The Pittsburgh Conference: A Special Instrumentation Report

The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, already the largest of its kind in the world, continues to grow. At the 29th annual session, concluded early this month in Cleveland, the number of instrument and equipment companies exhibiting at the show increased 14 percent to 365, the number of technical papers leaped 38 percent to 668, and the total attendance rose by 21 percent to 14,600. For the first time in conference history, a woman—Jane H. Judd of Westinghouse Electric Corporation—was president of the event; also the number of women attending the event seemed larger than in the past. One highlight of the meeting was the greatly increased number of instruments and accessories for HPLC, an acronym that once meant high pressure liquid chromatography, but that now seems to stand for high performance liquid chromatography; meeting veterans suggested that this proliferation was even greater than that which occurred when gas chromatography first became popular more than a decade ago. Perhaps the most interesting sidelight of the meeting was the jockeying between the mayors of Cleveland and Pittsburgh for future meeting dates, which are estimated to bring more than $6 million in business into the host city. The conference will definitely be held in Cleveland next year but Pittsburgh mayor Richard S. Caliguiri flew into town on Monday of meeting week to lobby for the conference's return to Pittsburgh in 1980, when that city's convention center should be completed. Cleveland mayor Dennis J. Kucinich, who, unlike his predecessor Ralph Perk, begged off from attending the traditional opening ceremony because of a crowded schedule, suddenly found some free time to attend the conference and lobby the committee members himself. It seems likely that the conference will remain in Cleveland, despite the fact that the conference strains the city's hotel and motel industry almost to the breaking point, because Pittsburgh's convention center will have less floor space than Cleveland's and because Pittsburgh has fewer hotel rooms. Considering the time of year when the meeting is held, however, many attendees argued that any move should be southward. Some cast an unofficial vote for future conferences to be held in Nassau or Miami Beach.

Microprocessors: More Instruments Are Becoming "Smart"

Again this year, the most striking aspect of the Pittsburgh Conference was the abundance of instruments with integrated microprocessors. These sophisticated silicon chips have found their way into the complete spectrum of instruments ranging from state of the art gas chromatograph–mass spectrometer systems to relatively inexpensive hand pipettes. The incorporation of microprocessors has undoubtedly increased the quality of many instruments and made them easier to use, but there has also been some concern that extensive manipulation of data by the microprocessors can, in some cases, conceal defects of the instruments.

Microprocessors—programmable integrated circuits on one or a few silicon chips—have become a staple ingredient on "Cadillac instruments," the relatively expensive, top-of-the-line equipment for atomic absorption, ultraviolet, and infrared spectroscopy, among others. The need for rapid operation of the instruments and for collection and processing of large amounts of data have made microprocessors all but indispensable. Microprocessors are also appearing more frequently in the "Chevrolet" models, where the same obvious advantages occur. In some of the newer applications, though, the advantages of a microprocessor, while still present, are not as immediately apparent.

Consider, for example, the Microlab P, a microprocessor-controlled hand pipette introduced at the meeting by the Hamilton Company. The $1750 syringe with a motorized plunger is designed to replace a $100 hand pipette, a proposition which at first glance seems ridiculous. But, Hamilton says, a typical hospital laboratory purchases about 20 hand pipettes each year, and these 20 can be replaced by one Microlab P at a net savings and with increased versatility. The Microlab P can be used, for example, as a repeating dispenser for continuous dispensing, as a burette for microtitrations, as a dispenser for serial dilutions, as a transfer pipette for routine work, and as a repeating dilutor—all with an accuracy and reproducibility that cannot be matched by any other type of system.

Another somewhat surprising place where microprocessors have made an appearance is in electronic top-loading balances. Most manufacturers now incorporate some type of chip circuitry to provide such functions as automatic taring and digital readout. Scientech Inc. and the Sartorius division of Brinkmann Instruments Inc., however, now produce microprocessor-equipped balances that offer a much wider range of functions. The chief advantage of these instruments, according to John Holman of Scientech, is that they can incorporate features in the programming or software that could previously be achieved only with specialized circuitry. Instruments from both companies can, for example, average weights over time to give accurate weights in the presence of wind or vibrations or when weighing live animals. They can also be used for parts counting, or for determining the mean weight of, a series of objects, among other things, and can readily convert weights from grams to other units. A typical balance of this type costs about $1600.

Other microprocessor-equipped instruments at the show were more conventional, but some represent advances in instrumentation. Fisher Scientific Company and Leco Corporation, for instance, each introduced microprocessor-controlled sulfur analyzers suitable for use on samples of coal, oil, and metals. Both instruments have ovens that oxidize sulfur in the sample to sulfur dioxide. In the Fisher instrument, the amount of sulfur dioxide is then determined by electrochemical titration in a pyridine-based solvent. In the Leco instrument, a prototype of which was displayed at the conference, detection will be accomplished either by a similar titration or by infrared spectroscopy. In each case, a complete analysis can be carried out in as little as 2 minutes. The new instruments retail for about $8000 each. Less sophisticated sulfur analyzers now on the market sell for as much as $23,000.

Speed of operation is one of the major

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