Today there is no limitation on the types of materials that can be investigated in the scanning electron microscope; and new improvements in microscope technology, such as low-vacuum mode, have made it common to investigate beam sensitive and non-conductive materials. Fortuitously, EDS detector technology, and computer software/hardware, have advanced even faster than the modern SEM. This now allows the acquisition of meaningful analytical data under conditions not previously considered suitable for analysis. We will review the new analytical hardware that allows EDS acquisition 100 times faster than a decade ago, and new software options that allow data processing while still acquiring, deconvolution of peak overlaps even while mapping, and better, standardless quantitation at low kV. However, our Microanalysis of more material systems has led to even more challenges in EDS, many of which may be summed up in one word: Geometry. Low kV in the SEM allows for better spatial resolution in EDS. But this encourages us to push the limits of geometrical constraints in what we analyze. Fast mapping means we study more inhomogeneous materials as well as likely map non-flat and non-dense materials. This requires more critical interpretation of map image data, especially when processed for quantitative results. Automated stage control means we can perform “Large Area Maps”, over 1-2 inch areas overnight. This gives us many Gbytes of data that needs user-friendly software to interpret and enable compatible transfer to the non-microscopy community.