

representation of the visual world undergoes a shift analogous to the shift of the image on the retina. Unlike the retinal shift that follows an eye movement, the parietal shift precedes the eye movement and predicts the location of reafferent visual input. This dynamic link between successive retinal images may contribute to the integration of visual information across eye movements and to the construction of a continuously accurate, retinocentric representation of visual space.

REFERENCES AND NOTES

1. H. von Helmholtz, *Treatise on Physiological Optics* (Dover, New York, 1962), vol. 3.
2. See also M. E. Goldberg and C. B. Bruce, *J. Neurophysiol.* **64**, 489 (1990); M. E. Goldberg, C. L. Colby, J.-R. Duhamel, *Cold Spring Harbor Symp. Quant. Biol.* **55**, 729 (1990); J. Droulez and A. Berthoz, in *Motor Control: Concepts and Issues*, D. R. Humphrey and H. J. Freund, Eds. (Wiley, Chi-

chester, 1990), pp. 137–161.

3. We recorded from 36 neurons in the LIP of two rhesus monkeys (*Macaca mulatta*). Monkeys were prepared for behavioral and physiological recording under sterile surgery with ketamine and sodium pentothal or isoflurane as anesthetics. Training, eye position recording, and neurophysiological recording were done as described [R. H. Wurtz, *J. Neurophysiol.* **32**, 727 (1969); M. E. Goldberg, in *Methods in Cellular Neurobiology*, J. L. Barker and J. F. McKelvy, Eds. (Wiley, New York, 1983), vol. 3, pp. 225–248].
4. T. C. T. Yin and V. B. Mountcastle, *Science* **197**, 1381 (1977); D. L. Robinson, M. E. Goldberg, G. B. Stanton, *J. Neurophysiol.* **41**, 910 (1978); J. W. Gnadt and R. A. Andersen, *Exp. Brain Res.* **70**, 216 (1988); R. A. Andersen, R. M. Bracewell, S. Barash, J. W. Gnadt, L. Fogassi, *J. Neurosci.* **10**, 1176 (1990); S. Barash, R. M. Bracewell, L. Fogassi, J. W. Gnadt, R. A. Andersen, *J. Neurophysiol.* **66**, 1109 (1991).
5. R. H. Wurtz and C. W. Mohler, *J. Neurophysiol.* **39**, 745 (1976); M. C. Bushnell, M. E. Goldberg, D. L. Robinson, *ibid.* **46**, 755 (1981). In the peripheral attention task, the monkey maintains central fixation and is rewarded for releasing a bar when a peripheral stimulus dims slightly. In the

fixation task, foveal attention is maintained by rewarding the monkey for releasing the bar at the dimming of the fixation stimulus.

6. A neuron without predictive remapping begins to discharge with a visual latency from the time the stimulus enters the receptive field, that is, at the end of the saccade. Any neuron discharging with a shorter latency shows predictive remapping. Because we cannot determine precisely when the stimulus crosses the outer boundary of the receptive field, we adopted a conservative statistical criterion. For each neuron, a *t* test was used to compare mean response latencies for blocks of 16 saccade and fixation trials. Neurons with a latency relative to the beginning of a saccade (when the stimulus is still outside the receptive field) that was shorter or not significantly different from the latency relative to the onset of a stimulus in the fixation task were considered to show predictive remapping.
7. We are grateful to the staff of the Laboratory of Sensorimotor Research for its help: J. Raber for veterinary care, K. Powell and H. Macgruder for animal care, C. Crist and T. Ruffner for machining, L. Jensen for electronics, A. Hayes for computer systems, and J. Steinberg for facilitating everything.

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Technical Comment

Enumerating Buckminsterfullerane Isomers

M. Saunders states (1) that the number of di-inside isomers of fully reduced $C_{60}H_{60}$ (buckminsterfullerane) is 21, a result that he obtained with the aid of a computer program. He indicates that this number can also be obtained by direct inspection. We carried out such an inspection, using a soccer ball to facilitate the enumeration, and found the number of such isomers to be 23. This number agrees with the result of a computer calculation [using a program written by one of us (G.T.)] and also with the theory of H. G. Pólya (2).

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2. H. G. Pólya, *Acta Math.* **68**, 145 (1937).

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Response: I have reexamined the question of how many di-inside isomers exist for buckminsterfullerane, and I agree that there are indeed 23. However, the main conclusions of my paper are unaffected. Originally, I refined the structure of the symmetric,

all-outside, $C_{60}H_{60}$ structure with the molecular mechanics computer program MM3 (1). I then obtained the 1770 distances between pairs of carbons and sorted them. The distances appeared to fall into 21 classes. I have now refined the structure further through additional cycles and have made another sorted list of distances. I had previously put the longest 120 distances into a single group (category 21), but the new data show breaks in distance in this group that are quite distinct. Category 21 (60 distances) now has values between 7.48620 and 7.48648 Å. The new category 22 (30 distances) has values between 7.48842 and 7.48874 Å (there is a small break, but it is quite clear). The final category, 23 (30 distances), has values between 7.64422 and 7.64452 Å. (This break between category 22 and category 23 is much larger than that between category 21 and category 22, and I must have overlooked it before.) Additional refinement would make the spread in distances within each category still smaller and the breaks more distinct. Thus, my method does indeed work for this case, but I did not execute it carefully enough originally.

One certainly could make similar kinds of errors with group theory or any other method. However, with sufficient care it should always be possible to get the correct answer with this method. To double-check one's

answer, one could separately optimize with MM2 or with any other force field that provides slightly different distances. This would further reduce the odds of a coincidence in distances. The advantage of this new technique is its simplicity; the program for finding and sorting pairs of distances was quickly written and used.

The main point of my paper was that putting hydrogens on the inside of the molecule should greatly lower its energy. This conclusion is unchanged. I have rerun the search program (modified to include the 23 categories of di-inside isomers). Several additional 11-inside isomers were found that were lower in energy than those discovered previously. (In my paper I stated that it was likely that more isomers would be found. This result may have nothing to do with there being 23 classes rather than 21.) None of the new 11-inside isomers are as low in energy as the best 10-inside isomer found so far.

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