single units in striate cortex are at least capable of conveying more than a single class of information and their discharge, therefore, contains a considerable element of ambiguity. A somewhat similar conclusion was expressed by Creutzfeldt, Pöppl, and Singer (12) on finding that most units in the striate cortex of unanesthetized macaques were affected in some way by most of the visual stimuli they employed.

SUMMARY

1. Activity of 239 units was studied in the striate cortex of unanesthetized, painlessly immobilized squirrel monkeys. The great majority of these units were within the foveal representation.

2. About 40% of the units tested with diffuse, steady light were luxotonic, i.e., their rate of discharge, maintained for > 1 min, in light versus dark differed by a factor of at least two and/or varied approximately monotonically with log luminance over at least a 3 $\log_{10}$ range. In 44% of these units no definitive receptive field could be demonstrated, whereas others had small fields and could respond to geometrical features of the stimulus. Rate of light or dark adaptation, threshold for the luxotonic effect and its continuation beyond the presumed level of rod saturation (28) all suggest that cones contribute the major input to luxotonic units. The latency of their response to electrical stimulation of the optic tract indicates that some of these units are accessible to the magnocellular system of the lateral geniculate nucleus. The sustained response characteristic of this heretofore undescribed type of cortical unit was seriously altered by nitrous oxide.

3. Two-thirds of the units responded to moving stimuli. The latency of response to movement averaged 100 ms (range 30–300 ms, Q = 45 ms). There was no statistically significant difference between direction-sensitive and -insensitive units in this regard, although only 16 units were tested.

4. About 50% of the units responded to stroboscopic flashes. Inhibition of ongoing activity was sometimes the earliest response, at 17–20 ms. Units sensitive to direction of movement had longer latencies to stroboscopic flashes than did units responding to movement in any direction (55 vs. 40 ms). The latency was also inversely related to the number of forms of visual stimulation (movement, local flash, diffuse illumination) to which the units responded.

5. Of 16 units tested for ocular dominance, 60% were binocular.

6. In 6 of 19 units responding both to stimulation of optic tract and optic radiation the latency was 0.5–1.5 ms longer for the latter, suggesting that some units are accessible to more than one afferent system. Furthermore, information of both geometric and nongeometric (intensive) features of the stimulus can be carried by a single unit, e.g., luxotonic units sensitive to direction of movement.

ACKNOWLEDGMENTS

This study was supported by Grants GB 7522X from the National Science Foundation and NS03606 from the National Institute of Neurological Diseases and Stroke.

REFERENCES

1. BARLOW, H. B. AND LEVICK, W. R. Changes in the maintained discharge with adaptation level in the cat retina. *J. Physiol., London* 202: 699–718, 1969.
2. BARTLETT, J. R. Insulating micro-electrodes by centrifuging. *Electroencephalog. Clin. Neurophysiol.* 21: 304–305, 1966.
3. BARTLETT, J. R. A signal generator providing independent control of trapezoidal waveform parameters. *Physiol. Behav.* 11: 255–257, 1973.
4. BARTLETT, J. R. AND DOTY, R. W., SR. Influence of mesencephalic stimulation on unit activity in striate cortex of squirrel monkey. *J. Neurophysiol.* 37: 642–652, 1974.
5. BARTLETT, J. R., DOTY, R. W., PECCI-SAAVEDRA, J., AND WILSON, P. D. Mesencephalic control of lateral geniculate nucleus in primates. III. Modifications with state of alertness. *Exptl. Brain Res.* 18: 214–224, 1973.
6. BISHOP, P. O., COOMBS, J. S., AND HENRY, G. H. Responses to visual contours: spatiotemporal aspects of excitation in the receptive fields of simple striate neurons. *J. Physiol., London* 219: 625–657, 1971.
7. BISHOP, P. O. AND HENRY, G. H. Striate neurons: receptive field concepts. *Invest. Ophthalmol.* 11: 346–354, 1972.
8. CLARK, W. E. LE GROS. The laminar organization and cell content of the lateral geniculate body in the monkey. *J. Anat.* 75: 419–433, 1940–1941.
9. CLELAND, B. G., DUBIN, M. W., AND LEVICK, W. R. Sustained and transient neurones in the cat's retina and lateral geniculate nucleus. *J. Physiol., London* 217: 473–496, 1971.