Conclusions.

It would be too bold to draw anything like a general conclusion from the examination of a comparatively few number of specimens; but in so far as the present experiments show, we have the following conclusions.

1. In most of rocks, Hooke's law does not hold even for very small twist.
2. Elastic yielding for torsion is almost unlimited for certain rocks and generally its amount may be calculated by the formula
$$\eta = k \log t$$
where k is a function of the applied couple and the modulus of rigidity in virgin piece.
3. The modulus of rigidity is much affected by the variation of temperature.
4. The modulus of rigidity in virgin piece is much greater than that obtained by assuming Hooke's law.
5. If the modulus of rigidity means the ratio of the change of twisting couple to the change of twist, it is wholly indeterminate, in so far as its previous history as well as its present condition is not completely known.
6. When a piece of rock is twisted to and fro and afterwards released from the twisting couple, it may return to its original non-twisted state, but even in this case, it retains latent traces of previous treatment and it is far from being neutral.
7. As the effect of elastic yielding, a piece of rock, not virgin, may become twisted by itself without any external twisting couple. Moreover, it may become negatively twisted though the couple actually acting is positive.
8. Total amount of yielding at any stage after N' reversals of twisting and untwisting may be expressed quite

accurately by the expressions

$$\gamma_{\mathrm{I.\,II.\ldots N},\,p} = k \log \frac{\Gamma\left\{\sum_{\sigma=1}^{N'} i_\sigma + p + 1 - \mathrm{N}\right\}\left[\Gamma\left\{p+1-\mathrm{N}\right\}\right]^2 \prod_{\rho=1}^{\frac{N'}{2}-1}\left[\Gamma\left\{\sum_{\sigma=\rho+1}^{N'} i_\sigma + p + 1 - \mathrm{N}\right\}\right]^2}{\prod_{\rho=1}^{\frac{N'}{2}}\left[\Gamma\left\{\sum_{\sigma=2\rho}^{N'} i_\sigma + p + 1 - \mathrm{N}\right\}\right]^2}, \qquad N' = \text{even};$$

$$\gamma_{\mathrm{I.\,II.\ldots N},\,n} = k \log \frac{\Gamma\left\{\sum_{\sigma=1}^{N} i_\sigma + \mathrm{N} + 1 - n\right\}\prod_{\rho=1}^{\frac{N'-1}{2}}\left[\Gamma\left\{\sum_{\sigma=\rho+1}^{N'} i_\sigma + \mathrm{N} + 1 - n\right\}\right]^2}{\left[\Gamma\left\{\mathrm{N}+1-n\right\}\right]^2 \prod_{\rho=1}^{\frac{N'-1}{2}}\left[\Gamma\left\{\sum_{\sigma=2\rho}^{N} i_\sigma + \mathrm{N} + 1 - n\right\}\right]^2}; \qquad N' = \text{odd}.$$

9. The ratio of the increase of twist to the increase of twisting couple increases with the amplitude of the cycle, provided the centre of symmetry of the cyclic process is fixed.

10. The ratio of the increase of twist to the increase of twisting couple diminishes when the centre of symmetry of the cyclic process becomes more remote from the neutral state, provided the amplitude of the cycle remains constant.

11. The statements 9 and 10 show that so-called modulus of rigidity becomes less and less when the specimen becomes further and further twisted, but also that it increases when the specimen is strained. These two facts are apparently inconsistent, but they are to be accounted for by the existence of torsional hysteresis.