is evident from a consideration of these curves that there is no definite law between strength and age; but there are several facts, however; worth noting. For the neat cement tensile test pieces, water storage appears to be the most advantageous. The low one-month tensile strength obtained from specimens stored in the cellar and in the cage are probably traceable to the drying action which followed their removal from the water bath. Judging from the appearances of the specimens stored in the cage, the effective cross-section must be considerably decreased by the hair-cracks. It is also quite likely that the

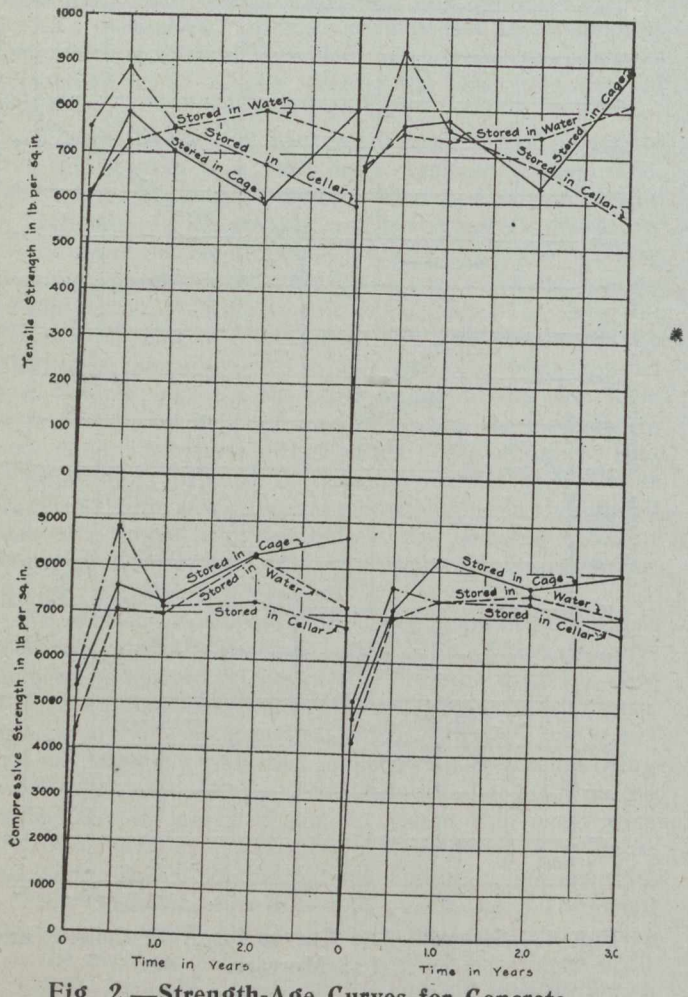

Fig. 2.—Strength-Age Curves for Concrete.

specimens subjected to either air storage condition were more brittle than the water-cured specimens. Consequently the effect of any eccentricity in the application of the load would have a more marked weakening effect than would be the case in testing the water-cured specimens. The compressive strength of the neat specimens does not appear to have been greatly affected by the differences in curing conditions.

The variations in curing conditions appear to have little effect on the strength of the 1:1 mortar specimens. Apparently they reached their full strength in tension when about one month old, and in compression when six months old; thereafter the variation was not great.

From a consideration of the age-strength curves of the 1:3 mortar specimens, it appears that either air-storage condition is ultimately much more favorable to high strength than the water storage. The discrepancies in strength are most marked for the tensile tests. Why there should be such a marked difference in the effects of curving conditions on neat and 1:3 specimens is not apparent. Possibly the greater porosity and the more permeable nature of the 1:3 mortar specimens may have a bearing upon this point. It seems quite evident, from a comparison of the results of the mortar tests with those obtained from the concrete specimens, that surface effects due to storage condition must have played a very large part in reducing the strength of the small mortar test pieces. It seems probable, therefore, that mortar specimens of the same mixture but larger in size would not have varied so much in strength.

The strength-age curves for the concrete cylinders are given in Fig. 2. It will be noted that they are much more regular than those for the mortar specimens and are indicative of continued strength, whereas some of the similar curves for the mortar test pieces show a gradual decline in strength. There is, however, a marked difference in the strength of the concrete subjected to different curing conditions. At most ages the water-cured concrete shows the greatest strength with the concrete cured in the open air a close second. The average strength of the water-cured concrete is about twenty per cent. greater than that of the cellar-cured. It will also be observed that the cellar-cured specimens lost the most

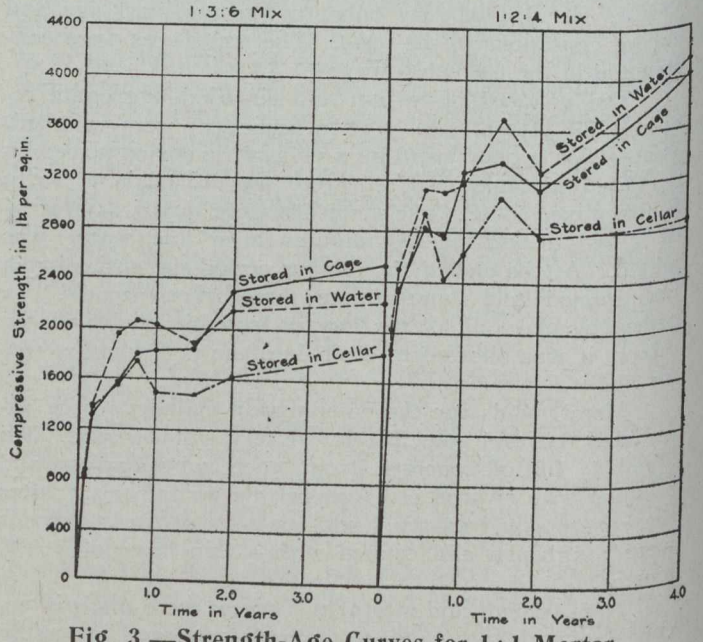

Fig. 3.—Strength-Age Curves for 1:1 Mortar.

weight, with the air-cured and water-cured following in the order named. It, therefore, seems probable that the diminished strength of the cellar-cured concrete was due to the dryness of the atmosphere surrounding the specimens.

One of the remarkable things about these tests is the effect which the moisture content in the surrounding medium has upon the concrete even after it is over a year old. Since only one brand of cement and one set of aggregates were used in the main portion of these experiments, it is not possible to draw wide applications from the results obtained. Nevertheless, it seems quite apparent that, under curing conditions which will ordinarily exist in well-executed constructions in this climate, we may expect concrete to secure the major portion of its strength in about six months to a year. The rate of increase in strength thereafter will be largely dependent upon the humidity of the atmosphere. From these tests it does not appear that there is any cause for fear of a decline in the strength of normally cured material.