



Bausch & Lomb/Canada

From its base of operations in Ottawa, Bausch & Lomb/Canada has become internationally known as one of the most respected — and innovative — companies specializing in the design, development, and manufacture of scanning electron microscopes (SEMs). B&L/Canada was formed in 1980, when SEMCO Instruments Company, Ltd. of Ottawa joined Bausch & Lomb. By combining SEMCO's technological virtuosity with Bausch & Lomb's manufacturing expertise and international marketing experience, the operation has flourished over the past two years. Staff has increased from 40 to 75 in less than two years, thanks to a coordinated employment plan that concentrates on local hiring.

The manufacturing capability — always a limiting factor in SEMCO's early years — has been upgraded and expanded. Last year B&L/Canada occupied a new facility with a manufacturing area with more than twice the size of the previous plant. At the same time, research and development programs continue, with increased budgets supporting developmental programs in several promising areas of SEM technology.

ADVANCES IN ELECTRON MICROSCOPY — LaB6

With more than ten years of experience in the design and development of SEMs, the Ottawa group has already achieved several important 'firsts'. The most notable development of the mid-70's (undertaken with the support of the National Research Council) was a practical electron emitter of lanthanum hexaboride (LaB6). The LaB6 emitter improves image resolution and clarity by providing a brighter, more durable source than the relatively inefficient tungsten emitter used in almost all other SEMs. In 1977 the Nanolab® 7 system, the first commercial SEM with a directly heated LaB6 emitter, was introduced. The effectiveness of the new LaB6 emitter was readily apparent when the instrument proved capable of resolving features as small as 5nm (2nm better than comparable SEM with a conventional emitter).

While the instrument was recognized as an advance in the field, and was attractively priced, limited manufacturing capacity and the lack of an experienced mar-

keting organization kept the Nanolab 7 SEM from achieving its full measure of success. However, development of the next generation of SEMs came to fruition rapidly with the formation of B&L/Canada. Early in 1981 two new instruments were introduced — the Nanolab 2000 and 2100 SEMs, and more recently an improved single-crystal LaB6 emitter has been demonstrated.

THE NANOLAB 2000 SERIES

The Nanolab 2000 and 2100 SEMs refine the advances that the Nanolab 7 introduced, with resolution down to 4nm now possible. Paying close attention to the environments in which SEMs are used, B&L/Canada's R&D and applications experts joined forces to create an instrument that places the needs of the operator foremost. Both Nanolab SEMs offer conveniently grouped and functionally arranged controls, easily readable displays employing the latest in microprocessor technology, and smooth yet precise stage controls that make specimen manipulation rapid and exact. Furthermore, samples susceptible to damage from the electron beam can be safely inspected with the low-beam-voltage feature (ideal for semiconductor samples and insulators).

The Nanolab SEMs can provide magnifications as high as X300,000 or as low as X5, and can also scan at television rate throughout the entire magnification range. Both instruments feature dynamic focus control to ensure that micrographs are as sharp as possible. Furthermore, both instruments provide a high-stability photographic recording system that compensates for all scan rates, which, together with an auto-brightness control, makes microphotography virtually fail-safe. To complete the picture, these state-of-the-art SEMs also provide alphanumeric data with each micrograph, identifying the micron marker, voltage, magnification, photo number, and an identification logotype.

Sample handling with a Nanolab 2000 or 2100 SEM offers a new level of convenience for the operator. The large, multiport sample chamber is extremely versatile and maneuverable — at the touch of a button, the top plate and column assembly of the specimen chamber can be hydraulically raised, allowing complete access to the specimen area and detector systems.

The Nanolab 2100 SEM is the fully configured model of the current series, and includes split-screen video, scan rotation/tilt correction, and a video interface unit. Both instruments can be used with a variety of Nanolab accessories, such as an IC evaluation unit, digital scan generator, transmitted electron detector, cathodoluminescence detector, backscattered electron detector, or gray level generator. For the optimum in advanced SEM operation, the Nanolab 2100, combined with a Bausch & Lomb OMNICON® 7500 image analyzer, provides a full laboratory system capable of automating data collection and analysis from both the SEM image and accessory X-ray spectrometers.

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