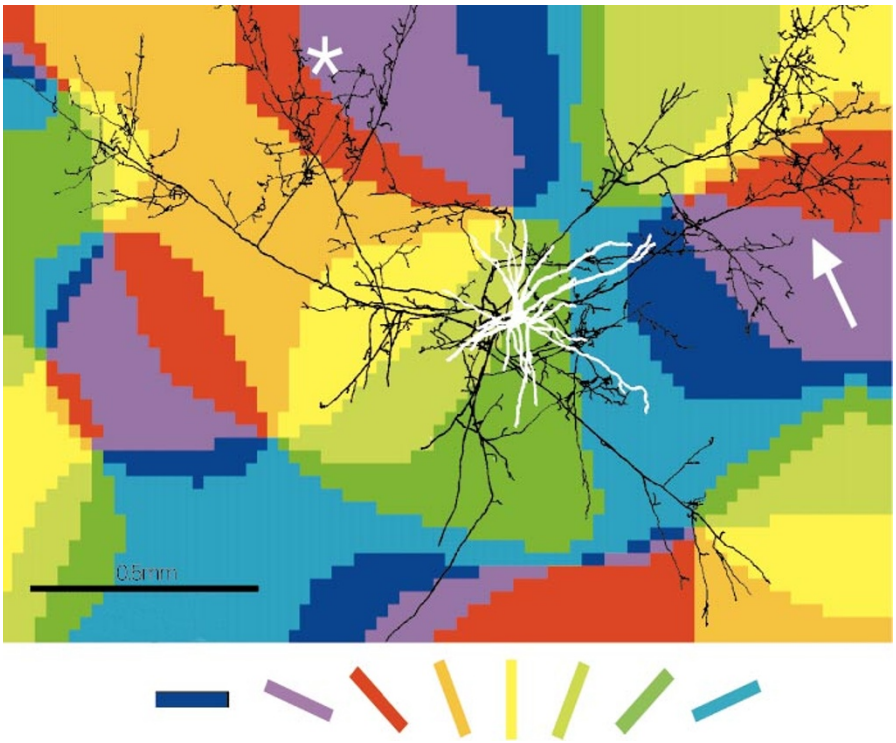

Figure 2 **Orientation map across the primary visual cortex with superimposed inhibitory neuron. Das and Gilbert[1] have shown that inhibitory horizontal connections between perpendicular orientations across a pinwheel can be used to analyse angular visual features, such as corners or T junctions. An inhibitory layer 2/3 large basket cell is shown, with soma (cell body) and dendrites in white, and the axonal distribution (black). (Modified from ref. 6.) The axons innervate regions of similar (green) as well as perpendicular (red) orientation preferences. Over distances of up to 1 mm, this inhibitory cell can supply cross-orientation inhibition to regions with complementary colours across a pinwheel (arrow), as well as across different orientation domains (asterisk) not including a pinwheel.**

of just 1 mm^2 on the surface of the cortex will contain all the possible orientation preferences, and, accordingly, can analyse orientation for one small area in the visual field. This topographical arrangement allows closely spaced objects with different orientations to interact. But it also means that a continuous line across the whole visual field would be cortically depicted in a patchy, discontinuous fashion. How can the spatially separated elements be bound together functionally?

The answer is that horizontal connections, varying in length from a few micrometres to 5–6 mm, allow local and remote interactions. They provide many excitatory and inhibitory connections between columns with both similar and dissimilar orientation preferences. Although the connections between similar columns could be useful in binding the distributed parts of a continuous contour, neurobiologists have long debated the functional significance of connections between drastically dissimilar columns. Now, Das and Gilbert[1] elegantly show that these connections have a suppressive (that is, inhibitory) function, and that, at this early stage of visual cortical processing, they could be used to analyse angular visual features such as corners or T junctions.

Forty years ago, Hubel and Wiesel[4] characterized the area of the visual field that can elicit responses from a visual cortical neuron as that cell's 'receptive field'. They also proposed that orientation specificity comes from aligned, convergent, excitatory subcortical inputs. Since then, many details about connectivity and processing within the cortex have been added. For example, if cortical inhibition is blocked, this can alter the orientation tuning of cells in the primary visual cortex[5]. One-fifth of all cortical neurons are now known to belong to one of seven distinct classes of inhibitory cell[6]. Unlike the excitatory cells, which preferentially connect to cells with similar properties[7], the long-ranging axons of inhibitory cells connect equally to cells with similar and different orientation preferences, and even to cells with preferences at a right angle[8] (Fig. 2).

Das and Gilbert[1] present new evidence for the functional significance of these cortical inhibitory interactions. The authors combined the optical imaging of intrinsic signals[2] (to obtain a functional map of orientation preferences across the cortical surface) with microelectrode recordings from pairs of cells at variable distances (representing non-overlapping parts of a visual scene with a preference for lines of very different orientations). They show a suppres-

100 YEARS AGO

In connection with the letter of "F.G." in NATURE of June 8 [see *Nature* 399, 525; 1999], on the strawberry cure of gout, I may mention that last year, when strawberries were so plentiful in England, a lady residing in Kent, who had formerly spent several years in Ceylon, where she had suffered from the wasting and often fatal complaint known as "Ceylon sore mouth" (the chief symptom of which is ulceration of the mucous membrane of the digestive organs), having had a return of the malady, and being unwilling to go abroad to undergo the "grape cure," conceived the happy idea to try strawberries instead, confining her diet to several pounds of these a day with plenty of milk. The remedy was so effectual that after a few weeks she was entirely cured of her malady, and had grown stout and well again.

Mr. G. Clarke Nuttall contributes to the current number of *The Contemporary Review* a popular account of the dependence of the flavour of tobacco upon the activity of bacteria during that important stage … known as fermentation. Interesting reference is made to the work of Suchsland, who examined the germs which he found in the fermenting heaps of the finest West Indian tobacco. This German bacteriologist isolated and cultivated these bacteria, and then introduced some into quantities of inferior German tobacco, which was subsequently transformed so that connoisseurs could not distinguish it from the finest brands of tobacco.
From *Nature* 15 June 1899.

50 YEARS AGO

The University of Edelbach was founded by French prisoners-of-war in Oflag XVII *A* (1940–45). Not content with lectures alone, the geologists made a thorough investigation of the area – only 400 metres square – enclosed within the barbed wire. No stone was left unturned, and trenches and secret tunnels provided many critical exposures. A microscope was constructed in the camp and equipped with polarizers improvised from piled cover glasses. Thin sections were mounted with a mixture of violin wax and edible fat. Only the determination of certain untwinned feldspars remained to be completed on the return to France.
From *Nature* 18 June 1949.