SENSE & SENSIBILITY

1 GAS DETECTORS
2 SCANNING LASER (HORIZ)
3 SCANNING LASER (VERT)
4 DATA PORT
5 MULTIMETER PROBES & THERMOCOUPLE
6 GAS PROXIMITY SENSOR

7 TOUCH-SENSITIVE BUFFERS
8 LIGHT PEN & BAR CODE READER
9 ULTRASONIC SCANNER
10 OPTICAL SENSOR
11 BAR CODE IDENTIFIER
12 INFRARED DETECTORS

STEVE CROSS

Robotic Sensation
The sensing equipment that a robot needs depends entirely upon its functions, but the more general-purpose the robot, the more sensors it is likely to need. The robot illustrated has examples of most of the possible sensors available, though it is unlikely that any single robot would carry such a range
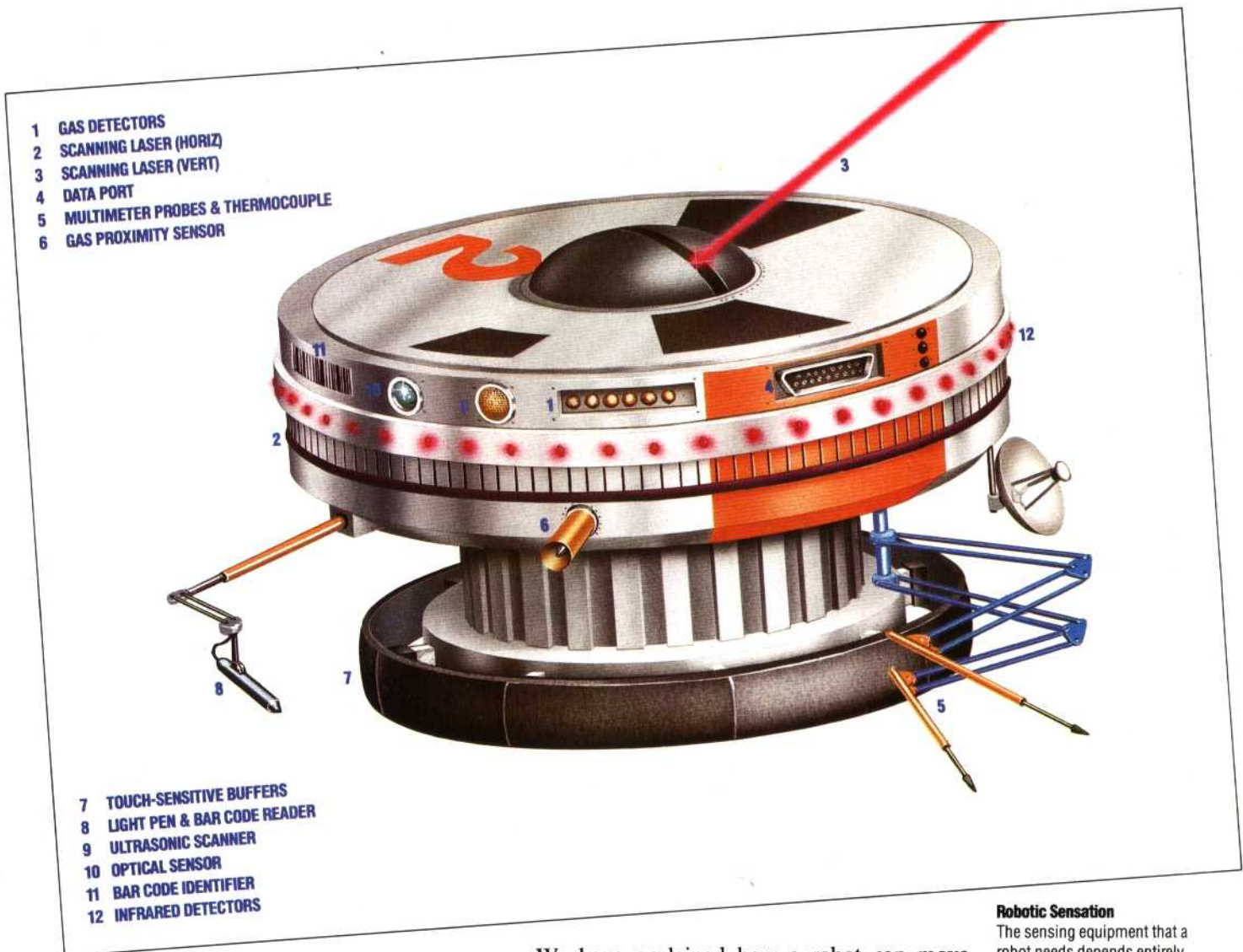
Our series of articles has now considered methods of controlling robot movement and the design of robotic 'arms' and 'hands'. We now turn our attention to the ways in which robots can 'sense' what is happening in the world around them.

The human sensory apparatus is something that we take very much for granted, but a person lacking all senses would be totally helpless. Without a sense of sight, you would bump into objects as you tried to walk; lacking a sense of touch you would not even know that you *had* bumped into anything; total deafness would mean that you could not even receive a warning that you were about to walk into an object. In fact, you wouldn't be able to walk at all, because internal senses are required to inform your brain of the way in which your body is moving.

We have explained how a robot can move around, but we must also provide it with a sensory system before it can act independently. It is tempting to try to design a robot that possesses *all* human senses — it could then perceive the world in much the same way as we do. As yet, however, this is impossible. The subjects of robot vision and speech understanding are so complex that we will deal with them at length in a later article. Here we will concentrate on simple approximations of sight and hearing that are far below the level of complexity possessed by humans.

A robot can be made to 'see' things quite easily by providing it with a light sensor — usually a photoelectric cell — which produces a voltage that varies with the amount of light falling on it. This is a very crude vision sensor, but it can be used to good effect. For example, a robot can be made to 'home in' on a bright light in much the same way as it can follow a line (see page 641). This might be used to allow the robot to return to a power point