Turbidimetric measurement of the growth of *Thiobacillus novellus*, *Thiobacillus thioparus*, an autotrophic thiosulfate-enrichment culture from soil, and *Ferrobacillus* sp. failed to reveal any deleterious effect of 10 ppm.; hence, 2-chloro-6-(trichloromethyl) pyridine appears to be specific for the nitrifiers among the chemoautotrophs. The results of table 1 show no inhibition of several algae grown under photoautotrophic conditions. The chemical thus would appear to be restricted in its action to only one group of autotrophic microorganisms, and the site of inhibition is consequently probably not associated with CO$_2$ fixation or carbon metabolism of the nitrifying bacteria. Further, turbidimetric assay of the development of the following heterotrophic bacteria failed to reveal any harmful effects: *Bacillus subtilis*, *Serratia kilensis*, *Alcaligenes denitrificans*, *Aerobacter aerogenes*, *Achromobacter* sp. or *Staphylococcus aureus*. Goring has reported similar findings with heterotrophic microorganisms.

These observations suggest that 2-chloro-6-(trichloromethyl) pyridine may be an important ecological tool, serving as a biochemical means of assessing the relative significance to soil nitrification of heterotrophic and autotrophic microorganisms. The results also provide evidence that biochemical techniques may be applied to the unravelling of ecological problems of agronomic concern.—G. E. SHATTUCK, JR., former Research Assistant, and M. ALEXANDER, Associate Professor, respectively, Department of Agronomy, Cornell University, Ithaca, N. Y.

ELECTRICAL WATER PRESSURE TRANSUCERS
FOR FIELD AND LABORATORY USE

With the increased use of automatic recording devices in studies of water movement in soil, it is desirable to develop new techniques for describing certain soil-water parameters. The water table or phreatic surface is one of these parameters. Recent advances have been made in this regard (1, 2, 3); however, these are not without some limitation either in cost or design. The purpose of this report is to describe a simple electrical water pressure transducer which has been designed and constructed for the purpose of measuring hydrostatic pressures in porous media. It employs a stainless steel sensing diaphragm and a linearly variable differential transformer.

**Diaphragm**

The principle of operation of the transducer is centered about a small circular stainless steel diaphragm which is rigidly held between two brass retaining housings as shown in figure 1. Timoshenko (5) has developed well-known equations describing axial movement of a diaphragm center caused by a uniformly applied pressure, and the maximum stresses occurring in the diaphragm during deflection. These equations were modified by relating water pressures to the geometrical properties and stress conditions of the diaphragm. This resulted in the following:

$$ s_{r\max} = \frac{0.027}{h^2} a^2 $$

where:
- $s_{r\max}$ = maximum radial stress (psi),
- $a$ = diaphragm radius (inches),
- $h$ = diaphragm thickness (inches), and
- $P$ = water pressure (inches of water).

To determine the theoretical range of linear deflection of a diaphragm, a value of 44,000 psi, the proportional limit stress for stainless steel, was substituted for $s_{r\max}$ and the equation solved for several combinations of $t$ and $a$. These solutions are presented in graphical form in figure 2 where the maximum water pressure a given unit will allow is plotted vs. the dimensions of the diaphragm. This figure may be used to select the component parts of a water pressure transducer. For example, if hydrostatic pressures from —30 to +30 inches are to be measured...