laboratory, the authors sent us 13 such samples. These were assayed in our laboratory, with the following results:

**Mean Na, mmol/L**

NOVA 1 143.4
IL 343 139.8

The mean difference of 3.6 mmol/L differs significantly from the authors' reported mean difference of 5.6 mmol/L. The results in our laboratory for these samples were about 1% higher than [would be expected from] the worldwide experience over the last two years with the NOVA 1 Sodium/Potassium Analyzer as compared to flame photometry. Our results are also consistent with a recent report by Ladenson (1). An extensive study conducted at New England Medical Center in accordance with FDA required "proof of claim" studies showed less than 0.5% difference between NOVA 1 and flame photometry.

Results from hundreds of NOVA analyzers in use throughout the world typically show results averaging about 1–2% higher than flame photometry. The lower values found by flame photometry have been conclusively demonstrated to be a result of the volume-displacement effects of normal concentrations of plasma proteins and lipids.

Annan et al. omitted reference to a large, and growing body of data that demonstrate that sodium and potassium results by direct potentiometry (electrode measurements on undiluted samples as in NOVA 1) are free from the analytical errors encountered with both flame photometry and electrode-based systems that involve dilution when analyzing samples containing high concentrations of proteins and lipids. It has been recognized for many years that falsely low electrolyte results (e.g., pseudohyponatremia), as reported by flame photometry, cause considerable difficulty in clinical diagnosis. These errors are the result of plasma water displacement by abnormally high lipids and (or) plasma proteins. This effect is quite independent of the often parallel effect of higher sample viscosity on diluting mechanisms. It should be noted that normal protein and lipid concentrations account for the small differences in normal values cited above.

In summary, the NOVA 1 Analyzer reports results that are comparable to flame photometry in patients with normal values for plasma proteins and lipids. Furthermore, in samples with increased proteins and (or) lipids, results obtained by flame photometry will be erroneously low.

References


2. Flannery, J., Differences in electrolyte results as measured by direct potentiometry (ion selective electrode) and flame photometry. (Pre-prints available from NOVA Biomedical).


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The authors of the paper in question respond as follows:

To the Editor:

In our Letter (1) we reported our experience with a direct potentiometric ion-selective analyzer (NOVA 1) for the measurement of sodium and potassium. Although we stated that the instrument measured sodium and potassium in whole-blood plasma, separated plasma or serum, or urine, we accept Levy's comment (Clin. Chem. 25: 1516, 1979; Letter) that direct potentiometry was not referred to in the title of the Letter.

There appears to be a misunderstanding by Coleman with regard to the specimens that we sent to NOVA Biomedical for analysis. We did not select "samples that showed the largest differences in sodium results by NOVA 1 and flame photometry." We sent seven patient's specimens that were randomly selected from our routine daily requests for multichannel analysis, together with six specimens from laboratory staff in apparent good health. For these 13 specimens we found a mean sodium difference between NOVA 1 and flame photometry of +4.2 mmol/L, as com-

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**Fig. 1.** pH, log pCO₂ equilibration lines for G.A.S. (---), D.B.C. (-- - -), and Quantra (----) measured at 37°C. **pO₂** measurements. They are suitable for pH and pCO₂ control, but share the principal drawback of not "buffering" for oxygen in the same way that blood does.

References


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More on Na⁺ Determination by Ion-Selective Electrode vs. Flame Photometry

To the Editor:

A recent Letter (Normal range for serum sodium by ion-selective electrode analysis exceeds that by flame photometry. Clin. Chem. 25: 643, 1979) requires reply for matters of commission as well as omission. The authors state that NOVA Biomedical has confirmed the magnitude of the reported differences in sodium values. In response to our request for those samples that showed the largest differences in sodium results by NOVA 1 and flame photometry in their