

Concerning the highest practicable voltage, without reference to anything but insulators, it is safe to say that insulators for the heaviest mechanical strains and for the highest electrical stresses can be manufactured at moderate cost, so that limitations of transmitting voltages must at the present time be looked for in other directions than in insulator design, porcelain insulator design in particular.

Wherever the world insulator has been used, porcelain insulator is implied, for no other material has been so universally used in the past, and none gives such promise for the future. Its one bad characteristic, that of brittleness, is overcome by good designing; otherwise, the material is very nearly ideal for it is cheap and comparatively easy to manufacture. Of prime importance is its permanency, and of no other manufactured dielectric can as much be said. Porcelain is made under extreme conditions of heat which effects the cementing together of stable elements which have been in their present form for thousands of years, and under the conditions at present obtaining on the surface of this planet, will remain unchanged. Moreover, the porcelain is homogeneous and of a uniform texture throughout and consequently of uniform specific inductive capacity throughout, so that electrical strains are evenly distributed. On the other hand, organic materials are subject to very rapid deterioration; many unite with oxygen at ordinary temperatures or are attacked by rain water in a very short time. Heating by condenser action also aids in oxidation processes and hastens the end. A favorite method of insulating against low voltage is by means of compositions of rubber, gutta-percha, pitch, asbestos, ground mica, shellac, and the like, but the result is always the same, and a moment's contemplation of the reasons of failure would seem to argue against their use for permanent exposed insulation.

The past is full of unhappy experiences in the attempt to insulate high voltage lines with glass, rubber, mica, *et cetera*, and occasionally an engineer is found who is willing to erect lines of high pressure on insulators of material other than porcelain, but such engineers are so rare as to make it safe to say that, as a permanent dielectric, porcelain, to-day, stands alone.