tected the presence of excess amounts of lysine in each of two 24-hr urine samples with excess arginine in only one of the two samples. The apparatus and technique described have also been used in the partial development of a simplified procedure for the detection of purines on paper chromatograms (*2*).

Fig. 2 indicates the location of certain sugars of clinical interest on two-dimensional ascending chromatograms. A sample of urine from a patient with hereditary familial pentosuria yielded the two abnormal components, S^1 and S^2, shown on the grid. Studies to identify these components and a simplified procedure for the detection of sugars on paper chromatograms will be reported in a later communication (*7*).

The features of the tank design which permit operation at reduced pressures were introduced because of findings during preliminary attempts to fractionate protein mixtures and diazotized protein mixtures. In our experiments (*6*) and in those of Tiselius (*4*), it was found that when inorganic salt solutions were employed as developing solvents, no fractionation occurred unless water was permitted to evaporate from the solvent during the run. The results we obtained by casual evaporation did not prove sufficiently constant or precise for useful application; but by employing low, controlled vapor pressures, Tiselius (*4*) has obtained more promising results. Tiselius has also obtained distinct fractionation of protein mixtures on paper by a somewhat different technique, that of salting-out adsorption (*3*). In this procedure, the developing solvent is a salt solution which has a salt concentration approaching that at which the protein component of minimum solubility will precipitate.

References

1. Consden, R., Gordon, A. H., and Martin, A. J. P. *Biochem. J.*, 1944, **38**, 224.
2. Gordon, A. H., and Stjernholm, R. In preparation.
3. Tiselius, A. *Archiv. f. Kemi, Min., och Geol.*, 1948, **26B**(1).
4. Tiselius, A. Personal communication.
5. Williams, R. H., and Kirby, H. *Science*, 1948, **107**, 481.
6. Wolfson, W. Q. Unpublished observations.
7. Wolfson, W. Q., and Pearlman, S. In preparation.

Electrical Still

F. L. Kozelka

Department of Pharmacology and Toxicology, University of Wisconsin Medical School, Madison

Many techniques, particularly the microdetermination of heavy metals, require metal-free water. Water from the usual steam tin-lined stills contains significant quantities of heavy metals and other foreign material, which necessitate redistillation of the water in an all-pyrex apparatus. The use of a Bunsen burner or an electric plate, as a source of heat, requires constant attention. The occasional cracking of the distillation flask when allowed to run dry, or after prolonged use, is a source of expense. Electrical heating elements can be employed; however, when in constant use, replacements are required.

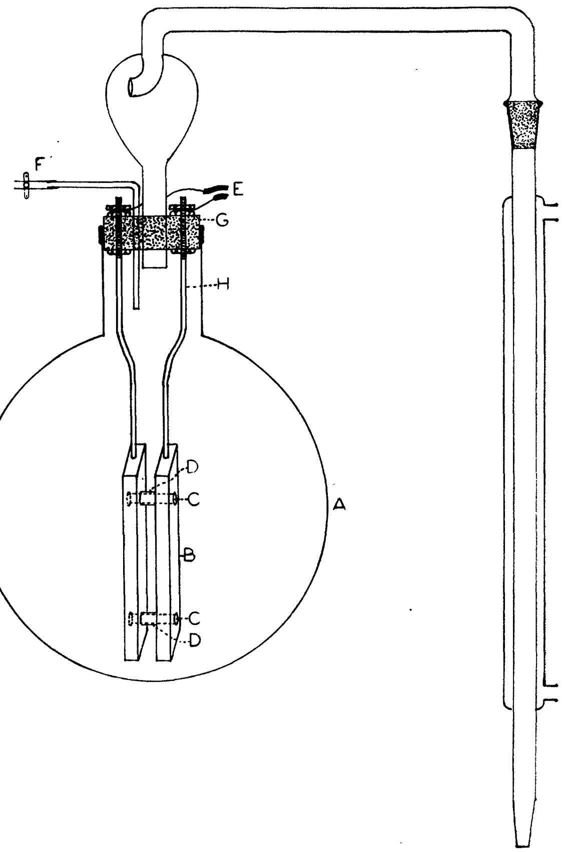

Fig. 1. (A) 5-liter flask. (B) Carbon electrodes, approximately 6 × 40 × 140 mm, which can be obtained at any electric motor shop. (C) Glass rods, 5 mm in diameter, with flattened ends to hold the carbon electrodes in place. (D) Glass tubes, 7 mm long, fitting snugly over the glass rods to keep the carbon electrodes apart. (E) Electric terminals connected to a 110-volt A.C. current. (F) Screw clamp on the water inlet from a 5-gal reservoir, adjusted so that the rate of the water dripping into the flask is in equilibrium with the rate of distillation. (G) Rubber stopper. (H) Brass rods, approximately 5 mm in diameter, fitted into the carbon electrodes and threaded on the upper end. The rods pass through the rubber stopper and are held in place with burrs.

It appears that a still (Fig. 1) which is easily constructed and requires a minimum amount of care and expense for its maintenance may well be of interest to other workers. It has the added advantage that the electric current to the heating element is automatically broken when the level of the liquid in the flask falls below the electrodes.

