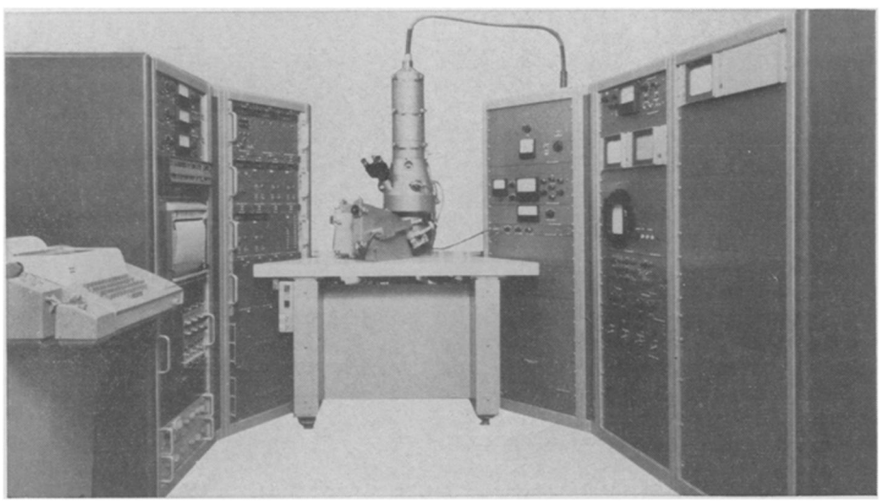
new products

Microprobe-microscope



An automated and computer controlled instrument has been devised—the first of its kind, according to Materials Analysis Co.—that combines two analytical instruments in one. The instruments are the electron microprobe and the electron microscope. The result is a combination electron microprobe analyzer and scanning electron microscope that is capable of making complex observations and recordings because of its automated features.

The scanning electron microprobe component works by directing a fine beam of electrons back and forth over an area. This primary beam produces secondary electrons that can be electronically bent by a collector to give a tremendous depth of field in which minute details are completely in focus.

The microprobe also relies on a primary beam but instead of secondary electrons, X-rays characteristic for specific elements are produced. These X-rays are analyzed by a spectrometer, which incorporates the principle of X-ray diffraction to measure the specific angles of X-rays to identify each element.

By combining these two techniques, researchers in biology, for example, can examine a cell with the scanning microscope and upon discovering a peculiar object analyze it with the microscope to determine its composition. Similarly, investigators in materials science, geology, paleontology and dental research, among others, can apply the instrument to their work.

The fact that the system is computer-controlled means that the computer can direct the microscope to scan in any direction. Graphic presentation possibilities include either a micrograph or a topographical map showing areas of high and low element concentration.

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Sulfur dioxide analyzer

Sulfur dioxide is so important an air pollutant that the Federal Government and many states have used it as a gross indicator of the extent of air pollution.

Most instruments that measure it, however, have a major drawback. They do not monitor it continuously, and what the observer gets are average measurements, taken at various times throughout the day, with large gaps in between. The result is that at 3 o'clock, for example, a plant could be discharging tremendous quantities of sulfur dioxide into the air but at 3:15 be well below the limit, and the observer would never know it.

This problem has been overcome with a sulfur dioxide analyzer from Calibrated Instruments, Inc. It gives a minute-by-minute account of the sulfur dioxide content of the air. The device, called the Ultragas Analyzer, is able to do this because it reduces reaction time. Most instruments have a lag time of as long as 25 minutes. The high-speed electronics of Ultragas give it a lag time of only 17 seconds. This permits continuous measurements to be made to show even momentary passing plumes of sulfur dioxide.

Futhermore, the instrument can run for eight days unattended.

The chemical reagent it uses to detect the sulfur dioxide is a solution of hydrogen peroxide and sulfuric acid. This permits it to distinguish between sulfur dioxide and other pollutants, such as carbon dioxide, hydrogen sulfide and sulfur trioxide, something many other sulfur dioxide detectors cannot do.

It comes equipped with an integrator, which can average all the individual minute-by-minute readings together for 15- 30- or 60-minute time periods and then print them out so the observer is not confronted with reams and reams of data. The instrument is portable and uses only 60 watts of power or 90 watts with the optional integrator.

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Atomic models

To understand the fundamental nature of atoms and the basis for chemical reactions, it is important to study the orientation of electrons around the nucleus. The electrons are arranged in different orbital configurations determined by their different energy levels. In order to make the concept of orbital relationships more understandable to students, ATOModels Co. has put out styrofoam sets of the individual atomic orbitals. Mounted on welded stainless steel axes, these models are about eight inches high and easily visible from the rear of large lecture halls. Visibility is further enhanced by the bright orange, red and yellow colors of the models.

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Syringe pump

Analytical chemists, biomedical researchers and clinicians are continually faced with the task of introducing liquids into a system, whether the system be an analytical instrument such as a chromatograph or a human being requiring treatment with radioactive isotopes or a drug. To insure that a uniform and accurate flow rate is obtained, many mechanical pumps have been designed which pump fluid from a syringe at a controlled speed. Because they can perform such feats as pumping from several syringes simultaneously and withdrawing as well as infusing fluids, their cost is high.

Sage Instruments, Inc., after a survey, found that a sizable percentage of applications did not require such extras. It has designed a syringe pump to meet basic needs. The less expensive and more compact pump handles one

syringe at a time with a maximum size of 50 cubic centimeters and a minimum of one microliter. With any given syringe, the pump offers 22 different flow rates. The rates are relatively close together—no more than a factor of one-and-a-half apart. A spring-loaded holder makes for quick changing: The holder is lifted up, the old syringe taken out and the new one put in.

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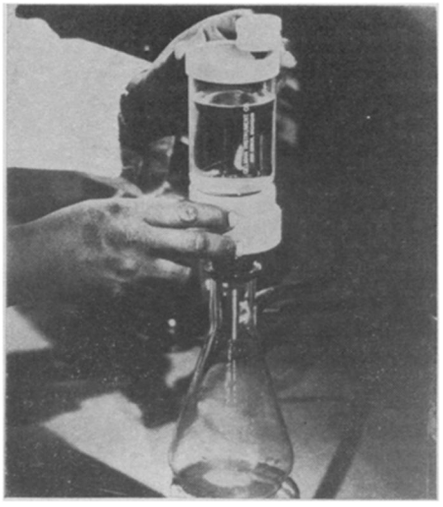
Filter funnel



In many areas of drug research, radiological analysis, water pollution investigation and cancer cell studies, the ultrafiltration of liquids is required to separate out extremely small particles or microorganisms. Gelman Instrument Co. has developed a filter funnel system that offers greater protection from outside contamination during the filtration process.

Heart of the system is a triacetate Metricel filter 47 millimeters in diameter that can filter particles as small as 0.2 micron. The funnel itself is made of borosilicate glass which gives it the heat resistance of Pyrex glass. Instead of metal clamps, which can prove a problem if they slip either from improper application or from repeated autoclaving, a silicone rubber collar connects the funnel to a stainless steel base. Since the silicone is inert, it will not react with chemicals, thereby preventing corrosion.

An added feature of the system is a second filter in the funnel top for airborne particles.

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