Videotex-the electronic challenge

Brian Gaines

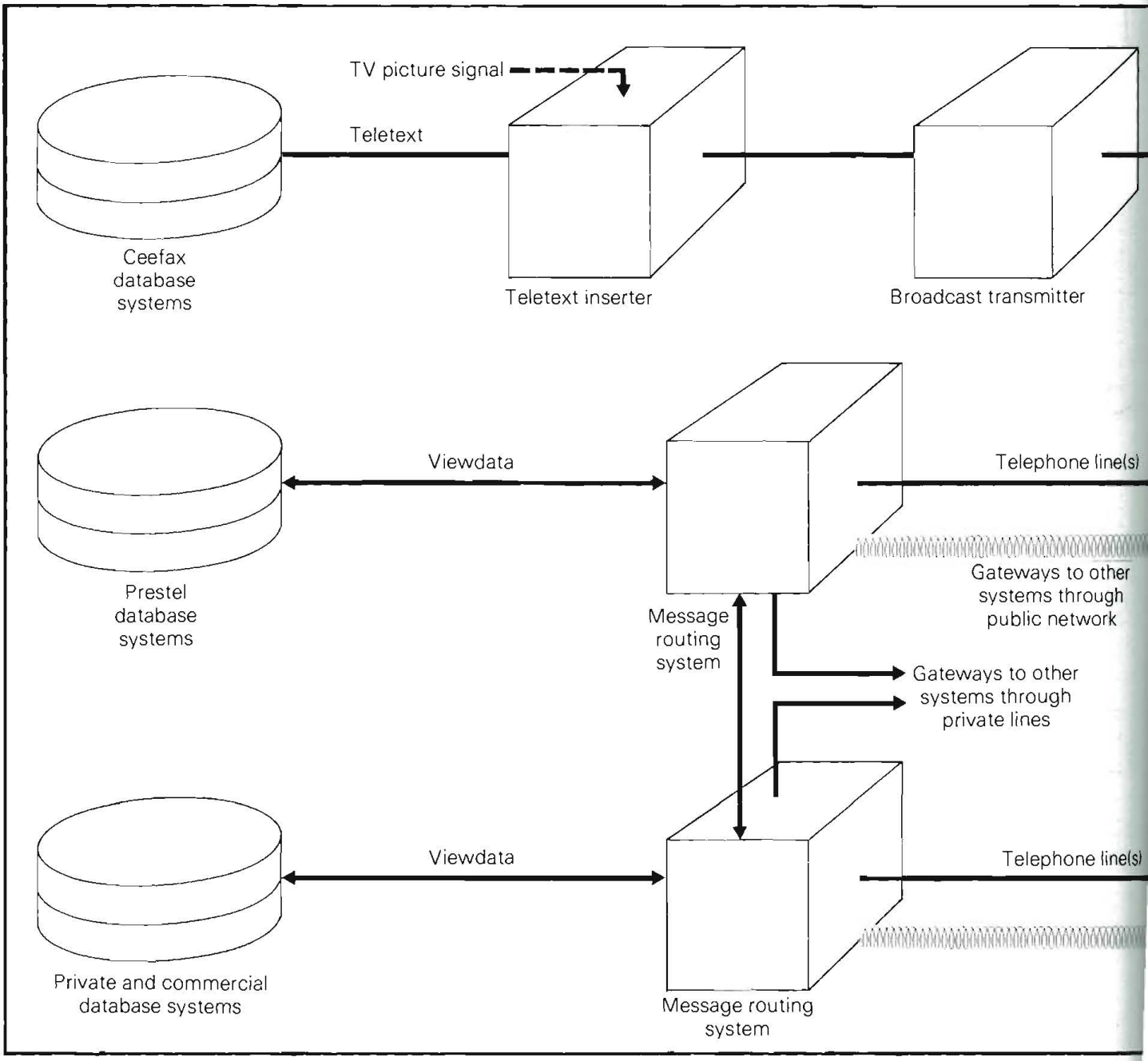
Gaines, B. R. (1982). Videotex: the electronic challenge. In Penrose 1982: International Review of the Graphic Arts Goodacre, C., ed, pp. 47-56. Northwood Publications, London.

Videotex, the electronic dissemination of text and graphics direct to the home and office through television and telephone, offers a challenging new publishing medium. The publishing industry has responded to this challenge as it did to the earlier opportunity afforded by commercial television and many publishers are now Prestel *information providers*. However, the videotex medium is still in its infancy and primitive in its capabilities compared with more mature media and its technology is changing rapidly. The author has been associated with videotex since its inception and developed the first private teletext and viewdata systems, which were installed in a London stockbroker's offices in 1978. In this article he outlines the state-of-the-art in videotex systems and highlights its main directions of development.

Electronic publishing has arrived. In Britain text pages have been available through the broadcast television services since 1976 and through the public telephone network since 1979. Such services are known generically as videotex and specifically as *teletext* when broadcast by the Ceefax service of the BBC or the Oracle service of ITV and as *Viewdata* when distributed by the Prestel service of the British Post Office. Many other countries are commencing trials of the same or similar videotex systems and not a day goes by without news items of fresh developments, competition over standards, and negotiations around the world as the communication giants and national governments vie with one another to gain commercial advantages. Terms such as the 'wired society' and the 'network nation' and questions about the 'future of the printed world' abound. For people in the printing and publishing industries the role of videotex is now of immediate relevance: do we have a technically and commercially viable novel publication medium, and is the technology approaching its final form or should we echo H G Wells' words of 80 years ago in *The Discovery of the Future* that 'the past is but the beginning of a beginning, and all that is or has been is but the twilight of the dawn'?

