shown in panel A, where the circular disks represent different orientations of the positive half-fields of either corner or occlusion fields.

However, a vertical edge would also be consistent with corners or occlusions about axes tilted relative to the image plane but within the plane of influence, as depicted in panel B. The same kind of stimulation would occur at every point within the plane of influence of the edge, although only one point is depicted in the figure. When all elements consistent with this vertical edge have been stimulated, the local fieldlike interactions between adjacent stimulated elements will tend to select one edge or corner at some depth and at some tilt, thereby suppressing alternative edge percepts at that two-dimensional location at different depths and at different tilts. At equilibrium, some arbitrary edge or corner percept will emerge within the plane of influence as suggested in panel C, which depicts only one such possible percept, and edge consistency interactions will promote like-state elements along that edge, producing a single emergent percept consistent with the visual edge. In the absence of additional influences, for example in the isolated local case depicted in panel C, the actual edge that emerges will be unstable; it could appear anywhere within the plane of influence of the visual edge through a range of tilt angles and could appear as either an occlusion or a corner edge. However, when it does appear it propagates its own fieldlike influence into the volumetric matrix. In this example the corner percept would propagate a planar percept of two orthogonal surfaces that will expand into the volume of the matrix, as suggested by the arrows in panel C. The final percept therefore will be influenced by the global pattern of activity; that is, the final percept will construct a self-consistent perceptual whole whose individual parts reinforce one another by mutual activation by way of the local interaction fields, although that percept would remain unstable in all unconstrained dimensions. For example, the corner percept depicted in panel C would snake back and forth unstably within the plane of influence, rotate back and forth along its axis through a small angle, and flip alternately between the corner and occlusion states, unless the percept is stabilized by other features at more remote locations in the matrix.

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Phenomenology is art, not psychological or neural science

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Abstract: It is tough to relate visual perception or other achievements to physiological processing in the central nervous system. The diagrammatic, algebraic, and verbal pictures of how sights seem to Lehar do not advance understanding of how we manage to see what is in the world. There are well-known conceptual reasons why no such purely introspective approach can be productive.

To see something is an achievement. That is to say, the claim to have performed correctly can be tested. Indeed, we can investigate how that task of visual recognition was successfully carried out. We can try to infer the information-transforming (cognitive) processes mediating the performance by varying what is visible and observing changes in response (i.e., doing psychophysics); this is an example of psychological science.

The physical "engineering" of these processes of seeing can also be studied by varying the optical input, but this time observing what is projected onto the retina and activity in the central nervous system (CNS), from the rods and cones to V1 and beyond. Considerable progress has been made in relating cellular neurophysiology to the psychophysics of elementary features of the visible world. It is not so easy to get psychophysical evidence that distinguishes between a cognitive process being in consciousness and transiently out of consciousness (Booth & Freeman 1993), although it is clear that some visual information processing never enters consciousness. When we cannot specify a mental process as conscious, there cannot be a theory of the neural basis of that process. Lehar's complaint that neuroscience fails to explain visual consciousness is vacuous.

Furthermore, what we know to be the case through use of our senses is a very different kettle of fish from the contents of consciousness, in the sense of how things seem to us while we discount our beliefs about how they actually are. By definition, how things seem cannot be checked against how things are. So the systematisation of expressions of subjective experience is an art form. Lehar's diagrams, his field equations, and his verbal exposition are sophisticated elaborations of the sort of thing that I draw when I wake up and try to sketch the visual imagery that I was experiencing as I woke. His and my graphic, algebraic, and verbal efforts cannot be wrong or right; they merely express how it appeared to be.

Lehar says that his visual experience is holistic. I can empathise with that impression. Yet I also have visual experiences that are not holistic. I bet that he does too but chooses to ignore them. Any artist may do that, on the grounds that it would spoil the picture or detract from the story. However, that is aesthetics, not science.

