now being erected. The cantilever and the suspension forms are the two kinds commonly used, although there is also an increasing tendency to employ steel arches of considerable length. The Quebec bridge failure has had the effect of temporarily throwing the cantilever type of truss into some disrepute, but engineers must not let the pendulum swing too far because the cantilever has certain well defined advantages which should not be completely ignored simply on account of one failure of its truss members. Lamentable as was this failure, it has been the cause of inaugurating a searching investigation into methods of design that are founded upon empirical knowledge and much good is being derived therefrom. Resulting from the influence which the Quebec bridge failure had upon the engineering world there is a tremendous desire on the part of experimenters to discover new laws underlying the action of structural materials and to verify experimental methods of design which until recently were accepted as being sufficient for all cases that might arise in practice.

One hesitates to predict what developments science may bring forth in bridge engineering but it is probable that for the next decade progress will be made along three lines, the perfection and increased use of alloy steels, the production of structural shapes which are free from objectionable details of fabrication, and finally, the combination of steel and concrete into a composite structure in which the steel will afford great strength and the concrete will be a protection against corrosion and other destructive elemens.

ELECTROLYSIS TROUBLES FROM STRAY CURRENTS AND THE REMEDY.*

Dr. L. A. Herdt, in the course of a valuable paper on Railway troubles due to Electrolysis, observes that experience has demonstrated that the proper method of preventing electrolysis is to reduce stray currents to a minimum, and that the remedial scheme advocated by some to bond the tracks with the water and gas pipes, although it may afford local protection, increases the amount of stray current, and must not be encouraged. The cure for the electrolysis trouble should come from the electrical railway companies, as the owners of pipes, cables, etc., can do little, if anything, to protect their system from stray currents. The remedial means are simple enough if properly and intelligen ly applied.

1st. High conductance return circuit provided by good bonding of the rails and additional feeders.

2nd. Proper bonding and cross bonding work at all track intersections.

3rd. Sub-stations at different points of the railway system to limit the amount of current through the rails.

4th. Systematic inspection of track returns.

Of all the appliances used in electric traction the rail bond has been one which has given possibly the most trouble and to which little or no attention has been paid. Bonds are still in use composed of pieces of iron or copper wire crudely riveted to the rails, making little or no electical contact and are worse than useless.

A good bond should show a conductivity that will add to the resistance of the section of the rails an amount of more than 3 to 4 ft. of rail. All bonds whose resistance is greater than that of 4 ft. should be replaced or improved. Track intersections should receive careful attention. Heavy bonding and cross bonding should be used so that little or no potential difference exists from one side of a crossing to the other.

*Read before the American Institute of Electrical Engineers.

A sub-station system of power distribution does away once and for all with electrolysis troubles. In large electric railway systems the current fed out by the stations reaches into ten thousands of amperes. In such cases it is practically impossible to provide a return circuit of sufficiently low resistance if such currents have to be returned to one station only, otherwise potential differences between pipes and rails will be set up, giving rise to stray current and electrolysis corrosion.

In a large number of cases the electrolysis trouble is due to a concentration of current in the track near the station. The current density in the track must be kept low, if electrolysis trouble is to be avoided. Sub-stations equipped to feed from 2,000 to 3,000 kw. and placed at different points of the system will subdivide the current required for the operation of the cars. It will also improve the problem of distribution, giving better voltage and better service and will, as stated before, do away once and for all time with electrolytic troubles.

In making an electrolysis survey of a piping system, potential differences between pipes, rails, telephones, cables, etc., should first be taken in order to locate the areas in which the stray currents flow between pipes and rails and between pipes and pipes. These readings are easily obtained by using a high resistance centre zero reading portable voltmeter. These readings should be marked upon a map showing the general lay-out of the gas and water mains, and telephone cables. The lay-out of the tracks, showing size of rails, type of bonds and all negative copper supplementary to the rails should also be marked. The areas in which pipes assume positive potentials to the rails can be tinted red.

An examination of the general condition of the track returns, return feeders, location of stations, demand of electric current, condition of the soil, run of the underground piping system and cables, will usually give very good indications as to the places where electrolytic corrosion due to stray currents is likely to exist. The track returns should be under test in order to remedy at once any faulty bonds as they appear, and accurate records of the potential difference of the track to ground at different points of the system should be kept at hand.

WATERPROOFING BLUE PRINTS.

Waterproofing blue prints to be carried into wet mines or tunnels, is accomplished by the following process, according to the "Mining and Scientific Press." Immerse in melted paraffine until saturated a number of pieces of an absorbent cloth one foot or more square. When withdrawn and cooled they are ready for use at any time. To apply to a blue print, spread one of the saturated cloths on a smooth surface, place the dry print on it with a second waxed cloth on top, and iron with a moderately hot flatiron. The paper immediately absorbs paraffine until saturated, and becomes translucent and completely waterproof.

RAILROAD EARNINGS.

Railroad earnings for week ended July 31st:—

	1911.	1910.	Increase.
C. P. R.	$2,905,000	$2,752,000	+ $153,000
C. N. R.	427,700	360,600	+ 67,100
T. & N. O.	48,893	30,378	+ 18,515
Halifax Electric ..	7,591	7,172	+ 419

The returns of the Guelph Junction Railway Company for the quarter ending June 3rd last show the earnings of the road for the city for the three months to be $8,897.37, as against $8,066.09 for the same period of 1910.