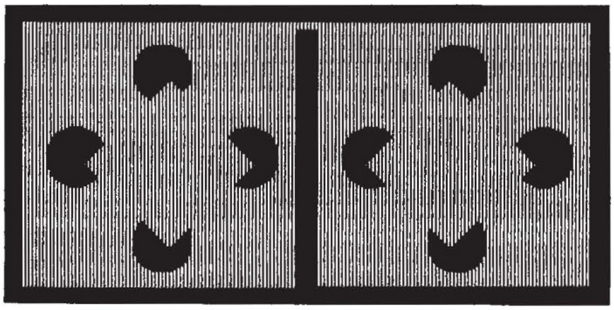

Fig. 3 Occlusion must be an inherent part of the stereoscopic matching process. The four black disks now become 'holes' through which one can see the four deep corners of a partially hidden diamond and the corners pull the corresponding lines of wallpaper with them.

odic displays. Second, Prazdny suggests that disparity signals from the 'unambiguously matched borders' help obtain true correspondences. This conjecture cannot be valid, at least in its simple form, as Fig. 2 does not yield stereo capture. (Here the disparity is between the disks themselves and not just between the cut sectors.) Hence construction of a three-dimensional surface and the presence of a steep disparity gradient are prerequisites; the mere propagation of depth signals will not suffice. Third, we find that reversing the sign of disparity does not simply reverse perceived depth. When the pictures of the two eyes are interchanged to convey uncrossed disparities (Fig. 3), a qualitatively different percept emerges. The black disks now look like holes through which one can see the four corners of a partially occluded square (diamond) and these deeper corners pull the corresponding lines with them. The illusory contours are now seen to complete the holes rather than the square. Here, the illusory contours are created after stereo matching and must, in their turn, influence the subsequent stereo matching of finer elements.

Effects similar to stereo capture can also be observed in apparent motion (motion capture)[3] but the effect is not phase sensitive and has a much higher tolerance for uncorrelated textures.

Any visual process can in principle be simulated in a computer but our results suggest that the brain solves the correspondence problem (in motion and stereopsis) by using a set of short cuts[4] rather than elaborate computation of the kind implied by artificial intelligence researchers. During phylogeny the visual system may have acquired many such tricks which were adopted not for their aesthetic appeal, versatility or mathematical elegance but simply because they worked—an idea that we call the utilitarian theory of perception[5]. Artificial intelligence can be useful in rigorously reformulating[6,7] perceptual problems, but the mechanisms used by the brain to solve these problems are best revealed by old-fashioned psychophysics and neuroanatomy[5,8]. Capture probably results from the fact that the motion (or depth) of certain salient image features is first extracted by the magnocellular pathways and then attributed to finer features that excite the parvocellular pathways. The nature of this interaction merits further attention.

V. S. RAMACHANDRAN

*Department of Psychology C-009,
University of California at San Diego,
La Jolla, California 92093, USA.*

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Is the Gulf of Tadjoura a platelet boundary or complex rift zone?

CHOUKROUNE *et al.*[1] have provided new data for the structure of the Gulf of Tadjoura (central Afar), which supposedly separates the Danakil and Somali platelets. Their observations (orientation and activity of a NW–SE fault set) made during dives with the *Cyana* submersible, are at odds with the model of orthodox plate-tectonics boundary, which had been developed in the central Afar and in the Gulf, and was previously widely accepted. Choukroune *et al.* question the westwards opening of the Gulf by rifting: their new interpretation of the Arabia and Africa plate-tectonics relationship does not imply that the Afar triangle is a multi-platelet building, but that it could represent a diffuse relay zone between the Aden Rift and the Red Sea Rift.

The new data support observations (unpublished) made during earlier cruises by Boucarut *et al.* Their complete tectono-bathymetric chart of the Gulf of Tadjoura shows that the Maskali–Obock trough and the Tadjoura trough are located on either side of a subcontinuous tectonic lineament (major fault zone), running ENE–WSW (N 60°) from 43°20 to 43°. Both troughs are delineated either by ENE–WSW, NW–SE, or EW fault zones, which form some important (Recent) submarine cliffs. Moreover, the presence of active (NW trending) extensional fault zones, some of them crossing the Gulf and cropping out on both sides[2], and of faulted Middle Pleistocene sediments in the Obock trough and on the northern side of the Gulf[3] had been mentioned.

Continuation of the major structures on land into the Gulf suggests that the Gulf floor is composed mainly of broken continental crust, separated by relatively narrow and irregular shaped rift zones filled with young volcanics[2].

The various orientations of the fault sets in the Gulf should be compared with those of the nearby land area, whose successive motions and combinations with volcanic occurrences during Plio-Pleistocene times are well known[4]. On land, the structural dominance of the 'Aden type' fractures (N 80°–100°) diminishes westwards: likewise, in the Gulf, it is taken over by that of the NW–SE and ENE–WSW faults. This explains the zigzag shape for the (supposed) boundary.

So, even if the platelet sketch for the central Afar has to be reviewed, various data indicate that the westwards tearing interpretation of the Gulf of Tadjours[5-7] should not be eliminated.

M. BOUCARUT
M. CLIN

*University of Bordeaux 3,
33405 Talence Cedex, France*

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