I am not being positivistic. On the contrary, it is Lehar who commits the empiricists' and rationalists' epistemological fallacy of trying to build public knowledge on the basis of impressions or ideas that seem indubitable because they are private and so cannot be wrong – but then neither can they be right. Lehar writes: "These phenomena are so immediately manifest in the subjective experience of perception that they need hardly be tested psychophysically" (target article, sect. 10, para. 2). In words of one or two syllables: "What appears seeming to seem in seeing is so clearly clear that there is no need to test it against success at seeing."

Lehar's paper is built on equivocation in use of the word "perception" between the objective achievement and subjective experience. (The word "conscious" in his title is redundant: experiencing subjectively is the same as being conscious.) Like most philosophers, mathematicians, and physicists who expatiate on consciousness, he shows no sign of having considered what was shown, and how it was shown, by any psychological experiment on the perceiver's achievement in a visual task. He also ignores the philosophical advances following the later Wittgenstein's debunking, 60 years ago, of the pervasive fallacy of supposing that when a patch that is red (in the world that we all live in) is seen as red, this is a "seeming" in another world (Lyons 1983). Worse, because these appearances, subjective experiences, conscious qualia, or whatever, are part of each of us, Lehar (like many) locates them in our heads, or as neurocomputations if we are foolish enough to look for consciousness among the brain cells (Booth 1978). This is all a big mistake about the grammar of the verb "to seem." When we are viewing something but have reason to doubt that we perceive it correctly, then we may retreat to a claim that it seems to be so. We are not looking at a world inside our minds; we are having problems in seeing the colour of the patch out there.

The grammar of "seeming as though" or "seeing as" also shows

what the subjective experience is isomorphic to. The syntax of "as" is the figure of speech known as simile. Subjective visual experience is holistic, at least at times, because the world in which we operate is "holistic" in its optics; black holes are pretty uncommon in everyday life. Lehar actually says this in section 3, although he has hidden the point from himself by a tangle of the conceptual mistakes that Wittgenstein (1953) cut through. "The perceptual experience of a triangle cannot be reduced to just three phenomenal values but is observed as a fully reified triangular structure that spans a specific portion of perceived space" (sect. 3, para. 2). Delete the reference to a contrary and all the redundancies and we get: "The perceptual experience of a triangle . . . is . . . as [*sic*] . . . triangular. . . ."

Furthermore, a triangle is not a triangle in any world unless it "emerges" "whole," "real," and "invariant." If a Gestalt is taken to be a subjective experience (rather than a perceptual performance), then it is consciousness simply of "seeing the world as it is."

There is no space in this commentary to dissect out the multitudinous errors built on this fundamental misorientation. Suffice it to deal with the absurdity of the target article's Figure 2. Lehar shows phenomenological slapdash if not downright dishonesty. You know and I know that he has never looked one way down a road at the very same moment as looking the other way. So it is rank self-deception to write (sect. 6.3, para. 1) that "the two sides of the road must in some sense be [subjectively] perceived as being bowed" as in the diagram. His Bubble bursts.

Double, double, toil and trouble – fire burn, and theory bubble![1]

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Abstract: Lehar's Gestalt Bubble model introduces a computational approach to holistic aspects of three-dimensional scene perception. The model as such has merit because it manages to translate certain Gestalt principles of perceptual organization into formal codes or algorithms. The mistake made in this target article is to present the model within the theoretical framework of the question of consciousness. As a scientific approach to the problem of consciousness, the Gestalt Bubble fails for several reasons. This commentary addresses three of these: (1) the terminology surrounding the concept of consciousness is not rigorously defined; (2) it is not made evident that three-dimensional scene perception requires consciousness at all; and (3) it is not clearly explained by which mechanism(s) the "picture-in-the-head," supposedly represented in the brain, would be made available to different levels of awareness or consciousness.

