

GESTALTEN AND COMPUTERS

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A primary distinction that comes to mind when one undertakes to compare gestalten and computers is that computers as instruments by themselves are deprived of consciousness, whereas the cognitive and perceptual processes of gestalten are not. But this distinction does not really hold, because the finest example of a gestalt can operate without consciousness. It is the physiological functions of the human and animal body. The nervous system organizes the complex physical activities of the body as well as its cognitive ones.

Since this reminds us that gestalten can be physical, what distinguishes them from computers? I shall not be concerned here with any details of the technicalities of computers but mostly with some of the principles inherent in today's practice. Computers serve today quite usefully to provide specimens from a large supply, such as showing on the screen a particular work of art drawn from an archive of art history, or they may provide a particular fact needed by a scientist. Computers are also helpful in putting together groups of examples located at separate places. They show the various aspects of a particular object, such as a building or its model as it appears from a varying distance or perspective.

These accomplishments, however, are not cognitive. It is up to the user to make any intelligent applications. In order to test computers for any cognitive capacities, one has to provide tasks of problem solving. Problem solving, of course, has been a favorite experimental subject of gestalt psychologists, such as Wolfgang KÖHLER, Max WERTHEIMER, or Karl DUNCKER. The chess game is such a subject. As a cognitive task, the chess board is a configuration of vectors striving to overcome their opponents by reaching a solution. Today's competitions between computers and chess masters are popularly described as duels between the machine and the brain. They are nothing of the kind. They can be cited to show that computers may be of some help for their users, as they may for certain cognitive tasks. They can search the past record of successful games to find out which moves a player used in a similar situation.

For the purpose of our present discussion it does not matter much whether such a competition is won with the help of a computer or without it. What we have taken for granted so far is the nature of the gestalten that do productive problem solving. What exactly is a gestalt? Its ideal form can be demonstrated to various degrees of approximation by the functioning of the organism, such as the human and animal body or by organic products, such as good works of art. But how does one describe or define a gestalt beyond just stating that it is the interaction of all its vectors. One

is limited to pointing to the relations between the whole and the parts or the parts among each other or the combinations of these two kinds of relations.

These descriptions are linear. They merely hint at gestalten from the outside. But these hints are useful in suggesting how gestalten come about. When one deals with life processes, one deals with functions, and the first question must always be: what are these functions needed for? What then are gestalten needed for? Why do nervous systems need to go beyond simple reflexes? The obvious answer is: because living creatures have to respond to an environment where there are constant variations in the dimensions of space, time, and intensity. Gestalten originate as organic processes that concede these complex variations. They develop variations of strength and hierarchies of dimensions, dominants and subordinates, centers and lateralities. They provide various sizes, shapes, and subdivisions to respond to the caprices of the environment. What this theory does not account for is the role of conscious awareness. But there we run into DUBOIS-REYMOND'S famous Ignoribimus. However, we are satisfied with the traditional psychophysical parallelism, which is beginning to offer the expected physiological consequences; the neurological equivalents of psychological gestalten.

The neurological configurations seem to be reducible to the linear units to which I alluded before. Ultimately we seem to land at the venerable elements of dendrites and axons, things and ties. These physiological elements of gestalten seem to be similar to the elements of which Computers are designed.

The upshot of our deliberation is that the physiological structure of gestalten seems to be reducible to elements comparable with the physical elements of computers. The present practice of Computers is far distant from the gestalten that solve high tasks of problem solving. What Computers can achieve today and what they will accomplish in the future remains to be seen.

Summary

The verbal description and Definition of gestalten operates with linear forms that resemble the physiological elements to which gestalten seem to be reducible. These physiological elements are like the physical elements on which Computers are based. To the extent to which today's computers rely on the old-fashioned principle of past experience, they remain far below the high achievements of cognitive problem solving by gestalten. In principle, however, there seems to be no technical limit to what problem solving by Computers can achieve.

Zusammenfassung

Die verbale Beschreibung und Definition von Gestalten bedient sich linearer Formen, die den physiologischen Elementen des Nervensystems ähneln, auf welche Gestalten zurückführbar zu sein scheinen. Diese physiologischen Elemente gleichen aber den Elementen, aus denen Computer konstruiert werden. Wenn Computer heutzutage das altmodische Verfahren benutzen, das auf der mechanischen Ansammlung von Erfahrungsdaten beruht, (wie sie es in der Tat tun) so bleiben sie weit hinter den Erfolgen von kognitiven Problemlösungen zurück, wie sie die Gestaltanwendungen zu verzeichnen haben. Im Prinzip jedoch scheint es keine technischen Grenzen zu geben, die von Computern nicht überschritten werden können.

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