OVERHEAD ELECTROLYSIS AND PORCELAIN STRAIN INSULATORS.

A paper by S. L. Foster in the Proceedings of the American Institute of Electrical Engineers for August, 1915, observes that there is a slight leakage of current from trolley wires to earth through insulated supports on all overhead construction, which, if not checked, permits a flow of current which gives rise to electrical separation of water into oxygen and hydrogen. The oxygen liberated acts vigorously upon the adjacent metal parts, which in time become badly corroded. This electrolytic action also seems to remove the galvanizing from live metal parts before attacking the iron. A partial remedy for this rusting of live galvanized wire is painting.

This electrolytic effect is also seen to take place over strain insulators when the creepage distance is insufficient. This indicates that a creepage distance proportional to the conditions met must be secured to stop the flow of current around the outside of the insulators. The author concludes that under fog conditions the insulator surface exposed for creepage is insufficient in our present standard devices.

Another form of overhead electrolytic action noticed in electric railway work is caused by the use of dissimilar metals in contact. Sulphuric acid and other fumes in the air and ozone from a nearby ocean are supposed to be the electrolytes that set up a local battery action at these points of contact. The logical remedy for this trouble is to use similar metal in contact.

Sandstone Varieties.—According to the U.S. Geological Survey, the products of rock decomposition may be reconsolidated either by great pressure or by the injection of cementing materials, or by both. Thus sands are formed into sandstones, clays become shales, and calcareous deposits yield limestone. Aside from their cementing materials, sandstones differ in composition exactly as did the sands of which they are composed. Sandstone may be nearly pure quartz, or quartz and feldspar, or quartz, feldspar, and mica, and it may vary in texture from the fine to the coarse. Some sandstone is so coarse that it will hold six quarts of water to the cubic foot, and underground deposits of such sandstone form excellent reservoirs, which may yield a never-failing supply of water. An arkose sandstone from the quicksilver region of California, made up of granitic detritus, was found to contain quartz, orthoclase, oligoclase, biotite, muscovite, hornblende, titanite, rutile, tourmaline, and apatite. In short, all the rock-forming minerals which can in any way survive the destruction or grinding up of a rock may be found in sands, and therefore in sandstones.

Stream Gauging and Hydraulic Science.—In the great advance which applied science has made in the last generation a prominent member of the vanguard has been the stream gauger—the measurer of the volume of flowing water. His rapid progress is even more notable when it is considered that his work was born hardly a generation ago. In 1889, the United States Geological Survey began investigation of the water resources of the country, and so little work of that kind had previously been done that the beginners felt that they were entering an entirely new field of research. Owing very largely to contributions of the engineers of the United States Geological Survey, stream gauging has developed empirically and scientifically until it comprises a field of classified knowledge which well entitles it to a dignified place among the sciences. As a science it is a subclassification of that longer recognized and more inclusive science of hydraulics. Knowledge of it is required in practically all branches of engineering, and it is being taught as a regular course in many of the leading scientific schools. The relation of stream gauging to the science of hydraulics, stream gauging as a science, and the probable future developments are discussed briefly in a report by C. H. Pierce and R. W. Davenport, recently issued by the Geological Survey as Water-supply Paper 375-C.

In regard to future developments the authors say: "It seems probable also that in the future the results of accurate stream gauging will be utilized in connection with problems in meteorology and physiography. Although the determination of better coefficients for use in the accepted hydraulic formulas and the deduction of new laws not heretofore expressed may be confidently expected, it should also be remembered that the results of stream gauging have already been applied to the measurements of rainfall on a large scale and to problems involving no less complicated features than the determination of effects of deforestation on the navigability of interstate streams."

PHOSPHATE IN WESTERN CANADA.

The discovery of phosphate deposits near Banff, Alta., referred to in *The Canadian Engineer* for September 16th, 1915, is of high importance in the opinion of the engineers of the Commission of Conservation. Western Canada, being a farming country far removed from the hitherto discovered deposits of phosphate in Canada, which are confined to the Ottawa district, will naturally look to the commercial development of these deposits in its endeavor to maintain soil fertility and to increase its yield. Supplies of phosphate at a low price will naturally have a very important bearing upon the agricultural industry in the prairie provinces. The following example, quoted from "Conservation," illustrates the amount of high-grade phosphate rock which it would be necessary to add to the land annually as fertilizer to replace the phosphoric acid removed from the soil by the crops in the three provinces. In 1913 there were 16,726,400 acres under cultivation in these provinces and the depletion per acre annually is equivalent to the phosphoric acid contained in 60 pounds of high-grade phosphate rock. At this rate, 501,800 tons of high-grade phosphate rock would be required each year simply to offset the depletion of the land already under cultivation in Manitoba, Saskatchewan and Alberta.

An order has been placed by the Canadian Brake Shoe Company, Limited, Sherbrooke, Que., for the installation of a Snyder electric furnace for the melting of steel. This furnace will melt and refine cold material and will deliver 24 tons per day of 24 hours. The steel will be used for the manufacture of shell steel for the British Government. The company has been operating a steel foundry for many years, using electric furnaces exclusively for melting. It now has six furnaces of the three-electrode type in operation.

In no one particular has road building grown more rapidly than in the use of bituminous oils in the treatment of road surfaces, their popularity being due to the fact that they water proof the surface and at the same time serve as a binder to retain the material on the roadway. That such treatment will go a long way toward making a road suitable for use every day in the year is conceded a fact by everyone, and the best of it is that oiling treatment is equally good for macadam, gravel or dirt surfaces. This opens a very large field for the use of this material and nothing seems to be more definitely assured in the road building line than the continued and increasing use of road oils in country districts.