

Contrast and Relief

Sometimes, it is all about contrast, but what is contrast anyway? It is usually thought of as the ability or sensation of perceiving visual differences in brightness: light or dark. Relief, a form of contrast, is related to optical path-length differences and presents itself with the impression of light and shadow in a 3-D sort of way. But there is much more to it than that—and the microscope, light or electron, in the hands of a well-trained and observant microscopist is often capable of enhancing the observed subtle differences in brightness that occur microscopically far below the limits of detectability of the eye—and sometimes beyond the ordinary limits of resolution.

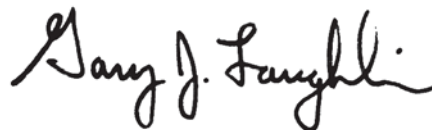
In this issue of *The Microscope*, Gary Nichols' paper, "Anomalous Atomic Number Contrast in Compositional Backscattered Electron Images of Organic Compounds Due to Cathodoluminescence" (page 147), explores the link between anomalous and previously unexplained contrast formation in some organic chemical compounds with cathodoluminescence in the scanning electron microscope (SEM). It is remarkable how well some low atomic number compounds, like those frequently found in pharmaceuticals and agricultural chemicals, emit such intense signals under these conditions, often in just a matter of seconds. The key to understanding the contrast-enhancement mechanism here is cathodoluminescence of the object and the use

of backscattered electron detectors in the SEM.

In Brian Ford's Critical Focus article on blood ("The Curious Paradox of Blood," page 165), it is through reflected light darkfield light microscopy that reveals the author's discovery of the previously imperceptible thin strands that suspend red blood cells necessary for clot formation. Marvelous!

And in the article, "A Novel Coal Fly Ash Sphere Reveals a Complete Understanding of Plerosphere Formation" by Patrick Chepaitis, Jim Millette and Tim Vander Wood (page 175), it is once again, the contrast enhanced by backscattered electrons in the SEM that leads to the probable explanation for the mechanism of formation of those tiny byproducts of coal burning power plants, fly ash, specifically the microscopic ones called cenospheres and plerospheres.

So there we have it, another issue and another year. To some it is all about contrast, to me it is also a relief. Onward to 2012—*The Microscope* journal's 75th anniversary!



Gary J. Laughlin, Editor