41). The seeming dearth of simple units in primate striate cortex, 10 and 7% for peripheral field representation as per Hubel and Wiesel (26) and Poggio (36), respectively, 3% and none for fovea as per Poggio and ourselves; and of hypercomplex foveal units, 5% as per Poggio and roughly the same for our experience, certainly cannot be construed as evidence against such classification and its implication of sequential processing. As Hubel and Wiesel (26) point out, simple units are probably most numerous among the very small, and hence relatively inaccessible, cells of striate layer IV; and most of the hypercomplex cells can be expected to lie in circumstriate cortex.

There are, however, other more serious difficulties. To accommodate about 45% of his "foveal" units Poggio (36) found it necessary to form a somewhat new category in addition to the simple-complex sequence. The behavior of several units being labile, he also raised the possibility that their classification could be meaningless without knowledge of factors controlling their momentary state. In addition, it now appears that all categories of cortical units in the cat, simple, complex, and hypercomplex, receive monosynaptic input from geniculocortical afferents (23, 41, 43). This is directly antithetical to the implied sequential processing, but is concordant with the data in Table 2. The fact that latency to stimulation of OR was often longer than for OT in the present study also suggests diverse input to a given unit.

The general lack of significant interrelation or exclusion, statistical or otherwise, among the many parameters examined in the present experiments must also be taken as evidence that sequential processing is not readily apparent in the foveal representation of the striate cortex in the unanesthetized squirrel monkey. There were only two suggestions of a possible ascending hierarchy. Units which were the more "specialized" in that they responded to only one type of visual stimulation (Table 1), had the longest latency to stroboscopic flash; whereas those that were least specialized, i.e., responded in some manner to all major forms of visual stimulation employed, responded earliest and presumably the most directly. A similar ordering in the latencies to flash was seen among units that responded to movement independent of direction versus those that were direction sensitive. The latter, which a priori might be considered the more specialized and, hence, at a higher hierarchical level than the former, had the longer latency.

This assignment of direction-sensitive units to a more specialized category than for units responding to movement in any direction runs counter to recent evidence in the cat (see ref 7) that direction-sensitive units correspond to the simple units. There are, however, in addition to the stroboscopic latencies, many suggestions in the present data for the unanesthetized monkey that direction-sensitive units do not meet the criteria for simple cells. Their receptive fields displayed no such properties as reported for simple cells (7, 25, 26); many of them had considerable background activity (contrary to findings in the anesthetized cat (7) and/or were luxotonic; the range of latencies for their response to movement was very great; their properties could change with change in color or velocity (Fig. 2) of the stimulus and, contrary, to simple cells in the cat (23, 41), they could sometimes be activated via the magnocellular system (Table 2). In the small sample of monocularly driven units there were none that were direction sensitive, but one responded to movement independently of direction.

It must be recognized that the majority of the units in the present study responded readily to stimuli (diffuse light or stroboscopic flashes) having only intensive rather than geometric properties. This in itself is wholly unexpected in view of earlier findings on anesthetized cats (25). Yet the hierarchical progression from simple to hypercomplex units is based wholly on the geometrical properties of the stimulus (form, movement, location); and luminance or color are irrelevant except as contrast at borders. While Dow and Gouras (17) have demonstrated a considerable degree of separation in channels subserving spectral versus spatial analysis, the representation of luminance and spatial properties in our data show a clear overlap, e.g., direction-sensitive units that are luxotonic. In this respect it is thus clear that many