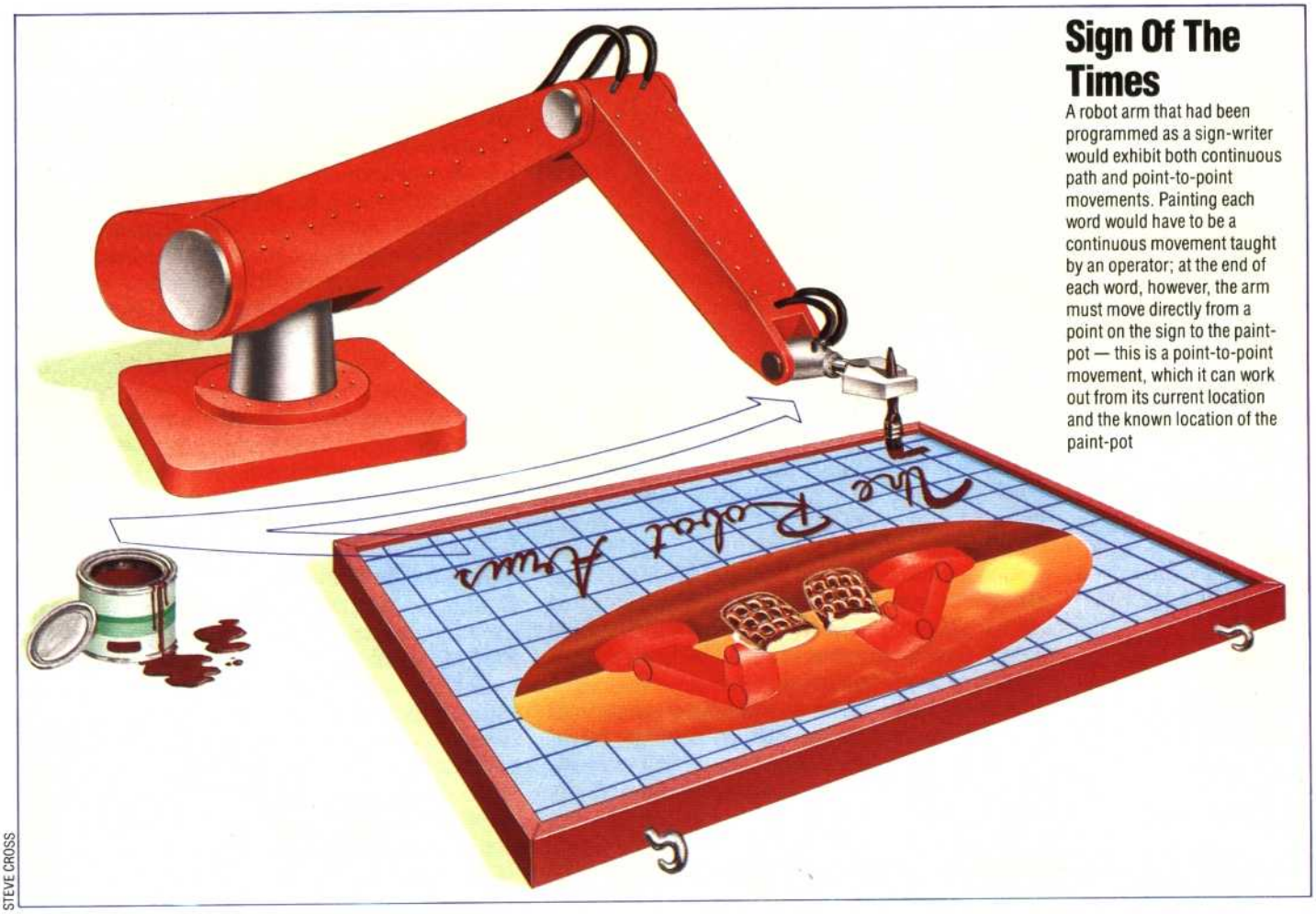
CALCULATED MOVES



STEVE CROSS

Sign Of The Times

A robot arm that had been programmed as a sign-writer would exhibit both continuous path and point-to-point movements. Painting each word would have to be a continuous movement taught by an operator; at the end of each word, however, the arm must move directly from a point on the sign to the paint-pot — this is a point-to-point movement, which it can work out from its current location and the known location of the paint-pot

Having considered methods of robot movement, and the design of robot 'arms' and 'hands', we now move on to discuss the various ways in which a robot arm may be programmed to carry out seemingly 'intelligent' tasks.

We have already seen how robot arms may be constructed in such a way as to resemble a human limb — they have 'skeletons' to provide structure, and 'muscles' to provide motive power. But the arm still needs 'intelligence' to carry out tasks.

The idea of an intelligent arm may at first seem nonsensical. However, the form of intelligence we are considering here is not the kind of high-level intelligence possessed by humans, but something considerably less complex. Let's consider a simple human action. You are sitting at a table that is empty apart from a small object situated on its left-hand side. Your task is simply to move this object from the left to the right of the table top. Two forms of intelligence are involved here. The first involves the perception of both the table and the object and the decision to move the object from one side to another. This involves 'aware thought', and it is tied up with concepts such as 'intention' and 'goal-orientated behaviour'. The intelligence we need to consider is the much lower-level form that is needed to move your arm and hand correctly *after* you have decided on the task that needs to be carried out — to move your hand to the right position and to ensure that your hand grasps the object and releases it at the correct time.

HUMAN TRAINING

This may seem both easy and obvious — but if you doubt that this is in fact an intelligent act, just watch a small child attempting to follow the same sequence. The infant will often fail to pick up the object, will move it to an inappropriate position and will, generally, appear quite uncertain as to what is required. The child is attempting to acquire the intelligence necessary to move its arms and