We now come to the most testing part of the layout planner's job: the transfer from paper to hardware, and the translation of methods and ideas into a working situation. We must be sure of our responsibilities and authority before we enter this phase; much has already been said about this aspect of the job, but it must be clearly known at this point 'who does what'. Once a piece of equipment is concreted to the floor, or an overhead conveyor is secured to the roof structure, changes become very difficult, if not impossible. Very close liaison must therefore exist between planning, line management and works engineer at every stage of the installation, and constant reference made to the agreed implementation plan. At the same time a degree of flexibility must exist, so that if an unexpected difficulty arises, minor changes can be accepted and agreed. No one can foresee everything!

One of the major difficulties about layout planning which makes it different from most other production-oriented activities is that it is seldom possible to experiment. The proposed layout can be assessed only in relation to the existing situation (if indeed there is one), and until all the machinery, equipment and personnel have been deployed there is no real way of testing the projected plan. (This is not strictly true, of course, because it is possible to produce a good mathematical model of a layout, and programme a simulation on a computer. However, the difficulties of doing this, and the cost, are sufficient to deter most people from attempting it, except for an extremely large or critical project, where it is essential. The technique would not normally be considered for the small-to-medium changes mainly discussed in this book.) Like quality control, layout planning must aim at being 'right first time', and the more research and effort spent in the planning stages, the fewer difficulties there are likely to be on implementation.

PLANNING AIDS: USE OF CRITICAL PATH ANALYSIS

While for a simple layout programme some form of bar chart, which plots activities against time, can be used, the additional
advantages of network analysis previously referred to can be clearly shown.

At the commencement of a layout there are many variables which, as the project progresses, become more and more predictable, and these will have interacting effects upon others, either holding up the work as a whole, or accelerating it. The recognition of this kind of pattern, and the way in which these kinds of variables can be shown to have a particular effect, is what makes the critical path analysis (CPA) methods such a valuable tool.

For example, buildings seldom conform to forecasts in construction time. The sequence of events in building is fairly rigid, i.e. foundations, floors, walls, roof, and these are to a large extent interdependent. Failure of a contractor to secure sufficient structural steel to complete a particular building could delay installation of equipment, and the interaction and ramifications of such a sequence would have far-reaching effects. Using CPA, a good estimate can be made of just what will be affected, by how much, and what action can be taken either to compensate or to switch resources to another point. In the early stages of planning the move or layout an arrow diagram or logic structure is prepared. Since very little is known about each step at first, only fairly vague estimates for the time required to carry out each step are possible.

The management usually has some idea of a time-scale that is desirable, for many reasons, e.g.:

1. A major sub-contract for heavy machinery with a long lead time may have to be placed, or has been accepted.
2. Management meetings are infrequent, and a particular meeting is assigned as the most likely one to be able to give financial approval.
3. A forecast date has been notionally fixed, perhaps by the chairman or board.
4. Start dates of buildings may be controlled by planning permission being obtained, or contractors being available.

As an example of (2), a large organisation planning a multi-million-pound project had a management committee which met at thirteen-week intervals (i.e. quarterly). At one meeting they were asked to approve a large contract running to many thousand pounds, which they duly did. However, the estimate included a ninety-day