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Short Communication

SOME EARLY EXPERIMENTS IN ELECTRO-CULTURE

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The possibility of enhancing agricultural productivity by the use of atmospheric electricity has been a matter of controversy for some 200 years.During the 18th and 19th centuries a number of attempts were made to accelerate plant growth by various electrical treatments, of which perhaps the most popular were based on the use of overhead conductors to "collect" atmospheric electricity and convey it to wires in the soil beneath the crop. Consistency in experimental design did not begin to emerge, however, until the introduction of the "artificial overhead discharge" technique in 1885 by K.S. Lemström, Professor of Physics at the University of Helsingfors in Finland. Application of this technique provided the first real evidence of potential economic significance, and Lemström may be credited with the logical introduction of the term "elektrokultur" (subsequently anglicized to "electro-culture"). Although at variance with some previous usages, it is convenient to restrict the term to those practices intended to influence plant growth and development by modification of the atmospheric electrical environment, excluding such other procedures as those dependent on the use of soil currents.

Lemström's interest appears initially to have been attracted by the rapid development of vegetation during the short growing season in arctic and sub-arctic regions. Attributing this apparent growth enhancement to the particular electrical characteristics of the atmosphere at high latitudes, he set up field experiments which were eventually standardized on a system of 1.25 m mesh wire networks supported about 0.4 m above the crop and provided with downwardly-directed discharge points resembling the "barbs" of present-day barbed wire. The networks were charged (to uncertain potentials) from one pole of an electric influence machine, the opposite pole being earthed. In most of his experiments, Lemström used a positive overhead discharge and, largely for empirical reasons, this polarity was widely adopted in subsequent electro-cultural work. The duration and times of application of the discharges, however, were subject to considerable variation in most early experiments, reflecting the frequent difficulties encountered with the generating equipment then available. Early workers were thus unable to obtain data from serial experiments consistent with respect to date of sowing, time of electrical