cadmium cells, one full charge of which lasts up to 50 hours, and the system is designed so that when the cells are running low it shuts itself down to preserve essential data.

In contrast, the NEC and Tandy use complementary metal oxide semiconductor (CMOS) circuitry, which requires much less power and enables them to run on ordinary pen-light cells.

The Epson, subject of the first mass-appeal advertising campaign in the marketing of micros, was originally seen as an 'executive aid', but it is more likely to be used outside the office than inside it. It is perfectly suited to data capture (the gathering of information) on the factory floor, on remote sites or even while walking down the street — to be processed back in the office.

In practice the Epson offers various ways of transmitting data. Proprietary add-ons allow it to be used as a Telex terminal; through a modem it can be connected to another machine via the telephone lines; or at the cheapest and simplest, data can be stored on cassette tape and sent through the post.

It is just this flexibility and versatility that makes these machines so attractive to people who had not previously considered that computers could be used in their everyday work. A salesman, for example, making 20 or more visits a day simply to record regular orders, might use a portable machine of this capacity and power rather than fill in order forms. The program to process orders would 'prompt' him with a product list and when the customer placed an order he would log the quantity. At the end of each call the order data would be dumped onto tape, and at the end of the day the salesman could post the tape to head office or transmit the information directly into the company's main computer system.

The micro's own printer would provide the salesman with a copy of his day's orders and his customer with an immediate confirmation.

Slightly more sophisticated versions might also refer to stock levels and give a warning when these fall dangerously low, though where more than one salesman was employed the micro would have to be connected to the mainframe at each call. This would present no problems, given a cheap, lightweight acoustic coupler. At this point our cheap portable turns into an interactive terminal, allowing the whole of the company's database to be interrogated with an immediate response.

Apart from the obvious benefits of immediate access to up-to-date information, the savings in time and cost brought about by this sort of on-line data entry can pay for a complete portable system in a matter of months.

Just as smaller pocket computers are ousting programmable calculators, lap-held machines are taking over from hand-held data-logging/data-collecting devices. These battery-powered 'dumb terminals' — which cannot be programmed — have been available for some time, but they have never been popular or successful due to high cost

and difficulty of operation.

Given suitable software, the ability to plug in to office-quality monitors and printers, and perhaps disk or cassette tape drives with faster access, lap-held portable computers are likely to become common. Portable machines of this sort provide the first real market for bubble memory — a self-contained, non-volatile memory based on a radically different type of chip, which offers huge storage capacity in a small package. Typical applications, such as Sharp's PC5000, provide 128 Kbytes of storage per plug-in cartridge, with an access time rather quicker than disk. The prospect of small machines with a million bytes of memory incorporated is very attractive.

This storage capacity is currently available on disk in the third type of portable machines such as the Osborne Executive, the Ajile Hyperion and the Portico Miracle. Costing up to five or six times

A Machine For All Seasons
(Clockwise, from top right.) Epson's HX-20, first of the new breed of 'lap-held' self-contained computers, offers up to 32 Kbytes of RAM and a wide range of peripherals.

Least powerful — and least expensive — among the available range of portable computers are the Sharp PC1251, shown here with printer and microcassette drive, and the Casio FX700P which uses a standard domestic cassette recorder.

After capturing a large share of the market for 'transportable' computers, the Osborne Computer Company's second model, the Executive, offered a larger screen and other refinements

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as much as the HX-20 or TRS100, these machines are better described as transportable, because they need mains power. Battery packs are available for some machines, but these rarely offer more than a couple of hours' use.

Their specification usually includes twin floppy disk drives, built-in television monitor, detachable

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Joined-up Writing
The concept of an 'electronic notebook' has come one step closer with the introduction of the Microwriter, a purpose-built word processor suitable for one-handed operation. The six keys are pressed in different combinations to achieve the full alphabet. Output can be either direct to a printer, with some formatting commands to allow you to arrange the text, or into a desktop word processor for storage