With the exception of the 427°C test conditions where the average error was 6.2 pct, most of the calculated values fell within 5 pct of the corresponding experimentally determined ultimate strength, differing by 4.5, 3.9, and 3.5 pct, respectively, for the *RT*, 593 and 649°C test conditions.

Fig. 3 clearly leads one to conclude that the calculated values of the 0.2 pct offset yield strength is underestimated when using Eq. [3], especially for the case of the seven room temperature values shown at the higher stress levels. The calculated yield strengths for the case of the 593°C test conditions were within 1 pct of the experimental values and those for 649°C being within 7 pct. The calculated room temperature yield strengths were low by an average of 24 pct and those of the 427°C test conditions by 19 pct. A constant of 3.1 was also used for the calculation of the yield strength.

The present studies show that similar to the correlation of the room temperature ultimate strength levels with hardness values as presented by Tabor[2] and Cahoon,[1,3] the elevated temperature tensile properties may be obtained from corresponding hot-hardness measurements. Eq. [5], differing only by a constant from Eq. [1] shows excellent agreement for test temperatures up to 649°C. The calculations of the yield strength appears to be reasonable for only the higher test temperatures.

It is interesting to note that the average diameters of dislocation cells (subgrains), which are formed in tensile tests of 316 stainless steel specimens[5] do not change significantly in the test temperature range of 200 to 600°C and the same should be true for the case of 304 stainless steel. In addition, the strain hardening coefficient values are shown to vary inversely with the subgrain dimensions.[6] The substructure being an important parameter in the correlation of hardness with tensile strength is presently being evaluated with the use of a 200 kV transmission electron microscope. In particular, the dislocation arrangements in the region of the hardness indent and in the gage section of tensile specimens strained to values of about 8 pct are being studied.

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In the development of Eq. [14] it is necessary to use the derivative of Eq. [3]. The equations in the paper appear as if the change in Young's Modulus with f was neglected. However, we will show here that incorporating this consideration into the development does not change the result. Starting with Eq. [3].

$$\epsilon_p^* = \epsilon^* - \frac{\sigma^*}{E} \qquad \text{(Eq. 3 in text)}$$

It follows that,

$$d\epsilon_p^* = d\epsilon^* - \frac{d\sigma^*}{E} + \frac{\sigma^*}{E^2}\left(\frac{dE}{df}\right) df.$$

Knowing that $E^2 \gg \sigma^*$ the third term on the right can be neglected. The resulting expression is the form employed in the development of Eq. [14] in the paper. Therefore, including the change in modulus with f into the development, as it should be, does not modify the original results.