This paper is a presentation of some of the work of Dr. J. Arthur Harris and his associates in the western deserts. It should be emphasized that, although there were many men associated with Dr. Harris in this work, he alone was responsible for its inception and continued development.

It was early recognized by Dr. Harris that the greatest task of biologists was the placing of biology alongside of physics and chemistry in the ranks of the exact sciences. Phytogeography is admittedly one of the least quantitative of the biological sciences, yet the exact methods of physics and chemistry can be successfully employed for its advancement. It was recognized, however, that the plant in its natural habitat is so variable that the physico-chemical measurements could not be used to their greatest advantage without careful biometric treatment. Through the proper application of Pearsonian statistical methods to the data collected, the degree of variation of plants and the correlation of these variations to soil and climatic conditions can be quantitatively expressed.

Those measurements which have proved to be most readily made in large numbers under field conditions are the osmotic concentration and ionized salt concentration of the leaf sap. These measurements were often supplemented by more or less complete soil analyses and at times by the measurement of the concentration of specific ions in the leaf sap, as, for example, the \( \text{H} \) ion, \( \text{Cl} \) ion, and \( \text{SO}_4 \) ion. But by far the greatest number of determinations have included only osmotic concentration and electrolyte content of the leaf sap. Fortunately, these measurements can be made quickly and accurately by the finding of the depression of the freezing point and the electrical conductivity. For each degree that the sap freezes below the freezing point of pure water, there is an osmotic concentration equal to about 12.06 atmospheres osmotic pressure across a completely semipermeable membrane. The electrical conductivity cannot be so readily restated in terms of total electrolyte concentration so this measurement is recorded as specific conductivity.

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