or updat

available. In some cases, a 3-dimensional *ac* or "mountain" picture is used. Several response surface approaches to optimisation are available, but perhaps the most useful method for displaying the two-factor situation is a *c d a a* (Fig. 1). The contours join points of equal system response: in the figure the optimum is shown by the central point. These graphical displays cannot very easily be extended to cover three or more factors, but the optimisation methods in common use can handle such situations mathematically.

At the start of the optimisation process the form of the contours is evidently unknown, while the aim is to approach their centre as expeditiously as possible. To achieve this we have two general options. We could use a carefully designed set of experiments to explore the response within a region of interest, then fit some mathematical model of the response, which we can use to identify a prospective optimum. This approach is called *ac d* (RSM) and will be discussed in maxima? These issues will be discussed further in a subsequent Technical Brief.

We have so far assumed that there is a single optimum response that we can locate unequivocally, or at least approach closely. But in some experimental systems this simplification is not justified; there may be *ca* *a* *a* as well as the *ba* *a* (Fig. 3). Such situations may be more common than is generally supposed. A search method should ideally be capable of distinguishing the global response from the lesser local maxima, preferably with a modest number of trial experiments: this significant problem will be discussed in subsequent Technical Briefs.

Some experiments require the optimisation of more than one response simultaneously. In an HPLC separation of compounds 1, 2 and 3 we may wish toga.(tog2.w)sly
1o26 22t2pairpoun2e2l622t1o aly(siplsponse)T-1.3341tog2.evmeat;oeppts,atie ion
L9.3.ni74-37M9.3aw232s9.3sma1f7516bethe