The policy of every utility company should be to study the service demands as fully as possible, and the management may wisely study carefully all serious complaints to services. Careful attention to complaints will be helpful to the company as well as gratifying to the public.

Many electric railway companies have been apprehensive because of the increasing degree of public regulation of their finances, services and charges; but I believe there is less apprehension now than there was 10 years ago. Regulation of public service companies in increasing measure by state and municipal authorities has come about naturally and logically. It is necessary for each municipality to have a unified transportation service; and, with but few exceptions, there is now but one street railway company in each city. The requisite unified service is performed by a consolidated company.

Likewise, the larger interests of the people demand that the state shall, by appropriate regulatory, supplement municipal regulation of public utilities. State regulation is necessary, first of all, because the public service company often serves more than one municipal area. The power that regulates must be as extensive as the object regulated; moreover, state regulation is desirable because experience has clearly shown that in the supervision of accounts, finances, services and charges of public service companies there needs to be an executive body whose jurisdiction is state-wide and whose powers are as comprehensive as the tasks to be accomplished. If the regulation of electric railway and other public service companies were left entirely to municipalities, the regulation would be incomplete and would vary greatly as between different localities. Such a condition would be of disadvantage to the companies and not a benefit to the public.

PROTECTING METALS BY CALORIZING.

A NEW process which will lead to economies in various phases of manufacture by preventing metals, especially iron, from burning when subjected to high temperatures for either long or short periods of time, and for one or many heats, is described by data and illustrations in a recent paper by Messrs. H. B. C. Allison and L. A. Hawkins, of the Research Laboratory, General Electric Co. This process, the discoverer of which is reported to be Mr. T. Van Aller, first consisted of heating metals in revolving drums with mixtures containing, among other things, finely divided aluminum, by which a surface alloy containing aluminum is produced. In the case of copper, this alloy is of the nature of an aluminum bronze, but richer in aluminum than the ordinary alloy of that name and more resistant to heat, so that copper thus treated is protected up to the melting period of the alloy from the scaling which occurs when untreated copper is heated above 300 deg. C. The same general result was obtained in the case of iron and steel.

A modification of this process extends its application to pieces which, because of their shape and size, are not adapted for tumbling. It admits of their being calorized by packing them in, or painting them with, a suitable mixture and heating them. There appear to be many places where it is desirable to use iron vessels or apparatus at temperatures above red heat, and at such temperatures, ordinary iron rapidly oxidizes and scales away. After iron is calorized the effect of heating is slight. Instead of burning and the scale falling off, as in the case of untreated iron, practically no effect can be detected after a considerable time—certainly none which injures the surface.

The above facts seem to indicate that this is a simple method for extending the use of iron under oxidizing conditions at high temperatures, and for greatly prolonging the life in those instances where it is now used, but must be renewed at frequent intervals. In the case of small muffles on crucibles, where temperatures are below 1,000 deg. C., this treatment of cheap cast or wrought iron shapes seems very promising. While the life of the coating depends on the temperature at which it is used, as well as on the duration of time taken in its preparation, i.e., the quantity of aluminum which alloys with the surface of the iron, it does not permit of long use at temperatures much in excess of 1,100 deg. C.

Copper parts also, which are exposed to high temperatures, can have their life increased by calorizing. In some cases calorized copper may be used advantageously in place of aluminum bronze. In some cases, also, the life of copper contacts can be increased by calorizing. For instance, a set of railway controller contacts which were calorized showed double the life of the ordinary untreated contacts.

The effect of calorizing is to produce a surface alloy containing aluminum. The thickness of this alloy varies with the length of time to which the piece is subjected to the calorizing process, and the percentage of aluminum varies through the coating being greatest at the surface.

For iron, calorizing is intended only for protection at high temperatures. It does not compete with galvanizing, sherardizing, and other similar processes for protection against oxidation or corrosion at low temperatures. Its usefulness lies within a range of temperature much higher than a galvanized or sherardized coat could stand. For copper, calorizing is effective against corrosion at low temperature as well as against oxidation at high temperature. The upper limit is determined by the melting point of the alloy, which is somewhat lower the heavier the calorizing treatment, since that means an alloy with a higher aluminum content.

The probable explanation of the effect of the aluminum in the surface alloy is that a thin coat of alumina forms which prevents further burning of the metal beneath. It is well known that a pure aluminum wire may be heated in the air to a temperature several hundred degrees above its melting-point, without flowing, when the thin alumina shell which surrounds and supports the molten metal is easily seen.

AT LAST.

The following clipping is from the Kansas City Post, of recent date:—

"An engine that runs itself on its own power, developing energy to operate machinery, has been invented in this city. The inventor has been working for five years on his self-operating engine, and now has it near perfection. A few alterations are to be made. These will increase its efficiency.

"The engine is run by compressed air, making its own pressure as it runs. The exhaust from the cylinders returns through a series of 8-port automatic valves, to a large steel pressure tank. This tank is a double affair, there being a smaller tank within the larger one.

"An air space of 6 in. intervenes between the two tanks. Into the air space the exhaust from the cylinders is forced, the action being such that the nitrogen gases are separated from the oxygen and forming a lighter gas, rises to the top of the tank, at the same time creating a pressure which forces the fresh air down through the inner tank and back into the engine, which is operated by this pressure."