amount of damping on the galvanometer is small, then U and D will be small and

$$GC\frac{dP}{dt} = K\frac{d^2\theta}{dt}$$

$$P = \frac{K}{GC}\frac{d\theta}{dt} + C' \; (P = O \text{ when } \frac{d\theta}{dt} = U. \therefore C' = 0)$$

$d\theta/dt$ is determined by reading slopes on the recorded deflection-time curve. K/GC is determined by calibrating the gage in a testing machine. The gage is subjected to a known load P_0 and the galvanometer deflections θ_0 is read, then

$$\frac{K}{GC} = \frac{P_0 T}{2\pi(1 + \lambda/2)\theta_0}$$

where λ is the logarithmic decrement of the galvanometer. Computations are made to show the sensitivity of the system.

Actual pressure measurements in guns have been made with several gages. A comparison with other data obtained simultaneously indicates that the performance of the gage is in entire accord with the theory developed. Results are not available for publication.

SPECTROPHOTOELECTRICAL SENSITIVITY OF ARGENTITE (Ag_2S).[2]

By W. W. Coblents.

[ABSTRACT.]

THE present paper, considered in connection with some previously published data, represents a study of the effect of crystal structure upon photoelectrical sensitivity, as observed in silver sulphide, Ag_2S, in the isometric form argentite, and in the orthorhombic form, acanthite.

Experimental data are given on the effect of temperature, of the intensity of the radiation stimulus, and of mechanical working of the material, upon the spectrophotoelectrical sensitivity of argentite. These observations are then compared with similar data, previously published, on acanthite.

Argentite reacts slightly photoelectrically to radiations of wave-lengths 0.5 to 1.1μ, followed by a sharp, fairly symmetrical maximum at 1.35μ. In contrast with this is acanthite, which reacts quite strongly to radiations at 0.5 to 1.0μ followed by an

[2] *Scientific Papers*, No. 446.

unsymmetrical maximum at 1.35μ. Both minerals react selectively to ultra-violet rays.

At low temperatures, the intrinsic photoelectrical sensitivity of argentite is greatly increased and the maximum shifts to the short wave-lengths—to 1.1μ as compared with 1.2μ for acanthite, under similar conditions.

The photoelectrical reaction of argentite differs from that of acanthite in being free from an induced photo-negative polarization.

In argentite, as previously observed in acanthite (also molybdenite, etc.), increasing the intensity of the radiation stimulus produces a more rapid reaction in the long wave-lengths than in the short wave-lengths, with a consequent shift of the maximum of the photoelectrical sensitivity curve toward the long wave-lengths.

Hammering the crystals of argentite and acanthite into thin, pliable, plates lowers the intrinsic photoelectrical sensitivity. The position of the maximum of spectrophotoelectrical sensitivity of the worked samples is less affected by changing the temperature than obtains in the natural crystalline state; and it is practically the same for these two minerals, at low temperatures. From this it appears that aside from the effect of crystal structure, silver sulphide has a photoelectrical response spectrum characteristic of this substance.

From a comparison of the spectrophotoelectrical reactions of these two crystal forms of silver sulphide under various conditions it appears permissible to conclude that crystal structure has a marked effect upon spectrophotoelectrical sensitivity.

THE DECARBURIZATION OF FERRO-CHROMIUM BY HYDROGEN.[3]

By Louis Jordan and F. E. Swindells.

[ABSTRACT.]

THE recently developed "rustless" iron may be considered as a stainless steel from which the carbon has been largely eliminated. The carbon content of rustless iron is in the neighborhood of, or less than, 0.1 per cent. In order to produce an iron alloy containing as high as 12 per cent. chromium and still keep the carbon content as low as indicated, it is necessary to use ferro-

[3] *Scientific Papers*, No. 448.