

Memo to: Dr. Kehoe

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From: Biometrics

1. Concerning Table 5 the mean for Phase III equals to 6.97 and the standard deviation to 5.38. The coincidence between the old mean and standard deviation, based on 445 cases, and the new mean and standard deviation, based on 952 cases, would indicate extreme reliability of the methods of measurement.

An overall test of significance, testing the hypothesis that the means of Phase I, Phase II, and Phase III have been drawn from a common population of measurements must be rejected. The analysis of variance gives a value of $F = 20.78$ (degrees of freedom 2 and 1,765) - the probability of obtaining an F of that magnitude, or greater, by chance alone is extremely small (less than 1/1,000,000).

Testing the difference between Phase I and Phase II by Students t , one obtains a value for $t = 3.84$ (degrees of freedom 815) which again indicates that the difference between Phase I and Phase II are reproducible with a high degree of reliability.

2. Concerning Table 1, the hypothesis was tested that the means for Phase I, Phase II, and Phase III, obtained at the Fueling Island, were drawn from a common population of measurements. The analysis of variance gives the value of $F = 154.27$ (degrees of freedom 2 and 185) again the probability of obtaining F of that magnitude, or greater, by chance alone is extremely small (less than 1/1,000,000).

A value of t computed between the means of Phase I and Phase II taken at the Fueling Island equals to 49.17 (degrees of freedom 94) which again indicates that the difference between Phase I and Phase II are reproducible with a high degree of reliability.

3. If the relation between temperature and humidity on one hand and lead on the other is taken into consideration one would expect differences between Phases I, II, and III to be in the same order in which they were observed, however, the magnitude of the difference would not be as great (.26 between Phases I and II, .34 between Phases II and III. These figures were estimated on the assumption that the relationship found for the last three weeks of Phase III held throughout the study.)

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One other item of note is the small standard error of the observed differences. For instance, for Table I the standard error of difference between the means of Phases I and II equals to .012. That means that a difference as small as .05, between the means of Phases I and II, would have yielded a highly significant statistical difference (i. e. t would have equaled to 4). This raises the question whether the observed statistical differences can be related to practical differences. Statistical analysis cannot answer this question with the present data.

4. Because of the small error of measurement the single deviating value of Phase I can be eliminated as an accident.