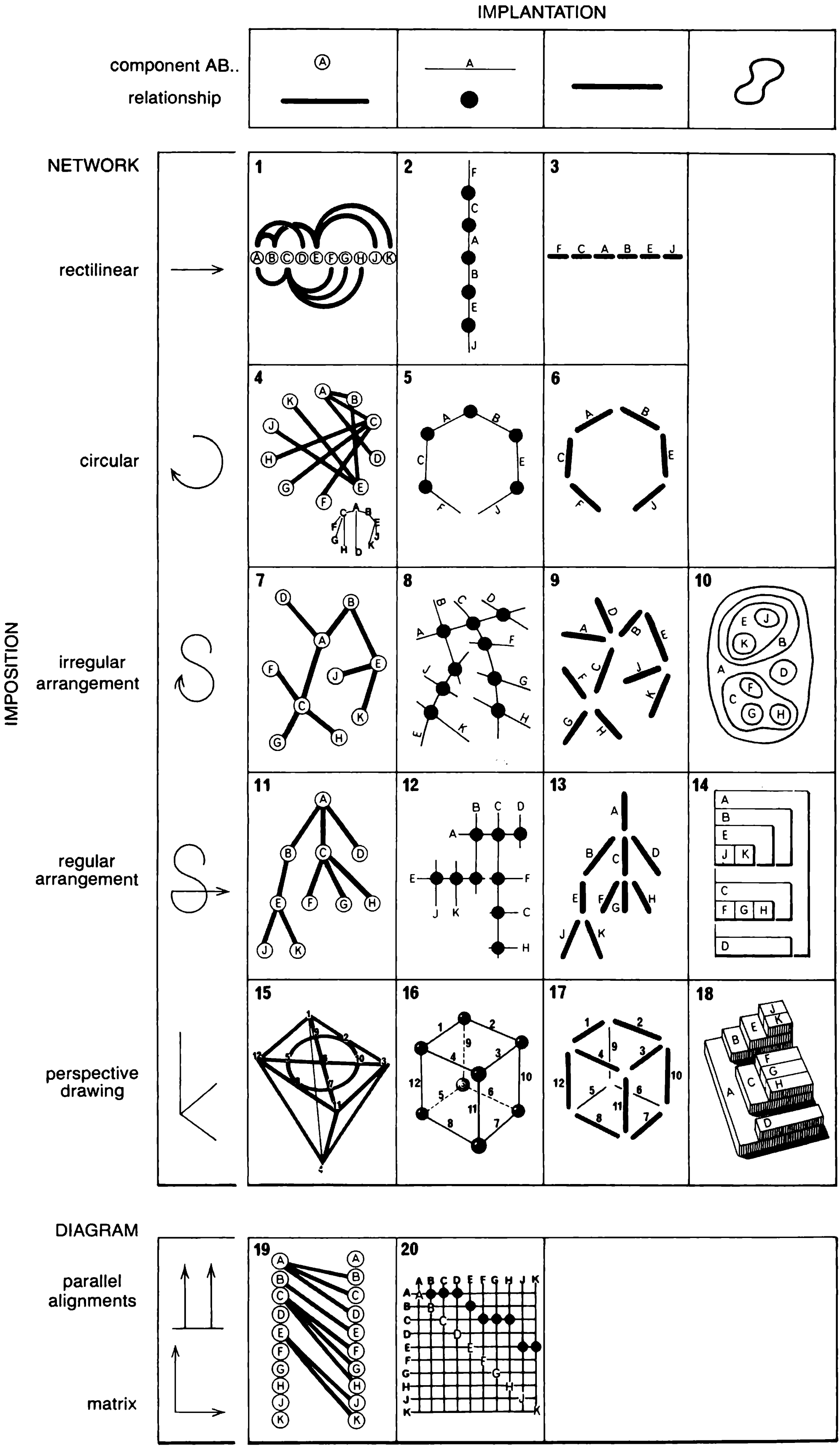
IMPLANTATION
component AB..
relationship
NETWORK
rectilinear
circular
irregular arrangement
regular arrangement
perspective drawing
IMPOSITION
DIAGRAM
parallel alignments
matrix
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

CONSTRUCTION AND TRANSFORMATION OF A NETWORK

Consider the data: A is father of B, C, D; C is father of F, G, H; B is father of J and K. A genealogical tree depicts the set of correspondences (kinship relations) linking the members of a family, that is, the elements AB . . . of a group of individuals. A flow chart represents the set of relationships linking a series AB . . . of preestablished functions. These datasets are constituted by the relationships among the elements AB . . . of a single component. When such information is transcribed onto the plane, it produces a NETWORK. For the same information, various constructions are possible.

