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# Temperature Changes Accompanying the Adiabatic Extension and Compression of Metals

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# TEMPERATURE CHANGES ACCOMPANYING THE ADIABATIC EXTENSION AND COMPRESSION OF METALS

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The metals in the form of vertical wires are extended and compressed by the addition and removal of a load within the elastic limit. The temperature change is a transient effect, the magnitude of which was originally worked out by Lord Kelvin to be

$$\vartheta = \frac{tep}{Jk\varrho}$$

where $\vartheta$ = temperature change
$p$ = stress
$t$ = temperature (Kelvin)
$e$ = linear coefficient of expansion
$J$ = mechanical equivalent of heat
$k$ = specific heat ($C_p$)
$\varrho$ = density

A modified Carey Foster resistance bridge is used, comparing the resistance of the wire with a standard. Since the effect is of short duration, the wire is inside a polished stainless steel tube to permit more time to balance the bridge, as the method used is practically a null method.

Allowance is made for changes in resistance due to tension. So far the results are satisfactory although the changes on compression have been larger than those on extension in the case of steel wire. After a cyclical loading-unloading of the wire, the two values have come pretty well together. Similar results were found for tungsten and nickel.

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# A STUDY OF THE EFFECTIVENESS OF PROBLEM SOLVING ON ACHIEVEMENT IN COLLEGE PHYSICS

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A study was made between matched pairs of students from two separate years. One year the students were assigned problems but no check-up was made as to whether the problems were solved. The next year the same textbook and lessons were used, but the students were required to hand in six solved problems three times per week. The criterion of success was the scores made on the