In this target article we are told that "the most serious indictment of contemporary neurophysiological theories is that they offer no hint of an explanation for the subjective experience of visual consciousness" (sect. 1, para. 2). Lehar attacks "good old" Neuron Doctrine by stating that as a theoretical approach to visual perception, it has reached a dead end because he (Lehar) finds it "hard to imagine how . . . an assembly of independent processors [neurons] could account for the holistic emergent properties of perception identified by Gestalt theory" (sect. 1, para. 3). He then proposes his own doctrine, the Gestalt Bubble model. The Gestalt Bubble is presented as a computational approach to the perceptual representation of three-dimensional visual space using a volumetric matrix of dynamic elements, each of which can exist in one of several states: transparent for the representation of void space, opaque coplanar for the representation of smooth surfaces, opaque orthogonal for the representation of corners, and opaque occlusion for the representation of surface edges. The supposed transformation of the physical world outside by a perceptual process taking place inside the brain is defined as the turning on of the appropriate pattern of elements in the volumetric matrix of the model in response to visual input. The Gestalt Bubble thereby replicates the three-dimensionality of visual objects as they are experienced in the subjective percept. The principal merit of this model resides in the fact that it translates some major Gestalt laws of visual perception such as emergence, reification, multistability, and invariance into computational codes.

What the author fails to make clear in his target article is the supposed link between his Gestalt Bubble model and general theories of consciousness. All he does here is demonstrate that modern computer technology produces algorithms that allow us to translate the laws of perceptual organization formulated in Gestalt theory into formal codes within the framework of a computational model. What the model has to do with consciousness, however, remains totally unclear. Neither the fact that we are able to consciously experience and describe three-dimensional shapes as entities and wholes, nor the fact that we can find laws or codes describing how these emerge perceptually, implies or proves that consciousness is necessary to see and move around in three-dimensional space. In addition, although Lehar seems to imply that his Gestalt Bubble provides a ready model of what he refers to as visual consciousness, he fails to provide clear definitions of what we are supposed to understand by visual consciousness, phenomenal awareness, subjective perceptual experience, or consciousness in general. In the title of the target article, he uses the term "subjective conscious experience." Does this suggest that there should be an objective conscious experience as well? Moreover, the author readily assumes the existence of a "visual consciousness" as a particular form of consciousness. This assumption needs to be justified. How would a visual consciousness operate in comparison to an auditory, tactile, or olfactory consciousness, for example? In fact, by using ambiguous terminology in his text (terminological danglers?), switching readily from one level of explanation to another, the author fails to convince his readers that he knows what he is talking about when he discusses the question of consciousness.

Moreover, the fundamental difference between Lehar's "picture-in-the-head" model and the concept of isomorphism from classic Gestalt theory is not discussed in a satisfactory manner. After a lengthy introduction that confronts the reader with odds and ends of numerous general theories of mind and consciousness, the author all of a sudden pops up his own version of the Gestalt hypothesis of isomorphism by suggesting that we see the outside world as we do because that is and has to be the way the world is represented in the brain. This "picture-in-the-head" view goes far beyond the classic Gestalt concept of isomorphism because it assumes not only a functional but also a structural correspondence between the visual percept and its brain representation. It is introduced here as the only rightful answer to Koffka's question "Why do we see things as we do?"; the original Gestalt viewpoints (e.g., Kohler 1961; Metzger 1936; von Ehrenfels 1890; among others) on isomorphism are not discussed.

Interestingly, the author seems to have overlooked that his "picture-in-the-head" hypothesis (structural isomorphism) stands or falls on the validity of the assumption that one of the key principles formulated by Gestalt theory, that of the common fate of parts (*Ganzbestimmtheit der Teile;* Metzger 1936), reflects the result of a neurophysiological mechanism. In the early sixties, some psychophysicists questioned the neurophysiological validity of precisely this principle of perceptual organization. Pritchard (1961) presented figures as stabilized images on the retina and showed that the constituent elements of these figures disappeared from phenomenal awareness one by one – not all at once, as the principle of common fate of parts would predict if it reflected the result of a neurosensory mechanism (see also Pritchard et al. 1961). In any case, even if the "picture-in-the-head" view could be proven right, Lehar would still have to come up with an explanation of the mechanism(s) by which the picture in the head is made available to consciousness. Also, a rigorous distinction between

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