Chromatograms are produced by plotting the continuously varying signal from the instrument against time. The time (x axis) is representative of the retention time or retention volume. The y axis plot is a direct representation of the detector signal after suitable electronic processing to produce an appropriate output voltage for use with chart recorders, integrators or computers (Fig. 8.1).

The detector signal is produced in response to the measurement of some property of the sample molecules. The magnitude of the signal at any given time is proportional to the concentration of sample molecules present in the detector. In addition to separating the components of a sample mixture, the chromatographic process causes band broadening. Therefore the detector records a broad signal in the form of a Gaussian peak since the solute molecules will be more numerous at the centre of the band (Fig. 8.2). The area under the peaks is a measure of the relative amounts of each component in a sample mixture.

**8.1 METHODS OF RECORDING THE CHROMATOGRAPHIC SIGNAL**

8.1.1 Chart recorder

Chart recorders used in chromatography are y/t recorders where the y axis is driven by the output of the instrument and therefore records detector signal intensity. The t or time axis is driven at constant speed by the chart paper drive motor; it is calibrated in seconds (time) or volume of mobile phase (Fig. 8.2). The y axis is calibrated to respond to signals over a preset range, which is set to match the output signal range of the instrument amplifier (Fig. 8.1). The true detector signal is measured from the detector base-line background signal. The main disadvantage of a chart recorder is that if the detector signal goes above the preset output voltage range it cannot record the true signal level.
Fig. 8.1  Signal processing in chromatography systems.

Fig. 8.2  Detector response for various solute bands from chromatogram plotted on a chart recorder.

Fig. 8.3  Measurement of peak areas.