munochromic reactions. Their recent paper (2) demonstrates that human serum albumin can be determined by turbidimetric measurements with an unmodified centrifugal analyzer and with a final albumin reaction concentration of 0–4 mg/liter. This albumin reaction concentration represents a final serum dilution of 21/600. Our reference to turbidimetric measurements was made in the first paragraph of the Discussion section (9), in our attempt to point out the difference in the terms “turbidimetric measurement” and “light-scatter measurement,” and it was directed in particular to the miniature Fast Analyzer, in which a rotor with a 0.5-cm path-length cuvette is used. We intended no reference to turbidimetric measurements made with other instruments, but obviously it can be so inferred.

However, I cannot agree with the remainder of the Letter, which attempts to explain why turbidimetric measurements are more sensitive than light-scatter measurements. Blom and Hjärne demonstrated a maximum absorbance change to 0.060 A for their highest albumin standard under their reaction conditions (e.g., 0.4–4 mg of albumin per liter of final reaction mixture). Under the reaction conditions used for the light-scatter measurements, they used similar specific protein concentrations in the reaction, with full-scale sensitivity being achieved at reasonably low photomultiplier voltages (400–600 V). They further refer to the total measurement of ΔI change (in turbidimetric measurements) as opposed to a part (in light-scatter measurements) as a logical physical justification for the greater sensitivity of turbidimetric measurements. ΔI for turbidimetric measurements is a loss in intensity of the impinging light source because of light scatter, not because of increase or decrease in absorbance, and it represents a small change in a large signal. ΔI for light scatter (a different entity), although a measurement of only a fraction of the total 360° light scatter as seen by the detector, is a measurement of a significant signal over a small background signal.

The discussion of which method is more sensitive is a minor point, however, in the realization that clinically useful procedures have been set up that may speed up the analysis process, that can provide test economy, and that provide a convenient means of determining several specific proteins in human serum and plasma.

References

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Instrument Control by Computer an Improvement?

To the Editor:
The recent paper by Davis and Lewis [Clin. Chem. 21, 1221 (1975)] illustrates an important pitfall in the conventional approaches to laboratory computerization. These authors have undertaken to design a computer interface for the SMA 12/60, so as to increase its productivity. After expenditure of $25,000 in direct costs and a much larger amount in labor costs, what have they produced? A reduction in useful channels from 12 to 8, and an increase in rate from 60 to 120 samples per hour—a net gain of 33%.

The resulting assemblage is more complex, hence more unreliable. If the system goes down, you lose 120 specimens per hour instead of 60. No technologist time is saved, not all malfunction are observed—indeed, there are some that clearly no computer interface can observe. Once it is set up, the equipment locks in the laboratory to the existing methodology: alterations are likely to be as expensive as the original development.

But is there any alternative? Yes: first, spend the money for a second 12/60 to get redundancy in the most unreliable component, and then design your operation to use the efficiencies of keypunching. A full hour's output on a 12/60 can be keypunched in 15 min; the delay is insignificant in the overall laboratory report cycle, but the operation significantly improves the chances of detecting errors in overall laboratory processing of the specimens. Build into the system features that facilitate checking of results by technologist and professional staff; this cannot be overlooked if we are to meet our professional responsibilities to the patient.

A system of this kind has been running successfully for five years in our laboratory.

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The authors of the paper in question respond:

To the Editor:
Dr. Raymond appears to have some misconceptions about our device, and we appreciate this opportunity to reply to them. Our paper reported preliminary results from a feasibility study. Since that report was submitted, however, the prototype has operated successfully on all channels of the SMA-12 at 120 samples per hour. Contrary to Dr. Raymond's inference, the microprocessor controller is physically less complex than the original controller it replaces. There are no cams or mechanical relays. We have changed methodologies on our instrument, and the controller parameter table was modified in a matter of minutes to accommodate the changes. No program modifications were required.

We feel that one of the most significant contributions of microprocessor technology to clinical computerization will be in instrument reliability and data integrity. A large proportion of the software in our controller is dedicated to checking both the instrument and the controller itself to assure proper operation.

At least two firms have announced computerized replacement controllers, and data will soon be available from which to judge whether we or Dr. Raymond are correct.

Our paper concerned dedicated computer control of a single instrument, not the laboratory data-handling task implied by the phrase "laboratory computerization." It has been 3½ years since we abandoned a keypunch reporting system (similar to Dr. Raymond's) for a computerized on-line laboratory system. We have no regrets. Furthermore, a recent study from our laboratories [Clin. Chem. 21, 1648 (1975)] shows manual keyboard entry to have a higher error rate than on-line data collection.

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Laboratory Computers: On- or Off-line?

To the Editor:
The issue raised by Drs. Davis and Lewis in their reply (this issue) is possibly the most significant one facing our profession today. If they are right and their view is widely accepted, we shall see a change in the practice of clinical chemistry (and of clinical pathology generally) that will equal or exceed the effects of automated analy-