Letters to the Editor

Discussion of "Technical Shortcomings of Doppler Traffic Radar"

Dear Sir:

Although the October 1985 article "Technical Shortcomings of Doppler Traffic Radar" (Vol. 30, No. 4, pp. 1186–1193) was technically correct, I was somewhat surprised to see it in the *journal* for the material presented was not new. Indeed, the scope of radar training for many law enforcement agencies exceeds the material presented by Mr. Goodson.

Further, although Mr. Goodson calls the difference between a radar indicated speed and true speed an "error," it is actually a characteristic of use. The radar unit is actually "seeing" what it displays and is not committing an error in its logic to arrive at the display readout. In the case of stationary cosine angle effect, the competent operator is aware of the phenomenon.

Similarly, Mr. Goodson's complaints regarding moving cosine "error" and nonspecificity are not errors per se, but require proper radar usage training to understand. Operators are taught to compile a target tracking history for each law enforcement target by use of the officer's visual observation, Doppler audio confirmation, and radar verification. Unless all parts of such "history" confirm each other, there should be no enforcement action.

It is true that oscillator frequency error, rare though it is, is a true or mechanical/electronic error. However, operators are currently taught to further cross-check the radar display with a certified speedometer comparison over a known distance.

Also, a radar unit should not be used on a multilane roadway unless the traffic pattern is such that targets are widely separated. Further, the "tactical advantage" of "hiding over hills or behind obstructions" is to control environmentally the range of the radar unit so the officer can make more intelligent determinations regarding the tracking of a target.

Lastly, I am in agreement with Mr. Goodson regarding the problem of unconscientious operators. Indeed, many progressive law enforcement agencies have upgraded their radar training and usage procedures in an attempt to prohibit the use of radar by untrained operators.

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Discussion of "Estimating Height and Weight from Size of Footprints"

Sir:

In the work of Dr. Louise M. Robbins concerning the estimation of height and weight from the size of footprints (Vol. 31, No. 1, Jan. 1986, pp. 143–152), a statistical treatment of data was presented that, in our view, is unsound and potentially misleading.

Dr. Robbins first set out to test the hypothesis that a 15% foot length to stature ratio exists. She demonstrated a 0.95 to 0.99 correlation between right and left footprint and foot outline measurements. We wish to point out that given this high degree of correlation, no additional strength is imparted to the relationship of footprint to stature by her investigation of the ratio of left foot outline to stature versus right foot outline to stature; we raise the same objection for a comparison of footprint length to stature *ratios*. We also question the empha-

sis placed on relating *both* footprint and foot outline to stature, since they are so highly correlated. The proper statistical approach to associate two highly correlated variables to a third variable would be to invoke multivariate analysis, which Dr. Robbins has not done. Dr. Robbins also attempted to estimate weight from measurements on foot outline ball width and footprint width. Again, in developing these weight estimates, we believe that undue emphasis has been placed on comparisons of correlated data.

As an example of the considerations applicable to the evaluation of correlated data, one might question the necessity for measuring separate parameters as estimates of height and weight. If height has already been estimated from a foot length measurement, then a reasonable question is how good a predictor is foot breadth, *over and above* that which may already be predicted on the basis of the moderate correlation between height and weight? Employing a multivariate approach would provide an indication of the degree of correlation of foot breadth to weight, *with the effects of height on weight removed.*

While it is not uncommon for researchers to fall into the seductive trap of overemphasizing relationships between correlated data, it is uncommon to see the casual use of ranges, standard deviations, and confidence intervals in the manner presented in Dr. Robbins' article. "Cautiously providing a margin of variation . . ." is neither a proper nor prudent utilization of the statistical information potentially embodied in her study. In addition, Dr. Robbins makes a point to note that "superfluous information was generated" while attempting to provide an equation describing the predicted height from a specific measurement. On the contrary, this "superfluous" data—presumably a regression equation based on the method of least squares estimators—is in our view the *essential* data if the data presented by Dr. Robbins are to be accepted. To the extent possible, the forensic scientist needs access to a method for predicting a *single* new value y (in this case stature) corresponding to a particular observed value of x (in this case foot outline). Moreover, an estimate of the variation of the predicted value and a prediction interval which contains the estimate with a stated level of confidence would represent the most objective manner in which to present findings.

Dr. Robbins has seemingly presented a good, fundamental data set, and we take no exception to these data. But she has failed to reveal the elements necessary for objective, predictive estimates to be drawn from the data, for example, the "best" straight line for a given relationship, the associated means for each variable (as opposed to ratio means), their respective standard deviations, sums of squares, and variances. While it may seem tedious to do so, it is in fact possible to arrange data in a format that will enable the estimation of the variance associated with a predicted value and the calculation of a prediction interval from a single observation.

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