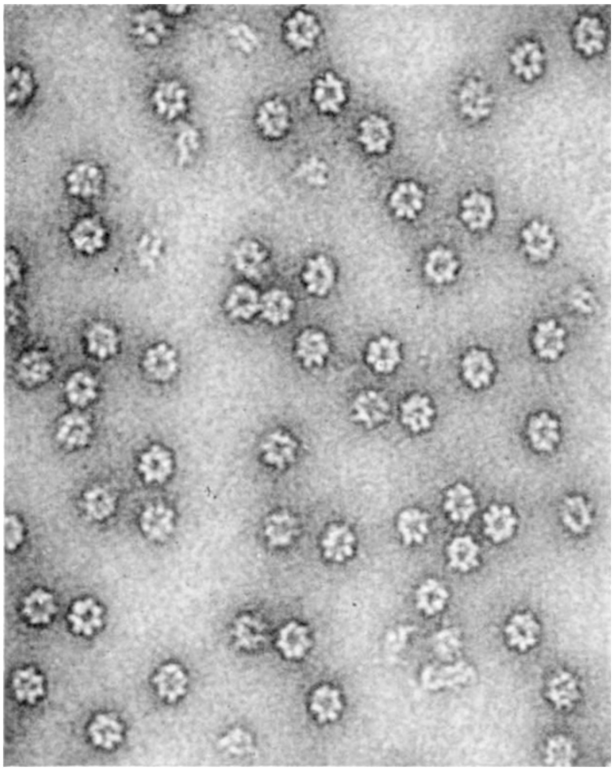
Meanwhile, C. W. Hesseltine and his colleagues at Peoria found that *Rhizopus oligosporus*—a mould used in oriental food fermentation—also has a high milk clotting activity (Wang, Ruttle and Hesseltine, *Canad. J. Microbiol.*, **15**, 99; 1969). Two acid proteases are produced by this *Rhizopus* and the ratio of proteolytic to clotting activities is a critical factor in good curd formation. The type of substrate used to culture the fungus not only affects total enzyme yield but also this ratio of activities; thus, the selection of culture conditions is very important for the production of a reliable commercial product. The *Mucor* and *Rhizopus* enzymes are alike in their *p*H stabilities, although the former seem to be the more thermostable of the two preparations. The *Rhizopus* enzyme and animal rennin showed very similar responses to *p*H, calcium ions (accelerated clotting) and sodium chloride, an effect studied because of the practice of adding common salt to milk during the manufacture of certain cheeses. Soon inadequate supplies of rennin should no longer hold up cheese making and there may be milk enough to raise an extra 30 million male calves a year as well.

MOLECULAR BIOLOGY

Not RNA Polymerase



"Seven-knobbed rosettes" in a preparation of *E. coli* RNA polymerase. The electron micrograph, ×480,000, was taken by Martin Lubin of the MRC Laboratory of Molecular Biology, Cambridge (*J. Mol. Biol.*, **39**, 219; 1969). Dr Lubin found other symmetrical structures in his preparations; hexagons, striped rectangles, rings and tetrads—but reports that these structures do not have RNA polymerase activity. Active RNA polymerase molecules appear to be irregular particles about 120 Å in diameter. The various symmetrical structures are presumably contaminants, and their function in *E. coli* is unknown.

NEUROPHYSIOLOGY

Collicular Receptive Fields

from our Neurophysiology Correspondent

THE superior colliculus—part of the brain—in the cat (and other mammals) receives large inputs from both the retina and the visual cortex. The colliculus is usually assumed to be concerned in the control of the direction of gaze, for electrical stimulation of a point on the collicular surface causes fixation in a specific direction in visual space. The properties of neurones in the superior colliculus, however, are not well known. Sterling and Wickelgren (*J. Neurophysiol.*, **32**, 1 and 16; 1969) have shown that some of the receptive field properties depend on interactions between both inputs.

In their first series of experiments they recorded from 200 units in anaesthetized cats. All were binocularly driven so that the control could not be retinal. Their receptive fields did not have the centre-surround organization characteristic of retinal and lateral geniculate units, but were much more like those of cortical neurones. Most had an activating region flanked by antagonistic areas. All responded to a moving stimulus but rarely to a stationary stimulus, 75 per cent having a strongly preferred direction of movement, and 25 per cent having no obvious preferred direction. An interesting difference between collicular units and those in the visual cortex responsive to movements was that for the colliculus there was also a genuine null direction 180° to the preferred, while in the cortex the null direction is 90° to the preferred. Ninety per cent of the preferred directions were within 30° of the horizontal meridian, while more than 75 per cent were from the centre of the field to its periphery. Thus as an example, most units in the right colliculus responded best to stimulus movements from right to left in the contralateral (opposite) half-field of vision. The directional preference was independent of stimulus contrast and of movement of the stimulus through antagonistic regions of the receptive field, so it seems likely that it was based on detection of temporal order of stimulation rather than on the spatial properties of the stimulus.

The most effective stimulus for most collicular units crosses the midline of the visual field and moves to the periphery. This is also the kind of stimulus most likely to elicit "following movements".

In their second paper, Sterling and Wickelgren show that many of the properties of collicular receptive fields disappear when cortical input to the colliculus is removed. Lesions in the visual cortex were followed by dense ipsilateral degeneration in the colliculus. Thirty-one of forty-one units studied after ipsilateral cortical removal (most of areas 17, 18 and 19) gave strong responses to stationary stimuli: their receptive fields could be mapped with light spots. None showed clear directional sensitivity and 70 per cent were exclusively driven by the contralateral eye. The receptive field sizes did not change, but there was increased spatial summation within their activating regions. In the normal colliculus, therefore, the neurones seem to share many of the receptive field properties characteristic of those in the visual cortex without being particularly sensitive to details of stimulus contour and size, reinforcing the view that they are concerned in particular with the detection of gross movements in the visual field.