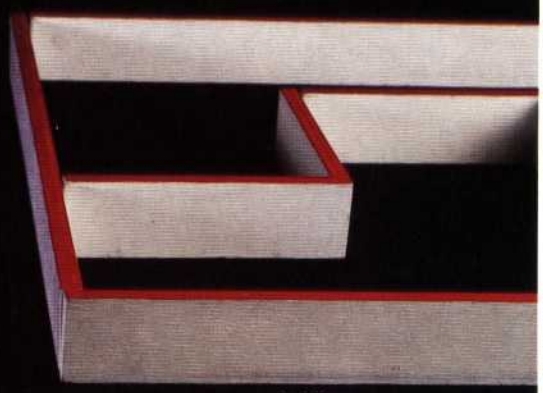
THE STRAIGHT AND NARROW

Of Mice And Mazes

Mouse...
The Micro Mouse competitions, in which robot mice compete to negotiate a maze, have been a valuable source of practical knowledge and technical expertise for many amateur roboticists. David Buckley's Quester, shown here, carries a comprehensive range of sensors (optical, sonic and touch-sensitive)



And Maze
The micro mice each have a practice period in which to 'learn' the layout of the maze by any method that does not require external communication, and must then run the maze against the clock — the basic objective being to reach the centre in the shortest possible time

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We have already looked at the three principal methods of robot movement (see page 621) and shown why electric motors are the most commonly used. Once in motion, however, a robot needs to be made to move where we want it to. Here we investigate ways of controlling a robot's movement.

The simplest method of moving a robot around involves using a mechanical device that 'reads' a specially-shaped card inserted into the robot. The outline of the card is followed by a small cam, which in turn operates a series of levers to control the robot's direction. In the past it was possible to buy model cars and small toy robots that operated in this way. A program was created using a pair of scissors to cut a card in the required shape. The robot would move according to the jagged edge.

Other robots used devices that allowed them to follow a set route by means of internal electromechanical relays. These mechanical methods of movement control, however, were limited in application for the simple reasons that mechanical parts tend to be expensive and relatively inaccurate. But they do provide a precedent for contemporary methods.

One of the better methods now used involves a robot following a track specially laid for it on the ground. This is similar to the method used by model racing cars,which have a guide pin inserted into a continuous slot in a model racing track. The two most common forms of track-following robots, however, are those that follow a line drawn on the ground and those that are guided by a wire.

Robots following a line do so by using a light sensor — typically a photoelectric cell or an infrared sensor — to determine whether the robot is standing over a 'light' area or a 'dark' area. If the background colour of the ground is dark and the line is light, the output from the sensor will always be at its highest when the sensor is directly over the line. Therefore, if the robot always follows that route which gives the highest electrical output from the sensor, it will always be following the line.

There is a problem with this technique: what does the robot do when the output from the sensor falls, indicating that it has left the line? With a single sensor system the best that the robot can do