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SOME EFFECTS OF THE ATMOSPHERE UPON PHYSICAL MEASUREMENTS¹

It has, I believe, been the custom for the retiring vice-president to address the section either upon the subject of his own research interests or upon recent progress or problems connected with some special field of his science. With your permission, I will to-day depart from this custom by adopting the rôle of a revivalist and delivering an exhortation. In one respect at least I feel that I possess the necessary qualifications for the part, since it is well recognized that the most effective exhorters are those repentant sinners who know, from personal experience, whereof they speak.

I take, as my text, the evil influences of a vagrant atmosphere upon physical measurements. This requires some explanation since the term atmosphere has several different connotations.

In the first place, we have that somewhat vague and impalpable atmosphere which is determined by the intellectual conditions surrounding an investigator and is ordinarily referred to as the research atmosphere of the institution.

Secondly, we have the insidious influences of meteorological conditions, temperature, barometric pressure and humidity, upon the physical and mental well-being of an observer and hence upon his ability to make accurate and trustworthy observations.

Thirdly, these same insidious influences frequently affect the properties of materials to an extent sufficient to cause the measuring instruments of the investigator to behave in a way no self-respecting piece of apparatus should and he is consequently put to all kinds of trouble in his efforts to combat them.

Each of these various types of atmospheric influences is important enough to be worthy of an essay, but none of them forms the topic of to-day's sermon. Instead, I shall direct your attention to certain effects of the physical atmosphere which sometimes result in causing an investigator to be under the delusion that he is measuring or utilizing one quantity when as a matter of fact he is dealing with something, not greatly perhaps but still appreciably different. I do not expect to tell you anything new. No revivalist in good standing would be expected to do that. In so far as any of us may have been guilty of backsliding it is because we have been immoral, not unmoral;

¹ Address of the vice-president and chairman of Section C—Chemistry, American Association for the Advancement of Science, Washington, D. C., December, 1924.

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