3. Assumptions relating an individual to the informational structure of his environment

Human beings have a number of assumptions that reflect the structure of the physical world that we have been discussing. These assumptions are normally tacit, deeply rooted, universal and compelling. Their operation can be detected particularly in illusions. Thus there is the universal assumption that the sky at the horizon is further away than the sky above. This leads to the moon looking larger on the horizon. Even when one knows that the moon on the horizon is actually no further away than the moon at its zenith, the illusion persists (Kaufman and Rock, 1962). In the perception of depth as determined by shadows (as in relief photographs) there is the equally universal and compelling assumption that the light source is above the surface. Thus for example a human face lighted from below produces a sense of strangeness and unnaturalness (Hess, 1961). Assumptions of this kind appear to prevail in all the ways in which the human organism handles information from the environment. Typically, the existence of these assumptions would make no biological sense if it were not for the fact that they represent adaptation to the persistent and pervasive characteristics of the external environment. Thus, as Ptolemy correctly observed about the moon illusion, the space between us and the horizon is typically filled with things and places for things; the space above us is generally empty. Similarly most occasions are illuminated by the sun, the moon or starlight, all of these enter our world from outside, from above. The adaptive nature of many of these assumptions has been positively established by experiments.

Perhaps the most strikingly relevant experiments are those of Kohler and his colleagues. Using various kinds of grossly distorting goggles they were able to show that after continuously wearing these for weeks the distortions disappeared. They could safely ride a bike in traffic. Although the correlation of stimuli – sensation had been drastically altered by the goggles, the organism adapted to the changes so as to re-establish the correspondence of distal objects and the central neural representation. The process was not conscious.
There is thus a solid body of evidence that:

1. persons are oriented to their environment by a set of assumptions that are universal, tacit and compelling;
2. these assumptions are adaptive with respect to the physical world;
3. the adaptive processes involving these assumptions have as their focal condition the definition for the organism of the main structural features of the physical world that concern behaviour. As we saw with the moon illusion these features, e.g. the extent to which space is filled with things, are not necessarily those that the physical sciences select as important.

It is important for our subsequent considerations that persons can establish directive correlations with parts of their environment only when they have evolved assumptions about the environment whereby:

1. they can relate themselves to the spatio-temporal framework of the environment. If as in the experimental 'Ganzfeld' (Dember, 1960), the environment offers no such framework, then the ordinary processes of perception break down. The adaptiveness of these particular assumptions affirms that there is a single physical environment with a definite arrangement and they mean that 'the world as we perceive it has certain systematic features; its parts imply each other to a certain degree. It is not a manifold where just anything can happen but one with restrictions . . . The requirement of fitting together in a consistent world puts limits on the possible effects of stimulus pattern. It is in a certain sense an internal limitation of the cognitive system.' (Heider, 1958, p. 51).

2. they can 'see' beyond the offshoots to the ever-further-removed source events and structures. 'First, man is usually not content simply to register the observables that surround him; he needs to refer them as far as possible to the invariances of his environment. Second, the underlying causes of events, especially the motives of other persons, are the invariances of the environment that are relevant to him, they give meaning to what he experiences and it is these meanings that are recorded in his life space, and are precipitated as the reality of the environment to which he then reacts.' (Heider, 1958, p. 81). This process of attribution is not to be confused with conscious inference. As the Kohler experiments show, there are unconscious adaptive processes whereby what reaches the retina is transformed in such a way as to 'undo' the transformation in the media from object to the spurious stimulus unit. Because of these adaptive processes the person sees meanings