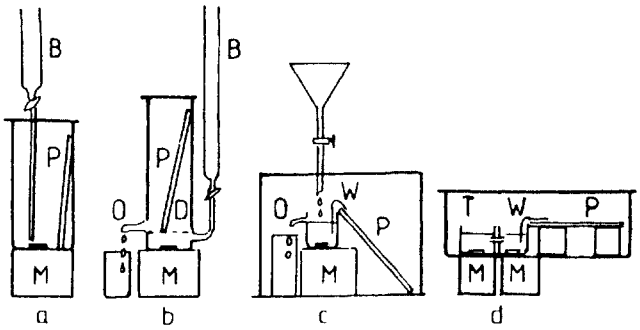

Figure 3 Devices for gradient elution in TLC. (Reprinted from Ref. 7 with permission.)

A. Devices for Achieving a Mobile-Phase Gradient

In gradient elution, devices for generating both continuous and stepwise gradients are used. Details related to the devices are described by Liteanu and Gocan (3) and by Niederwieser and Honegger (6). Some devices for generating continuous gradients are presented in Fig. 3.

Rybicka (28,29) employed a normal separation chamber (Fig. 3a) equipped with a magnetic stirrer (M) and a buret (B) containing the stronger solvent. Wieland and Determan (27) used a glass cylinder divided by a filter plate into a 1 cm deep mixing chamber equipped with a magnetic stirrer and an upper separating chamber (Fig. 3b).

Luzatto and Okoye (45) used a descending chromatographic technique (Fig. 3c) and a paper wick (W) as a capillary bridge between the mixing chamber and the chromatographic plate.

In Strickland's (46) device (Fig. 3d), a polyethylene trough (T) is divided along its entire length into two equal compartments filled with different solvents and stirred by magnetic stirrers (M). The partition wall between the compartments has two holes through which solvents are able to mix. The eluent from the trough is delivered to the plate (P) by means of a filter paper strip (W).

The devices described (Fig. 3) have some disadvantages: They produce only one type of gradient profile (mostly a convex gradient, Fig. 2c), and they require magnetic mixing and a considerable excess of solvent.

The delivery of the solvent to the adsorbent layer should be determined by the migration rate of the eluent front; otherwise deformation of the gradient shape will occur (6).

Niederwieser and coworkers (7,43,44) described a system that allows free choice of gradient shapes, involves reproducible partial mixing of two neighboring solvents in a capillary tube, and requires only as much solvent as the adsorbent layer can absorb. Their device (Fig. 4) differs

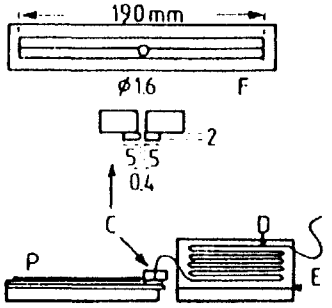

Figure 4 Device for solvent gradient TLC according to Niederwieser et al. (7). (Reprinted from Ref. 7 with permission.)