Available graphic means

We have seen that graphic representation *(implantation)* involves three elementary figures: the point, the line, the area. The elements AB . . . of a component can be represented by points and the relationships by lines, or conversely. In certain cases, the lines alone can represent both elements and relationships. The same is true for areas, when the relationships are inclusive. Furthermore, the utilization of the planar dimensions *(imposition)* enables us to organize these figures in a rectilinear or circular manner, or order them along one of the two planar dimensions. A perspective drawing can suggest depth and situate the network in a "three-dimensional" space. Finally, any network can be constructed in the form of a diagram, provided the component AB . . . is represented twice. In the set of figures opposite, implantations and impositions are combined to illustrate the various possible constructions of a network.

Types of network construction

A rectilinear construction (figure 1). This type of construction orders the elements. The relationships are curves and can be distributed from one part to another on the line. This construction is useful when AB . . . has an ordered characteristic (page 273) or when the nature of the relationships justifies a distribution in two groups.

The constructions in figures 2 and 3 are possible only in a series without ramifications.

A circular construction (figure 4). By arranging the elements AB . . . on a circle, any relationship can be transcribed by a straight line. This is the construction which produces the least confusing image, whatever the number of intersections stemming from the raw data. Consequently, it is useful for a first graphic transcription, enabling us to pose visually the problem of simplification. The constructions in figures 5 and 6 are governed by the same principles as those in figures 2 and 3.

Irregular arrangements. One can forsake rectilinear or circular alignment and use the entire space to arrange the elements. In figure 7, the relationships are represented by lines, the component AB . . . by points. In figure 8, the opposite is true. In figure 9, lines alone represent both. In figure 10, the example chosen utilizes the properties of area representation. By expressing the notion of inclusion, areas enable us to transcribe all the relations in the information being considered. They can either, as here, express both the element and all the successive groups which it engenders, or group elements among each other (see page 282).

Regular arrangements. In the preceding examples, neither of the two planar dimensions was meaningful. If one considers the vertical direction to represent the order of generations, one arrives at the classic form of the genealogical tree (figure 11). The ordered meaning of the plane facilitates comprehension of the image in contrast with figure 7. A line-point inversion leads to figure 12, in which the series of generations is represented successively on one or the other of the two planar dimensions. Lines alone are utilized in figure 13, which, in this case, appears to be the simplest solution (see also page 276). Areas can be constructed in an ordered manner and can trace out images which are easily accessible, as in figure 14.

Perspective drawings. Whatever the arrangement of five points on the plane, their correspondences will produce at least one meaningless intersection (figure 21). However, if we suggest three-dimensional space, it is possible to avoid any intersection (figure 22). If the drawing creates a sense of volume (figures 15–18), it will also suggest that the lines do not cut across each other. The impression of depth is obtained by utilizing various perceptual properties (see page 378). In figure 15, the elements 1, 2, 3, . . . of the component are represented by points. The set of relationships is simplified considerably when these same elements 1, 2, 3, . . . are represented by lines (figures 16 and 17). Areas can also be situated in three-dimensional space (figure 18), illustrating the stratification of generations, already suggested in figure 14.

Diagrams. Any network can also be constructed in the form of a diagram. One merely represents the component twice and considers the elements AB . . . as starting points for relations leading to arrival points AB . . . . Two constructions are possible. Parallel alignments (figure 19) are useful for comparing orders (see pages 248 and 260). A matrix such as that in figure 20 allows for permutations in rows and columns and can thus lead to the simplification of complex information by diagonalization.

The transformations of a network

The simplest, most efficient construction is one which presents the fewest meaningless intersections, while preserving the groupings, oppositions, or potential orders contained in the component AB.... In the absence of a simple and general calculating procedure, which would permit us to define the optimal construction and arrangement of the elements for given information, it is necessary to pose and resolve most problems graphically. When the information is not too complex, experience shows that it is the circular construction which affords the best visual point of departure. For example, it permits us to discover that the order ABEJKDHGFC eliminates meaningless intersections (figure 4) or to see that an arrangement (page 278) produces a greater simplification. It also enables us to reconsider the conceptual relationships contained in the component AB... (see figures 5 and 6, page 274).

When the information is highly complex, the permutable matrix (figure 20) affords the means of proceeding to an initial simplification prior to construction of the network.