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Editorial on the Centennial Feature “Movers, Shakers, and Storers of Charge: The Legacy of Ferroelectricians L. Eric Cross and Robert E. Newnham”

In this issue Susan Troiler-McKinstry and Clive Randall present a Centennial Feature on the science of ferroelectrics. It is also a tribute to two influential contributors to this field, Eric Cross and Bob Newnham. I am delighted to have this personal tribute to these two giants of the field. Personal tributes also appeared in Volume 1 of the *Journal*. Indeed the first issue had an editorial on the contributions of Edward Orton Jr., so in this Centennial Feature we continue that tradition.

There was very little about involving electroceramics in the 1918 *Journal*. At that time, porcelain insulators was the only major electrical application for ceramics. There are only two mentions of the topic in the index of Volume 1 of the *Journal of the American Ceramic Society*. In the September issue, L.E. Barringer briefly discussed tunnel kiln firing of insulators at the Porcelain Department of General Electric. But a paper on electrical behavior appeared in the October 1918 issue. A.V. Bleininger reported on the effect of temperature on the resistance and “di-electric strength” of porcelain. This work was done at NBS, motivated by the higher temperatures that were encountered in spark plugs and in the insulators used in the

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Cottrell Process for electrostatic precipitators to remove smoke from flue gas. Blieninger showed that the logarithm of resistance decreased with temperature, and the behavior depended a great deal on the alkali from the feldspar. Replacing the feldspar with a magnesium silicate or beryllium silicate flux improved the high

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temperature resistance and dielectric strength. He noted that direct current measurements had polarization effects, so used high voltage AC. Blieninger's paper was written long before development of non-porcelain electroceramics, and before ceramics came to include high permittivity titanates, low loss dielectrics for high frequency, co-fired multilayer ceramic capacitors, or ferroelectrics. This Centennial Feature presents the story of ferroelectric ceramics, and the remarkable contributions of Robert Newnham and Eric Cross.

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