A System of Reading AutoAnalyzer Charts

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A convenient method of reading test results during an AutoAnalyzer run is described.

Despite the short time it takes to do a laboratory procedure on the AutoAnalyzer,* recovery of results must often wait until all tests are completed and the chart removed and read on a chart reader. Alternatives, including digital readouts and direct-reading chart paper, can be expensive or not always practical. Readings from a plot on graph paper are liable to error because of the number of eye fixations required to transcribe each peak. The system described below allows the operator to read the unknown directly as soon as it is recorded. Conversion to this type of “readout” requires about 5 min. and approximately 25 cents.

Recorder Modifications and Apparatus

1. The pen position indicator is removed.
2. The chart cut-off guide is removed.
3. The percent T scale bar is reversed to give a plain background.
4. Reading strips of Technicon percent transmission chart paper are cut from the length of the roll into strips 11.5 in. long and about 1.5 in. wide. Cuts at 12.5, 27.5, 42.5, 57.5, 72.5, and 87.5 percent T will yield reading strips with 20 divisions bounded and divided by heavy ruled lines.
5. A plastic T-square with a 10- or 12-in. blade and the T cut down to a width of 3 or 4 in. is used as a reader. (Sterling 542 is usually available.) With the T-square riding on it, the scale bar should be adjusted

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*Technicon Instruments Corporation, Ardsley, N. Y.
†Sterling Plastic Co., Mountainside, N. J.
so that the blade of the T will be parallel to the percent transmission lines on the chart paper. The chart paper must be running straight.

**Procedure**

A reading strip is taped to the scale bar. As the baseline and standards are recorded their positions are marked on the heavy ruled lines at the top and bottom of the reading strip. A line is drawn from a point on the bottom line to the point on the top line denoting the reading of the adjacent standard. These lines will give a series of curves with the interval between standards divided into 20 parts. (See Fig. 1.)

This procedure has been used in the clinical chemistry laboratory at these hospitals for more than 4 years and has been mentioned to a number of training classes at Technicon Instruments Corporation. Differentiation compares well with the AutoAnalyzer chart reader, and over the whole range, was generally superior to graphs on semilog paper. Reading in this manner, combined with faster sampling in "N" methodologies, provides enough useful work in the area of the instrument to

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**Fig. 1.** Method of graphing and reading as applied to glucose determinations.
occupy the operator almost full-time. The readings can be taken at intervals of 20 or 25 min. and are complete by the time the test procedure is finished. Continual surveillance of the recordings means that specimens giving high values can be detected, diluted, and rerun without loss of time. Drift will be seen as soon as additional standards are recorded. Split or plugged manifold tubing, broken dialyzer membranes, and other malfunctions are detected sooner and cause less loss of time and specimen.

One disadvantage to this means of graphing is the inability of the reader to be sure that all standard peaks fall on a straight line or a smooth curve. If the plot should be a straight line, as in flame photometer readings, the lines on the reading strip should be parallel. Plots of colorimetric methods should give lines that change slope gradually but consistently. Critical inspection of the reading strip will usually detect a contaminated or deteriorated standard but will not be as reliable as a graph of the whole curve. Readings from a two-pen recorder present some added complications. If two reading strips are hinged together, one strip and the graph from one pen can be flipped down out of the way while readings are being taken on the other strip.