Introduction

While the analyst is always confronted with a sample problem, he encounters a definite homogeneity problem less often and he seldom has to deal with the "standards making" problems.

While many have been aware that the three entities, sampling, standards and homogeneity, are all closely bound, it has been only recently recognized through E2 Subcommittee 04 discussions how necessary it is that we define these three aspects of the sample.

All of the papers presented at the symposium could not be included in this Special Technical Publication for various reasons, but problems in the manufacture of some standards are covered. Sampling of various products, such as ferrosilicon and cement are covered as well as the two foremost subjects of ecology—air and water: probably the two most difficult fields today.

The difficulty in these latter two fields probably arises in a definition of homogeneity. While air and water may be polluted, they are only polluted locally. Where the sample is taken, and when, are very important things to know.

The statistics of homogeneity is needed to help define the direction in finding a needed handle to measure its goodness or poorness. The paper given in this publication certainly points in the right direction.

In emission spectroscopy, one cannot discuss the sample without considering the means of volitilization or excitation or both to produce the spectra. Such a fundamental picture of excitation appears here. One hopes that further efforts in this direction will help us understand the sample problem.

An outstanding problem of criminal investigation is not the sample, *per se*, but what was the sample prior to the catastrophe, and this is discussed.

The problem of sampling large masses such as a mountain, or large areas, for mineral identification is only diminished in the real problem of that of sampling the moon to help discover how it was formed. Both subjects are adequately covered.

The publication shows that the sampling problem is dynamic and present in all analytical methods. It is inherent in all good analytical methods, that they are independent of the sample and it is incumbent on the "standard method producers" to make them so. Homogeneity can be good or bad, depending on ones point of view, but we must first learn to measure it.

Finally, we cannot have good analytical methods without good standard reference materials and we must find the best ways to manufacture these in sufficient quantities.

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FIG. 1—*A preliminary lunar regional geology map. D. Wilhelms and J. McCauley, U.S. Geological Survey, 1966.*

FIG. 9—*A color enhanced far UV-photo of the earth. Note the two, little understood, equatorial airglow belts.*