

other works, and between the inner and outer portions of the concrete or masonry pillars supporting the floors of a building in which a fire occurs, make the thermal stresses approach the breaking strength of the materials and they are crushed or torn asunder." These stresses have hitherto been calculated only under the assumption of certain limiting simplifications. The author solves the problem in a more general way and shows "that for any temperature distribution, with any law of expansion, the stresses may be found by a simple graphical method so long as the variation of the elastic constants with the temperature may be neglected."

After the problem has been solved the solution is applied to definite cases occurring in industry such as the putting out of service of a pottery kiln. "The sudden cooling of the interior of a furnace such as that described above will therefore subject the interior of the wall to tensile stresses in both longitudinal and tangential directions much above the tensile strength of the material, and radial cracks will be produced at the inner surface, which, since the stresses are equal in the two directions, will run indiscriminately longitudinally and tangentially. Through the kindness of Sir Robert Hadfield I have been able to inspect the walls of furnaces which have been in use for various periods at the Hecla Works, Sheffield, and I find that the above results are confirmed by experience." An explanation is furnished also of the cracks which exist within columns that have been subjected to fire and which do not show themselves at the surface.

This paper will in the future be used in the design of structures.

G. F. S.

The Dielectric Constant of Mica. J. R. WEEKS, JR. (*Phys. Rev.*, April, 1922).—Eighteen samples of mica of twelve different grades were measured. For sheets without visible air films the value of the constant was found to range from 6.4 to 9.3. Sheets having included air films seemed to give values from 2.9 to 5.6. Thin sheets split from the sample which had given 2.9 were measured and the results varied from 6.6 to 8.4. Other similar experiments confirm the belief that the low results are to be attributed to the presence of air. Thus is probably explained the wide divergence between values of the dielectric constant of mica given in handbooks.

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The Departure from Ohm's Law in Gold and Silver at High Current Densities. P. W. BRIDGMAN. (*Phys. Rev.*, April, 1922).—A method has been devised of attaining current densities of 5,000,000 amperes per sq. cm. along with the possibility of correcting the resistance for the increase of temperature. With these high current densities the resistance was found to increase about 1 per cent., the proportional increase being larger in thick than in thin gold and also greater for gold than for silver.

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