C. Classification of Gradients According to Their Shape

According to Niederwieser's (31) definition, gradient TLC is "a chromatographic technique using within the separation area locally different separation conditions." Separation conditions can vary in both the stationary and mobile phases. Taking into account these variations, chromatographic gradient techniques can be classified (3) as follows:

Mobile-phase gradients
- Composition
- pH
- Ionic strength

Stationary-phase gradients
- Composition
- Impregnation
- Activity

Gradients connected with change
- Temperature
- Flow rate
- Vapor pressure

The greatest possibilities of achieving gradients are offered by changing the mobile-phase concentration. Some examples of different shapes of gradients are presented in Fig. 2. The concentration of the more efficient solvent in the mobile phase can vary linearly (Figs. 2b and 2e) or curvilinearly (Figs. 2a, 2c, 2d, 2f). In practice, a continuous gradient is preferred (1,4,5), but stepwise gradients are much easier to obtain. It should be emphasized that if several steps are used in a stepwise gradient, then the gradient obtained is almost identical with a continuous gradient (41,42).

II. APPARATUS FOR GRADIENT DEVELOPMENT

Which device is used for generating the gradient depends on the type of gradient desired. The greatest number of devices have been described for generating mobile-phase gradients. Some of the most typical devices are presented here; however, so far there is no single best one.

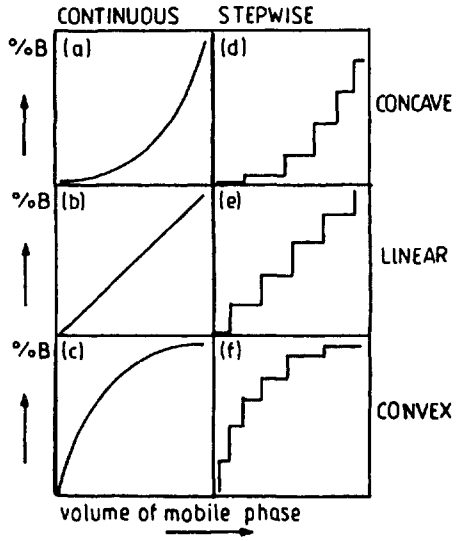

Figure 2 Classification of gradients according to their shape.