Prof. Albert F. Ganz: It is not generally possible to satisfactorily answer questions in regard to electrolysis unless complete information stating all of the conditions can be given. It is generally difficult to obtain such complete information from inquiries made in connection with discussions before meetings like this.

I am glad to hear that the department of water supply, gas and electricity of New York City has refused to permit the electric railway companies to bond their water mains to the railway tracks. Such permission should not be granted, because the bonding of water pipes to the tracks makes the water piping system part of the railway return circuit, and almost always makes the piping system carry very large currents, and these become an increasing source of serious danger. Mr. Nicholas S. Hill has well illustrated by his experience in Baltimore that it is of great advantage to railway companies to connect underground structures to their railway return circuit, as they thereby obtain the use of these underground structures for the return of current. He has also shown that these structures are made to carry very large currents by such connections.

In regard to the attempt in San Antonio to stop electrolysis by encasing the water services in tile pipes, I beg to say that this arrangement can only succeed if the joints in the tile pipe and the connection to the water service are made waterproof, so that the space between the service pipe and the tile pipe does not fill with water. If this space does fill with water, then current may continue to flow from the service pipe to the water and produce corresponding corrosion of the service pipe by electrolysis. I would suggest as an improvement that the space be filled with a compound like pitch.

The heating of the 2-inch water meter by current from the New York, New Haven and Hartford Railroad in New Rochelle is very interesting, and I am sorry that I have not more details in regard to this very important observation. Mr. Hazen's remarks emphasize the fact that it is not possible to tell from the appearance of a corroded pipe alone whether it has suffered from electrolysis or from purely chemical action. To determine this requires electrical measurements to see whether current is leaving the pipe which could produce electrolysis.

In regard to lead service pipes which are reported to be destroyed by electrolysis from current reaching the water service pipe from the gas main by way of the house service connections, I would suggest that if this is the path of the current which damages the water service pipe, the trouble can be remedied by inserting an insulating joint in the water service directly inside of the cellar wall, thereby preventing the flow of the damaging current out on the water service pipe. If, on the other hand, the current flows from the water main to the water service pipe, then an insulating joint would have to be inserted in the water service pipe close to the main. A safe precaution would be to insert an insulating joint in the water service pipe both close to the main and directly inside of the building.

In regard to the question of grounding transformer secondaries to water pipes, I would say that there is absolutely no danger in permitting such connections to be made. Transformers operate with alternating current, and the object of grounding the secondaries of transformers is to serve as a safety measure to prevent the possibility of persons obtaining a high voltage shock. Under normal operating conditions there is no flow of current to the water pipe from such transformer connections, and in my opinion such connections can be safely permitted.

COLORIMETRIC TEST FOR ORGANIC IMPURITIES IN SAND.

UNDER the auspices of Committee C-9, on concrete and concrete aggregates, of the American Society for Testing Materials, colorimetric tests for discovering impurities in sand have recently been conducted. The methods employed as well as the data secured have now been issued in a circular, from which the following is abstracted:—

The colorimetric test may be described briefly as follows:—

A sample of sand is digested at ordinary temperature in a solution of sodium hydroxide ($NaOH$). If the sand contains certain organic materials, thought to be largely of a humus nature, the filtered solution resulting from this treatment will be found to be of a color ranging from light yellow up through the reds to that which appears almost black. The depth of color has been found to furnish a measure of the effect of the impurities on the strength of mortars made from such sands. The depth of color may be measured by comparison with proper color standards.

The colorimetric test has been applied to sands from about 40 widely distributed deposits in 20 different states. The research to date has brought out the following:—

Examinations of deposits of defective sands show that surface loam is the principal source of contamination.

All natural sands which have been found to be defective on account of the presence of organic impurities have responded to the colorimetric test with sodium hydroxide, and all sands which have given high color values have shown low values in mortar tests.

Sands which were similarly graded by screening out and recombining the different sizes to a definite sieve analysis showed a fairly definite relation between the compressive strengths of 1-3 mortars at 7 and 28 days and the color values of the sands.

The mortar-making quality of sands known to contain organic impurities has been much improved by removing the organic matter, either by repeatedly digesting them with sodium hydroxide and then washing free from alkali, or by driving off the organic impurities by ignition.

When the sodium hydroxide extracts from sands which mortar tests had shown to be defective were purified and applied as coatings on high-grade sand, that sand was made "defective" or gave much reduced mortar strength.

It is impracticable to give exact values for the relation between the color value of a sand and the strength of mortars made from the same sand. However, the tests made thus far show this relation to be about as follows:—

Color values of sand.	Reduction in compressive strength of 1-3 mortar. Per cent.
250	10-20
500	15-30
1,000	20-40
2,000	25-50
3,000	30-60

The reduction in strength is based on compression tests at ages of 7 days, 28 days, and 3 months, of 1-3 mortars made from the same sand, before and after coating with different per cents of organic impurities which had been extracted from defective sands and purified. Tests on mortars made from defective sands as received and after removal of the organic impurities, either by repeated extractions with sodium hydroxide or by ignition,