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## A Comparison of Glass and Quinhydrone Electrodes for Determining the pH of Some Iowa Soils

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## THE NITROGEN, PHOSPHORUS AND ORGANIC CARBON CONTENT OF IOWA SOILS

P. E. BROWN AND R. H. WALKER

During the past 20 years an investigation has been underway to determine the nitrogen, phosphorus and organic carbon content of the various soils of Iowa. Samples were taken of the various soil types mapped in each county and they were then analyzed. A statistical analysis of the results has been made to determine the average nitrogen, phosphorus and organic carbon content of each soil type, and also to determine the significance of the differences between types.

The results show that although the individual types of the upland drift soils are rather heterogeneous, there is a highly significant difference in the nitrogen, phosphorus and carbon content of the various types. The loessial soils are apparently more homogeneous with respect to nitrogen, phosphorus and carbon than the drift soils, but even these soils differ significantly in nitrogen and phosphorus content.

There was a rather close relationship between the nitrogen and organic carbon content of these soils. The average carbon : nitrogen ratio for the loessial soils was 11.93; and for the drift soils it was 12.67.

The average composition of the loessial soils to a depth of 6 $\frac{3}{8}$  inches, is 1,183 pounds of phosphorus, 3,510 pounds of nitrogen and 41,386 pounds of organic carbon per acre. The average composition of the drift soils to the same depth is 1,208 pounds of phosphorus, 3,640 pounds of nitrogen, and 44,980 pounds of organic carbon.

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## A COMPARISON OF GLASS AND QUINHYDRONE ELECTRODES FOR DETERMINING THE pH OF SOME IOWA SOILS

HAROLD L. DEAN AND R. H. WALKER

A comparison was made of glass and quinhydrone electrodes for determining the pH of some Iowa soils. Particular attention

was given to the "QH error" and the "QH electrode error," and also to any changes in the hydrogen-ion concentration of the soil as it is permitted to stand in contact with water. The modified bulb, silver-silver chloride type of glass electrode and the ordinary type of platinum electrode with quinhydrone were employed in making the determinations.

The data obtained show that the addition of quinhydrone to the soil suspension increased the pH of each soil slightly. This change in pH resulting from the addition of quinhydrone is referred to as the "QH error." The error was scarcely large enough to make the quinhydrone electrode method unsuitable for determining the pH of the soils studied. The glass and quinhydrone electrodes gave similar results when employed to determine the pH of soil suspensions containing quinhydrone. The "QH electrode error," therefore, was of little or no consequence in these soils.

There was little change in the pH of the supernatant liquids or the soil suspensions during the first 6 and 12 hours, respectively, after preparation. After that time, however, there was a significant increase in the pH of the acid soils and a decrease in the pH of the basic soil. This change in pH is presumably, of no practical significance in determining the pH of soils as it does not occur until a rather long time after preparation of the samples for the determinations.

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## QUALITATIVE ANALYSIS WITHOUT HYDROGEN SULFIDE

JACOB CORNOG AND LOTHROP SMITH

A system of Qualitative Analysis is presented in which ammonium sulfide instead of hydrogen sulfide is used as a source of sulfide ion.

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