The term base exchange as applied to soils refers to the reaction between the base of a salt solution and the absorbing fraction of the soil in which the base of the latter is replaced in chemically equivalent amounts. At first the base exchange property of soils was viewed by many soil workers as a more or less constant or non-variable value and as the property of a limited group of alumino-silicates. While it was recognized that soil humus was an active absorbent, its quantitative exchange value lacked verification. As one outgrowth of the extensive research on the exchange property of inorganic materials by a large group of soil workers, several compounds were found to be involved and a dynamic rather than a static property was established. Probably because the term humus applied to a group of organic compounds rather than to any definitely defined substances, work upon the exchange property of organic matter, in most part, awaited progress with the inorganic compounds. It is only within the last few years that much has been contributed to our knowledge of the organic exchange compounds, but already this soil fraction has been shown to be equally important to the inorganic fraction and to contribute additional proof of the dynamic nature of this soil property.

During previous investigations in this laboratory (4, 5, 6), it has been shown that the exchange capacity of organic matter and highly organic soils is a linear function of the percentage of carbon which they contain; that the exchange property of organic matter is in largest part due to ligneous compounds; that lignin definitely possesses a chemically equivalent exchange property; that the exchange capacity of organic matter is a linear function of the percentage of lignin; and that green manure has an exchange capacity which also is largely a function of its lignin content. While the exchange capacity of the inorganic soil colloids can be altered by physical and chemical methods, the organic exchange compound is subject to alteration by chemical and biological agencies. As for lignin itself, investigations have shown (4, 5) that the exchange capacity depends upon the method used in preparing or separating it from the mother substance, and that after preparation, it may be subject to further increase in exchange capacity by hydrolysis or fractionation. The highest exchange capacity obtained for ligneous material was approximately 400 M. E. per 100 grams. The part which biological agents play in the exchange capacity of organic matter was shown by the increase which accompanies its decomposition.

The above observations have been confirmed by Mitchell (7), Powers (9), and Muller (8), while Waksman and Iyer (11) believe