To operate the still, approximately 100 mg of sodium chloride are placed in the flask (*A*) to serve as a partial conductor for the current. The flask is filled about half full of water and the distilled water from a reservoir is allowed to drip into the flask at the same rate as the water is distilled. When this equilibrium is attained, it can operate without attention for many hours. This apparatus can supply about 5 gal of water in a 24-hr period. It should be added, however, that the use of the still herein described does not free the distillate from volatile substances such as carbon dioxide and ammonia.

Application of Probits to Sweet Corn Earliness Data

Gordon Haskell

John Innes Horticultural Institution, Merton, Surrey, England

Two widely used measurements for estimating earliness in maize are date of first tassel appearance and date when half the population have silked. Measurements are more liable to error when first tassel date is used than with the half-silking date, for in a normal population the earliest plants to flower are few compared with half the population in flower. Similarly, stragglers may flower very late, or not at all, and upset measurements of flowering spread used to indicate uniformity.

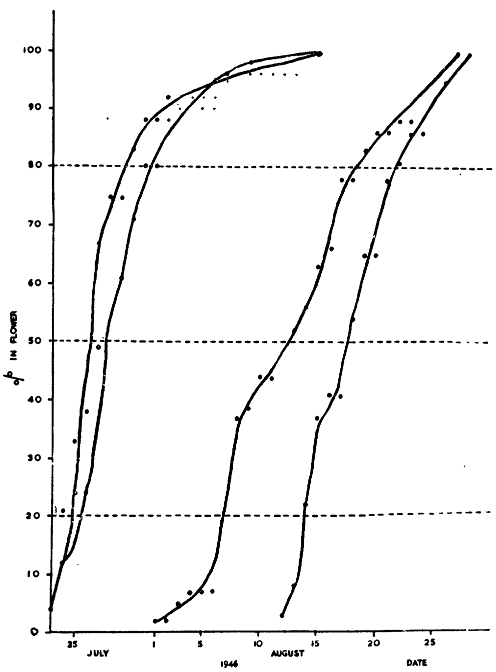

FIG. 1. Flowering (tassel) time for sweet corn variety *Dependogold* sown at 28-day intervals. Percentages plotted against actual date.

In England, where for breeding purposes it is important to get very early plants of sweet corn varieties, date of first tassel appearance has been used to measure earliness; this helps selection of the earliest plants. Unfortunately, earliest plants may be impeded by fruit fly damage and flower later than they are potentially capable of doing, thus increasing error.

Data for variety *Dependogold* were taken from an experiment to determine the best time for sowing sweet corn in England, four sowings having been made at 28-day intervals from the 1st of March 1946. Tassel date of each plant was recorded; and the percentage of plants in flower at a particular date for each sowing time was calculated and plotted (Fig. 1). Although irregular, the curves to some extent resemble the sigmoid curve characteristic of growth. Percentages were transformed to probits and plotted against logarithm of flowering date. Such transformed data of true sigmoid curves are expressed as straight lines drawn along the best fitting position, as shown by Finney (*1*). The transformed data for flowering times for the four sowing dates are given in Fig. 2. Here the dots lie reasonably close to the best fitting straight lines, although there is slight discrepancy for the earliest sowing which was based on few surviving plants.

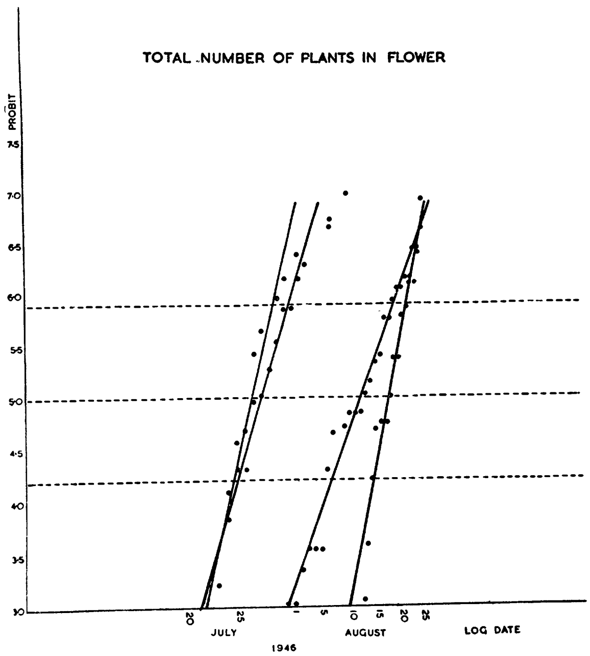

FIG. 2. Data from Fig. 1 transformed. Probits plotted against logarithm of flowering date.

The 5.0 probit value on any line gives the theoretical date for half the population in flower and is an index of earliness, like the 50% in flower of untransformed data. Angles of the slopes of the various lines indicate, too, how rapidly a variety flowers when sown at different times. Hence, for different varieties sown at the same time, this method would give an easy visual method of determining uniformity, the larger the angle the greater the uniformity.

The value of applying probits to plant breeding data in general should, therefore, not be overlooked.

Reference

1. FINNEY, D. J. *Probit analysis.* Cambridge: 1947.