from the drift at about 165 feet below the surface. Since the first development of this type of water in 1884, the local area has been greatly extended. As a result of study, about 1900 to 1905, of the water supplies of the Illinois Central, the Chicago & Alton and the Big Four Railroads between Peoria and Indianapolis, an area producing such waters could be roughly indicated by drawing a line from a point somewhere between Paxton and Gilman on the Illinois Central Railroad, proceeding westward to include Normal, thence southward through the centre of Bloomington somewhere between the Chicago & Alton junction and the pumping station of the Big Four Railroad near Centre Street, thence south and east to include Bement, Tolono, Philo, Veedersburg, Ind., and thence westward again to include Hoopes-ton and Paxton, the starting point.

Some of the Reactions

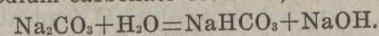
In addition to this area, the Illinois State Water Survey has found waters of this type very widely distributed and far more commonly in use than when the supplies came from shallow wells. Bulletin 4 of the Illinois State Water Survey gives the distribution of such waters throughout the state.

In order to understand some of the unusual or unsuspected properties of these waters it will be well to note some of the reactions involved when these waters are in use in steam generators. The first stage in the decomposition of the bicarbonate by heat would of course be the simple reaction:—

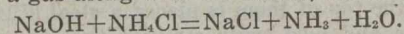


*Paper read before the Illinois Section, American Water Works Association.

However a study of the actual conditions in the boiler showed that the reaction did not stop here, but a partial hydrolyzation of the sodium carbonate occurred, thus:—



It will thus be seen that the residual water within the boiler becomes an active reagent for the precipitation of fresh incoming bicarbonates, thus indicating why such waters are self-purging and develop no scale whatever within the boilers. In this discussion, however, the author wishes to call attention to another reaction which accounts for the liberation of ammonia as a gas along with the steam; thus:—



Now a word as to the extent to which ammonia may be delivered under the conditions such as are found in the local water supply. If we take, for example, the local power station of the Illinois Traction System, which uses approximately 100,000 gallons of water per day, then on a basis of 0.1 pound of ammonia as NH_3 per 1,000 gallons of water, the output would be 10 pounds per day or in the form of ammonium carbonate, 50 pounds daily.

Of course, upon cooling, a combination of the ammonia and the carbon dioxide occurs forming the ammonium carbonate salt. Evidence of this is occasionally shown in the complete stoppage of risers in dwellings where the steam has been shut off for some time.

Corrosion of Brass Parts

This brings us directly to an explanation for a serious corrosive action which occurs in the heating system of the University, especially in connection with the brass parts of the steam traps to the radiators. The number of these parts thus affected would have to be expressed by three figures, but no very exact data are at hand showing the approximate number.

In making a study of the conditions that accompany these failures, it was found that in those buildings where the return water was most strongly impregnated with ammonia, the corrosive action was greatest. These variations in the content of ammoniated condensate that accumulates in certain buildings to a greater extent than in others is a peculiarity that is found to exist also with the variation in content of carbon dioxide gas that accumulates in the radiators.

So far no explanation for these variations has been found, other than that due to their place on the line or the method of taking off the steam supply from the mains. These features, however, are not essential to the main fact that the condensation water becomes sufficiently impregnated with ammonia to become a strongly corroding reagent for brass.

The Warren Bituminous Paving Co. have entered suit at Osgoode Hall, Toronto, against the Construction and Paving Co., Ltd., Toronto, for alleged infringement of a Warren patented pavement.

The first passenger train has left the new South End terminals at Halifax. Its departure was the occasion of an inspection of the terminals by the premier of the province and a number of other prominent citizens. The old North Street station has been handed over to the Militia Department for use in making up troop trains and hospital trains.

At the end of November, 199 sailing vessels of 44,135 gross tonnage had been built in Canada since 1914; also 160 steamers of 69,612 tons gross. For the Imperial Munitions Board, Canadian shipyards built 15 ships, each of 1,440 net tons and seven of 6,200 net tons. The government is now having 42 ships built under contract, aggregating 255,250 tons. The total capacity of Canadian yards is 460,000 tons a year.

The improvement of the St. Lawrence River, from Lake Ontario to St. Regis, N.Y., was disapproved by United States army engineers in reports recently submitted to the United States Congress by Secretary-of-War Baker. "No improvement should be considered," says Major-General Black, chief of engineers, "until the completion of the enlarged Welland Canal and of tangible plans for the deepening of the Canadian St. Lawrence River channel."