Guest editorial

Art and perception of nature: Illusory contours in the paintings of Ellsworth Kelly

There are many paths to learning about perception, and one of the most pleasurable is the path into the art museum. In 1993 in the National Gallery of Art in Washington DC I first saw a reproduction of one of Ellsworth Kelly's paintings from the La Combe series. It was a reproduction of La Combe III from the show "Ellsworth Kelly: the Years in France 1948–1954" which was exhibited at the National Gallery the previous Winter (exhibition catalogue edited by Bois, Cowart, and Pacquement, 1992). What is remarkable about this La Combe painting, and all Kelly's paintings in this series, is the repeated use of illusory contours to show the shape of things. These paintings are very insightful demonstrations of perceptual capability. They also are an introduction to the work of a great American master, Ellsworth Kelly. They reveal Kelly's continuing artistic preoccupation with visual perception.

Figure 1. La Combe I. Painted in 1950 by Ellsworth Kelly. This is a black-and-white reproduction of the original which is red paint on white canvas. There are strong vertical illusory contours along the alignment of the terminations of the thick diagonal bars. The illusory contours demarcate rectangular panels that are long and narrow and that abut one another across the extent of the painting. The original is 38 inches × 63.5 inches. Reprinted from the book by Bois et al (1992) with permission of the publisher and the artist.

Illusory contours, as every reader of Perception probably knows, are boundaries that are perceived in regions of the visual image where there is no luminance or color difference that would provide evidence for an object's boundary. They are formed by perceptual grouping operations that interpolate or infer a boundary that should be there in the image, on the basis of evidence from groups of features in the neighborhood. Illusory contours are a good example of the influence of perceptual organization on the appearance of the world because they are generated by the brain's responses to fragmentary information that it organizes into a coherent whole. They are also thought
to be related to the fundamental process of scene segmentation, and thus are clues to understanding crucial steps in visual perception of objects. There are numerous studies of the properties and mechanisms of illusory contours, and two excellent books on the subject (Kanizsa 1979; Petry and Meyer 1987).

Figure 1 is a black-and-white reproduction of *La Combe* I. Kelly's illusory contours are intermediate in kind between those defined by occluded solid objects, as in Kanizsa's demonstrations (Kanizsa 1955—chapter 4 in Petry and Meyer 1987; Kanizsa 1979) and illusory surfaces produced by line endings, as in the Ehrenstein effect (Ehrenstein 1941—chapter 3 in Petry and Meyer 1987). There is no question that this painting from 1930 was ahead of its time: Kanizsa's famous paper that put illusory contours into the mainstream of research on perception was not published until 1955. This is another example of a visual artist discovering important principles of visual perception before the scientists working in this area.

The *La Combe* paintings demonstrate important facts about illusory contours that are still being explored actively by scientists. They suggest that illusory contours indicate the shape of things as well as 'real' contours do. They teach us that regularity, parallelism, and symmetry are not necessary for inducing an illusory contour. The lines in the paintings go in random directions at irregular spacings. Furthermore, the lines that terminate at the illusory contour do not need to be continued on the other side of the occluding border. Therefore, illusory contours do not require completion of the 'thing occluded' behind the illusory surface. These two points were expressed explicitly in 1987 by Barbara Gillam (Gillam—chapter 30 in Petry and Meyer 1987). From a mechanistic point of view these perceptual facts suggest that the process of generating illusory contours is not fully cognitive and not sensitive to very-long-range constraints, but rather depends mainly on local interactions between parts of the image.

Kelly's *La Combe* goes further to show us that illusory contours can participate in figure—ground reversals just like ordinary contours, and they do in the paintings—first one and then the other rectangular column in figure 1 is in front or in back, in a kind of dynamic equilibrium. It is worth observing that the two sides of a rectangular panel in figure 1 almost always move in front or in back together, implying that figure—ground effects with illusory contours are surface-based rather than contour-based. Certainly in Ellsworth Kelly's paintings, the illusory contours are attached to rectangular surfaces they define. The artist has made it clear in published interviews that the *La Combe* paintings were inspired by the pattern of shadows on a staircase that led down to the sea, at a seaside villa called 'La Combe' where he stayed in the Summer of 1950. He deliberately omitted luminance edges for the boundaries of the rectangular panels that represent the stairs on the staircase, and instead their existence is evoked by the illusory contours that are caused by the artistic rendering of the shadow pattern. Stripped of all brightness-defined borders, and of texture and shading and perspective, the stairs still are there to see in Kelly's paintings.

One can find rare examples of illusory contours in other art works. They were used as decorations in some Egyptian tomb paintings, on Greek vases, and in medieval manuscript illumination (Halpern—chapter 18 in Petry and Meyer 1987). However, Kelly's *La Combe* series is unusual because the main focus of the paintings is illusory contours in our perception of nature. Also other paintings by Ellsworth Kelly from his Parisian period (*Cité, Meschers*) reveal this same insight—that perceptual organization alone can carry the form. This is related to the driving force of much of Kelly's work: to simplify a picture to the essential forms, and to look at familiar forms in new ways.

This is a good time to become a student of the art of Ellsworth Kelly. His work is being given a major retrospective exhibition at the Guggenheim Museum in New York City until January 15, 1997. This exhibition will travel to Los Angeles in February 1997 staying there until May 1997. Then it will travel to London, to the Tate Gallery
in Summer 1997, and thence to Munich in Winter 1997–1998. The exhibition includes one of the La Combe paintings (La Combe I, see figure 1). There are also preliminary drawings related to the La Combe paintings in the show. It is worth considering the total artistic accomplishment of Ellsworth Kelly in the retrospective exhibition and how he used perceptual insights throughout his career.

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References