ATHOUGH comparatively new to the family of essential elements, and classed as a minor nutrient because of the small quantity required by plants, boron is today receiving a major share of attention from the plant nutritionist and soil scientist. In the eight years that have elapsed since Brandenburg reported a boron deficiency affecting sugar beets and mangolds on certain German soils, extensive and fruitful research has been conducted in this country, and today we attribute to boron deficiency some twenty or more physiological disorders affecting cultivated plants. Where such deficiencies occur, small applications of borax or boric acid have been effective in producing normal growth. In other instances, such applications have produced increased yields with crops where no evidence of a nutrient deficiency existed. Borax has already become a standard fertilizer ingredient for certain crops in many areas and the number of these areas are rapidly increasing as research in this field progresses.

Once a soil deficiency is established, questions immediately arise concerning the extent of the deficient areas, the plants affected, and the measures necessary to overcome the deficiency. To obtain this information from the country at large, the author has corresponded with workers in the agricultural experiment stations of all 48 states. The replies to these enquiries have been courteous, prompt, and informative. All states have been heard from and I wish to take this opportunity to thank those who so kindly supplied the information which makes this paper possible.

DISTRIBUTION OFBORON-DEFICIENT AREAS IN THE UNITED STATES

The information obtained from the various states regarding the location of boron-deficient areas is presented in Fig. 1. In most cases, each dot upon the map represents a county in which boron deficiency is known to occur under field conditions. In a few instances locations are reported in terms of a section of the state.

The largest areas of boron-deficient soils are centered along the Atlantic seaboard, the Great Lakes region, and the Pacific northwest. There seems to be little correlation between soil type and deficiency for the country as a whole; organic, and light and heavy mineral soils being affected alike in various sections. Midgley has observed that Vermont soils derived from limestone need very little, if any boron. Magness states that the worst internal conditions of apples in the Potomac Valley occur on the orchard soils having a limestone base. Such variations in the available boron content of different soils may be due to a number of factors, many of which will be discussed later.

CROPS AFFECTED BY BORON DEFICIENCY

With the exception of the grasses and cereals, which apparently require very little boron, the important field and vegetable crops and several fruit crops, are known to be subject to boron deficiency under field conditions. Table I shows the geographic distribution by states of the various crops which have shown deficiencies, along with the source from which the information was obtained. An attempt was made to determine the approximate acreage of each crop affected by the deficiency, but we felt that their present information justified no approximation. The few estimates that were made varied from a few acres in some states, to the entire cultivated area for certain crops in others. The 24 states not listed in Table I reported that boron deficiency was not known to occur within their borders. In many instances little or no work had been done in this field.