stresses from the observed ones was 13.0 per cent, whereas the standard deviation of the observed stresses from their mean was 14.4 per cent, so that no significant correlation was obtained. Since the work on calcite single crystals (*see* below) had indicated that $\{10\bar{1}1\}$ translation was important at 300°C, a similar test for correlation was tried assuming that deformation occurred by $\{01\bar{1}2\}$ twinning and $\{10\bar{1}1\}$ translation. The standard deviation of the calculated from observed stresses was 10.7 per cent—no significant correlation. Taylor's hypothesis of homogeneous grain deformation presumes no intergranular motion. The fabric of Yule marble deformed at 300°C indicates a considerable amount of intergranular motion. This is one possible cause for the poor correlation obtained.

Wet Yule marble.—The effect of interstitial water at 300°C is similar to that reported at 150°C (Part IV). Figure 2 shows stress-strain curves for varying amounts of water for *1* cylinders in compression. One experiment with a 10% $MgCl_2$ solution is included. Comparison of these curves with the similar curves of Figure 3 of Part IV might seem to indicate that the effect of water is less at 300°C than at 150°C. Such a conclusion would seem to us unfounded since our method of determining water content is not accurate; the two sets of experiments were carried out under different confining pressure; and the method of jacketing was different (in the earlier experiments some soldering flux was always present in the fluid).

As reported in the work at 150°C, microscopic examination of marble deformed wet at 300°C showed no differences from the dry specimens that could be attributed to the presence of the

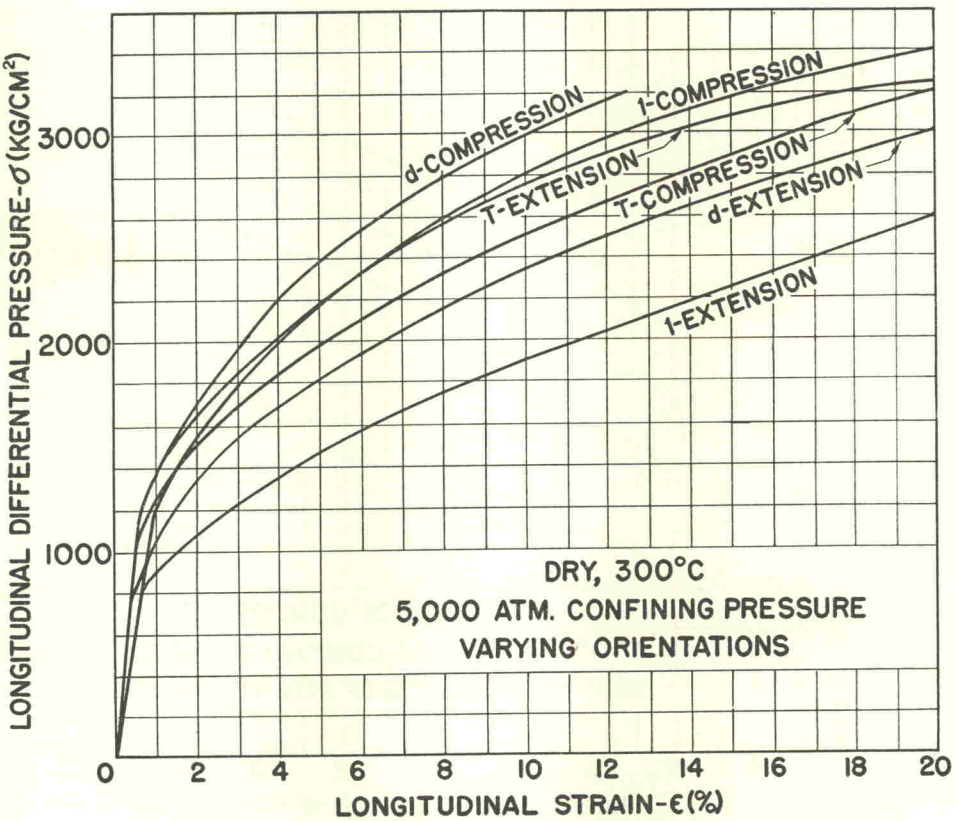

FIGURE 1.—STRESS-STRAIN CURVES OF YULE MARBLE

interstitial fluid. There is no evidence contrary to our previous conclusion that the main effect of water is mechanical. The amount of magnesium in the $MgCl_2$ solution was sufficient to cannot occur, the response of the specimen is definitely different from that at room temperature. Interpretation of thin sections of such specimens is difficult. Turner is undertaking an

