to be made, either directly through this frame charge or indirectly through the publicity gained from it.

One enterprising group of students in South Wales approached a local department store at Christmas time and offered to set up a local viewdata system displaying pages of advertisements to the customers. They created the pages using a simple viewdata editor package on their micro and then installed the computer in the store's main window, where it automatically cycled through the various pages. By charging the store for the pages and for the micro rental, they earned themselves a useful Christmas bonus!

These are just some of the examples of ways in which viewdata can be used, but anyone with imagination could think of many others. All that is otherwise needed is a microcomputer, a little artistic talent and, of course, the software.

The specific viewdata package we shall look at here is called Viewtext and runs on the BBC Micro. For those particularly interested in using viewdata, this computer scores over most other home micros because of its built-in viewdata character set. Even though this package is one of the cheapest — it costs only ten pounds — it incorporates both a viewdata editor to create the pages, and a program to set up a 22 page carousel system.

The editor works much like any other on-screen editing system: the cursor is positioned using the cursor control keys and then the text is typed in. To select the various viewdata attributes — the colours for the text and background, flashing characters, double-height characters, etc — you just need to press the red function keys at the top of the BBC's keyboard. For example, to get the word 'HELLO' flashing and in yellow letters, you press the keys f3 (for yellow) and f8 (for flashing), and then type the word in.

At this point it is worth mentioning two details regarding the operation of a viewdata editor. Firstly, the attributes, such as 'flashing' or 'red text', are lost when you move down to the next line — the text reverts to small white letters on a black background. Secondly, each attribute takes up one invisible character space on the screen. Therefore, in the example above, there would be two apparently blank spaces in front of the word 'HELLO'. If you delete or type over these spaces then the relevant attribute will be lost.

VIEWDATA GRAPHICS

What has been said so far enables you to create pages consisting of text only, which is adequate for many viewdata applications. However, diagrams, advertising material and the like really require the use of graphics as well as text. Viewdata graphics are made up from a set of graphics characters, each character consisting of up to six pixels on a two-column by three-row grid. Pictures are built up in a similar way to that in which a mosaic is constructed from little tiles, and for this reason the characters are known as *alpha-mosaics*. The quality of the
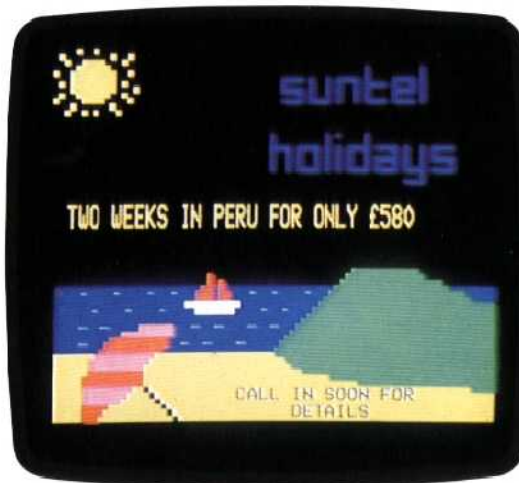
resulting picture is quite crude when compared with the graphics capabilities of most home computers, but with a bit of imagination any picture can be realised in alpha-mosaics.

Incidentally, the reason why the graphics are so basic is that each viewdata page is allowed only one Kbyte of memory, whereas a high resolution graphics screen on a home computer can use around 20 Kbytes. With the baud rate at which Prestel works, the delay in receiving a complete high resolution page would be unacceptable.

Using the alpha-mosaic characters is one area where the Viewtext editor does not perform well. The characters are obtained by first pressing the red function key (f9) to turn on the graphics, and then pressing any of the lower case or number keys on the keyboard. Each key produces a graphics character, but unfortunately there is no connection between what is engraved on the key and the character which appears on the screen — you have to continually refer to a table in the manual to find the required key. This process is very wearisome — the mosaic graphics in the accompanying photographs took a couple of hours to create. More sophisticated editors let you construct each character by turning on or off each of the six pixels in the character matrix, which is a much quicker method.

There are two special attributes that are only used with the mosaic graphics characters: Separate Graphics explodes each character so that the pixels are slightly separated from each other; Hold Graphics is used to cover over the blank spaces left when a new attribute is set. For example, to get a red mosaic character next to a green one without a blank space between, you would press the Hold Graphics function key before pressing the Green Graphics key.

That covers most of the features found on any viewdata editor; the more expensive versions have facilities to speed up the page creation process, which are useful in a commercial environment but not necessary for the home user. For example, a more expensive package would let you move or copy parts of the viewdata page, and would have a much quicker method for creating the mosaic graphics than those explained above.

Having created your page of viewdata, the next