Comments and Communications

Inspection of Simple Relations among a Number of Variables[1, 2]

EXAMINATION of all interrelations among measured variables is difficult, and the difficulty increases as the number of variables increases. Thus, 45 simple correlations exist among 10 variables, but 780 among 40. To detect striking correlations between any two variables in complex data more readily, a device has been developed that permits visual inspection of coded data (Fig. 1).

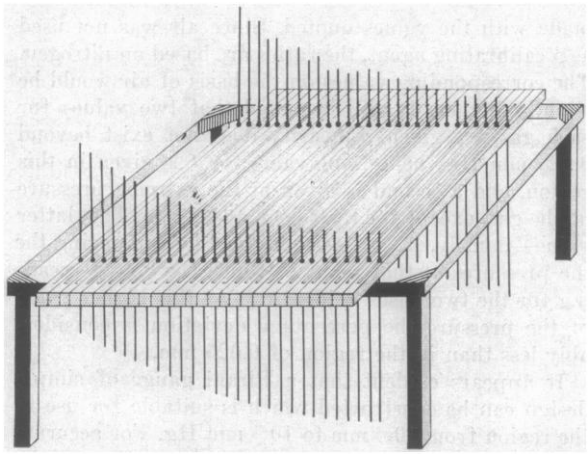

FIG. 1. Pinball device. Only two variables measured for each of 28 objects are shown; i.e., 28 bars are shown.

The device consists of a rack, or frame, on which rest the ends of a number of slotted metal bars. Each bar represents one of the objects, or organisms, or units of any kind on which measurements were made. Each bar carries a number of pins mounted in little balls that are free to slide along the slot. Each pin represents one variable in one object. The length of each pin protruding above a bar is adjusted to represent the measured value of a variable in one object. The same variable occupies a similar position on each bar. The slots in the bars are long enough so that any two sets of pins (i.e., two variables) can be slid far enough from the other pins that their protruding lengths can be visually compared without interference from other pins. In Fig. 1, for the sake of simplicity, only the front and back rows of pins are shown.

In use, all pin lengths are first adjusted to represent the measurements obtained. One variable is selected as the basis for the first series of comparisons. The bars are then arranged so that the pins representing that selected variable are in the order of their protruding lengths, ascending or descending. This is illustrated by the front row of pins in Fig. 1. The back row in Fig. 1 represents a variable that is, in this illustration, closely related to the selected variable. The other variables (omitted) are then compared, one at a time, with the selected variable. Each comparison is made by sliding each set of pins away from the others so that the newly isolated set may be inspected for any possible regularity in length. Findings are entered on a check list. Next, a second variable is selected as the basis for the second series of comparisons. The bars are rearranged so that the second set of pins is in the order of their protruding lengths. As the work proceeds, the number of new comparisons possible for each rearrangement of the bars decreases.

This device has been useful in inspecting data from a number of measurements made on each of a series of animals. We have observed regularities and curvilinear correlation that would be obscured in calculation of correlation coefficients, the usual assumption being homoscedasticity of data.

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A Thermal Precipitator for Aerobacteriology

THE phenomenon involving the precipitation of small airborne particles on a cold surface from the influence of a warmer surface has been known for some years. Aerosol samplers based on this principle have been referred to as thermal precipitators. With

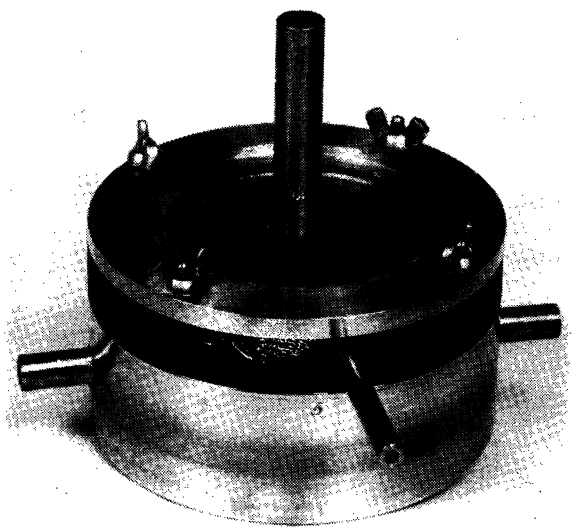

FIG. 1.