The dead load loss due to the weight of a ball mill grinding media charge has been investigated as well as qualitative tests of the amount of power used to rotate a mill charged only with grinding media, wet and dry.

A few preliminary grinding tests are included mainly for the purpose of showing the weak points in the grinding circuit but also illustrating the effects of speed variation over a short range. The thesis outlines the foundation work for an investigation which will continue in the future.

M. ENG.   CIVIL

CLEMENT JOHN PIMENOFF

THEORY AND APPLICATION OF PHOTO-ELASTICITY.

A new optical method has been recently developed, by which it is possible to analyse transparent models for stresses.

The main principles on which it rests are:

1. The stresses in two dimensions are independent of elastic constants of the material.
2. Transparent materials become doubly refracting when strained.
3. At any point in a plane plate there are two mutually perpendicular stresses, called the principal stresses, acting on planes of no shear.

Thus, at any point there are three unknowns: magnitude of one of the principal stresses, magnitude of the other and the direction of one of them.

The direction is obtained by analysing the specimen between two cross nicols.

Difference of the stresses is obtained from measurements of relative retardations of component rays, emerging from the stressed plate.

Sum of the stresses is obtained by mechanical measurements of lateral deformation. In another method the stresses are obtained independently of each other by interferometer measurements.

M. ENG.   MECHANICAL

ROBERT ARTHUR RANKIN

POWER SUPPLY IN INDUSTRY.

Particularly in the manufacturing industries, choice of power supply merits considerable economic and engineering attention. On this continent, public service supply has been for many years the chosen method of power service and it can be added that a large percentage of this supply has water power for its source, although of course large steam central stations also carry their share of the industrial load.

However, no matter from what source marketable power may come, many cases do exist where the private power plant is by far the most economical proposition, and the more industrialized a country becomes, the more is this point realized.

In a properly balanced community, industry will recognise the value of co-operation with regard to the supply and use of available power and heat services. Public service supply from a water power or a steam power source and the private industrial plants are all together very necessary to produce the economic whole which will conserve our national resources.

M. ENG.   ELECTRICAL

CLARENCE HARRIS SHAPIRO

RELAY PROTECTION OF HIGH VOLTAGE ELECTRICAL POWER SYSTEMS.

The thesis is divided into three parts of approximately equal length.

Part I deals with the fundamentals of the Method of Symmetrical Components. Several theorems are developed and the behaviour of the various currents in networks analyzed. It contains also a series of short-circuit calculations on the 220 K.V. System of the Hydro Electric Power Commission.

Part II describes the eight most important synchronous machine reactances. Direct and quadrature values of the synchronous, transient and subtransient quantities are given close consideration. All of these reactances were measured: the methods and results are given. Oscillograms are included.

Part III first presents the fundamental principles of relay protection. Various schemes are developed for the protection of station equipment and all types of transmission systems. Latest developments and tendencies are noted. A typical problem with a solution is given in an appendix.