From the Editor

Happy Birthday MAS

This year we celebrate the 50th anniversary of the founding of the Microanalysis Society, named in 1967 as the Electron Probe Analysis Society of America. Coincidentally, it is also the 75th anniversary of the Microscopy Society of America, founded as the Electron Microscope Society of America in 1942. The cooperation of these societies, particularly in the annual Microscopy & Microanalysis meeting and the peer-reviewed journal *Microscopy and Microanalysis*, has created one of the world's most respected partnerships in the dissemination of information concerning these important fields.

Non-destructive analysis of elements in a substance began with Moseley's 1913–14 experiments in Manchester, UK, showing that, when excited by energetic electrons, each element emits a set of relatively simple X-ray lines that are characteristic of only that element. Prior to this, elemental analysis involved destructive wet chemistry using various reagents or light spectroscopy. Soon after Moseley's discovery, workers began to excite the specimen with continuous radiation from X-ray tubes, which gave rise to X-ray fluorescence spectrometry, a bulk analysis technique with a spatial resolution on the order of millimeters. This was the situation until André Guinier's student Raimond Castaing in Paris incorporated a wavelength-dispersive X-ray spectrometer into a modified transmission electron microscope (TEM) creating the first electron probe microanalyzer in 1949-1951. Castaing's device had the capability of producing a fine beam of energetic electrons capable of exciting X-rays from most of the elements in the periodic table. He worked out experimental and mathematical methods that permitted non-destructive quantitative elemental analysis with a spatial resolution on the order of 1 μm, an improvement of three orders of magnitude.

While prototype scanning electron microscopes (SEMs) were built in the 1930s and 1940s, poor vacuums and image resolutions inferior to the TEM slowed interest. In the 1950s and 1960s, Charles Oatley and his students in Cambridge, UK, developed the first practical SEM that produced images of surfaces with a depth of field and a resolution many times better than the light microscope. Among Oatley's challenges were finding an efficient electron detector as well as utilizing early television technology to record the image produced when the focused electron beam was scanned in a raster across the specimen. In 1956 Ellis Cosslett and his student Peter Duncumb, also in Cambridge, combined ideas behind the microprobe and SEM to generate the first compositional images in a microscope—elemental maps showing the spatial distribution of elements at the micrometer scale.

The exciting possibilities for these new tools convinced a group of scientists and engineers to form what is now known as the Microanalysis Society. To commemorate the Society's founding, this issue of *Microscopy Today* highlights some recent advances in SEM and microanalysis: transmission SEM and X-ray microanalysis with the silicon-drift detector.

Publication Objective: to provide information of interest to microscopists.

Microscopy Today is a controlled-circulation trade magazine owned by the Microscopy Society of America that is published six times a year in the odd months. Editorial coverage spans all microscopy techniques including light microscopy, scanning probe microscopy, electron microscopy, ion-beam techniques, and the wide range of microanalytical methods. Readers and authors come from both the life sciences and the physical sciences. The typical length of an article is about 2,000 words plus figures and tables; feature articles are longer. Interested authors should consult "Instructions for Contributors" on the *Microscopy Today* website: www.microscopy-today.com.

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