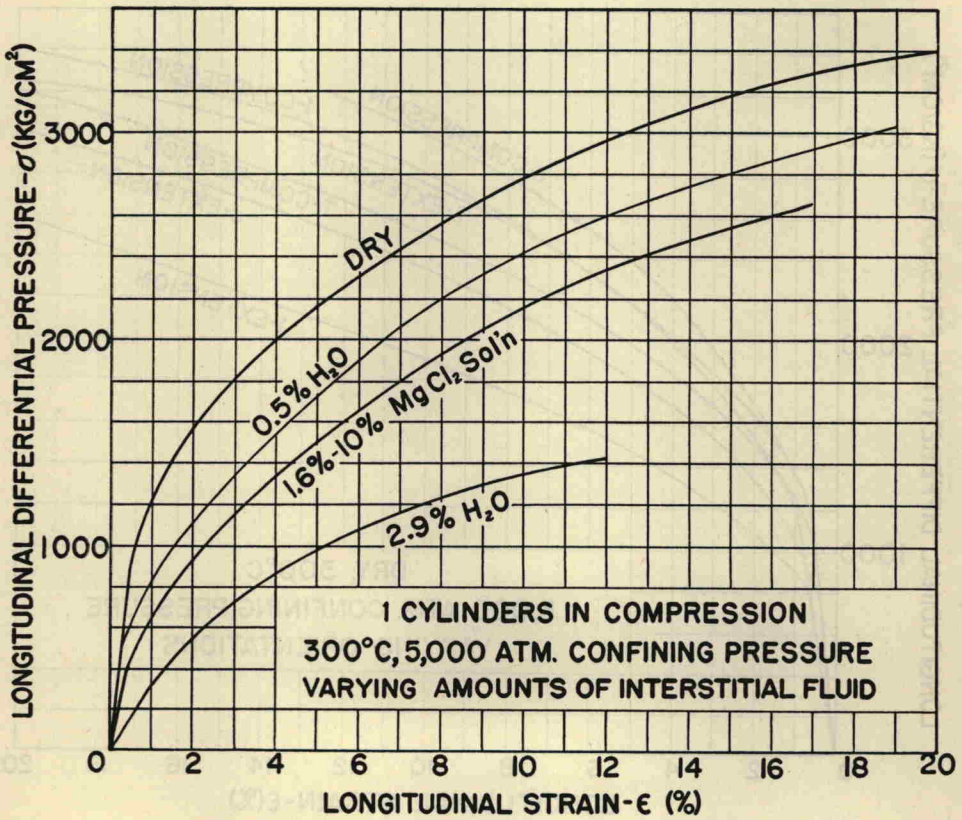

FIGURE 2.—EFFECT OF VARYING AMOUNTS OF WATER

dolomitize only 0.1 per cent of the marble if the reaction had gone to completion, so it is perhaps not surprising that this had no special effect. Attempts were made to use larger amounts of $MgCl_2$ solution, but these failed, owing to loss of cohesion of the specimen.

Single crystals of calcite.—Cylindrical specimens cut from single crystals of calcite in various orientations were deformed at 300°C, dry, at 5000 atmospheres confining pressure. When the orientation of the stress is such as to favor twinning on $\{01\bar{1}2\}$, the specimen twins in a fashion similar to that at room temperature and at 150°C, at the same critical resolved shear stress within our experimental error. When, however, the orientation is such that twinning intensive microscopic analysis of thin sections of all calcite single crystals which have been deformed at room temperature, 150°C, and 300°C. His results will be published separately. His work to date indicates strongly that translation on $\{10\bar{1}1\}$ is the dominant mechanism at 300°C.

Creep.—It was thought that a test of longer duration would accentuate intergranular motion (recrystallization). Accordingly, a *1* cylinder was tested in compression, dry, at 300°C for a 48-hour period. The stress-strain curve is shown in Figure 3. It was intended that the stress should be maintained constant at an appropriate value to produce 40 per cent deformation in 48 hours. The creep properties were