A major stimulus behind videotex developments has been a desire by the manufacturers of television sets to generate new markets for their products by offering additional capabilities in the set. During the same time period there have been other major developments around the television set that also have implications for electronic publication and the future development of videotex. The *television games* industry has boomed through a wide variety of action games of skill and strategy. The *personal computer* industry has also developed major sales in both the domestic market for advanced games and in the professional markets for office products. We find computer books and computer programs for the home computer offered alongside one another in bookshops. How does this form of electronic publishing interact with videotex and what roles do the personal computer and videotex play together?

This article reviews briefly the present status of videotex, emphasising the astonishing rate of change of the technology. It is impossible to give an in-depth survey of all that has happened to date but an annotated bibliography of the growing literature on videotex is given at the end of this article. Recent developments in the technology are discussed and some projections given of its probably future development.



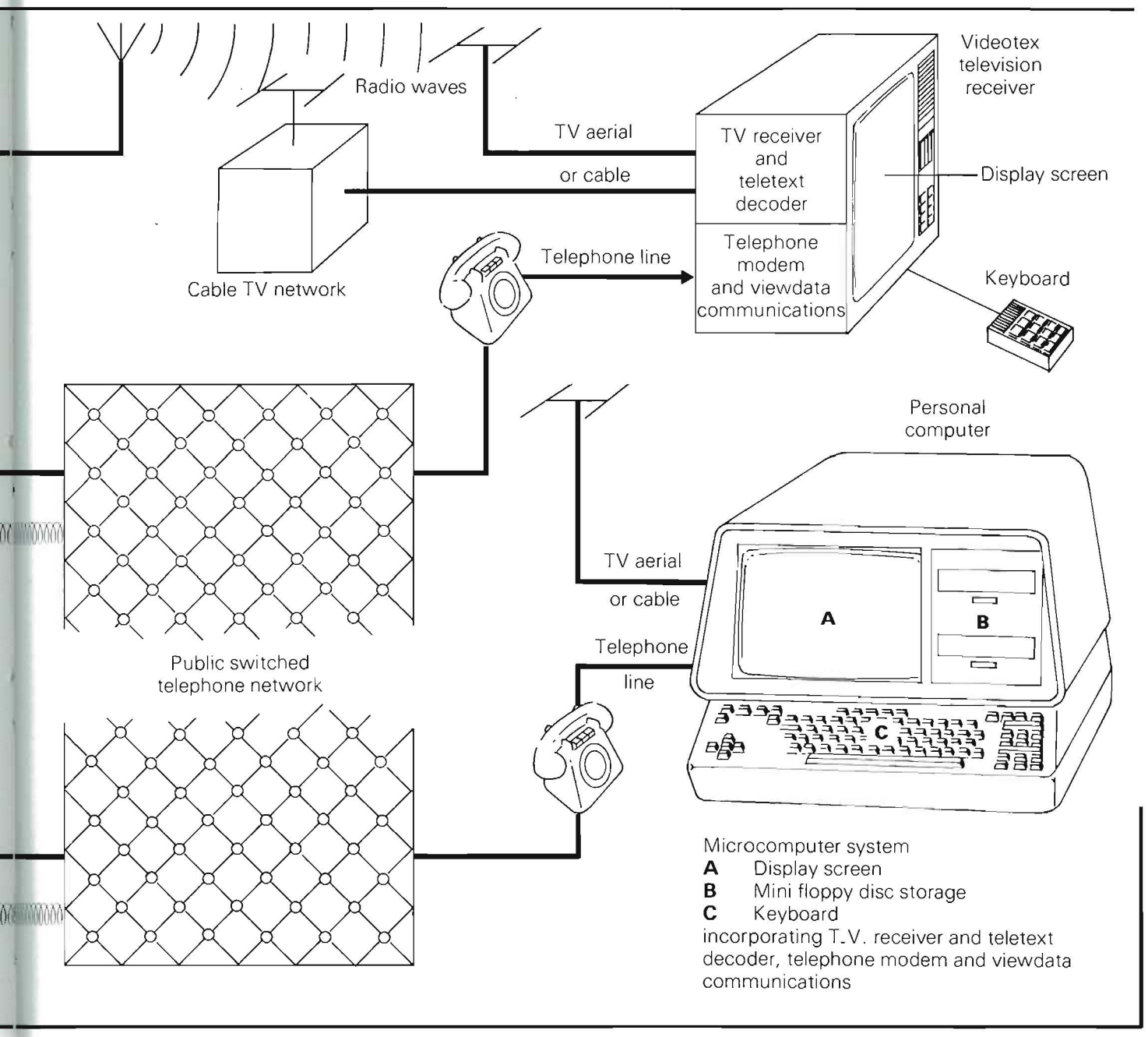
The diagrams above illustrate various ways of transmitting and receiving videotex. On the left are computer-controlled *databases* giving access to information, message communications, and computing facilities. On the right are computer-controlled terminals for accessing the databases, ranging from minor extensions of domestic television sets to complete personal computers with their own database storage and computing capabilities. Linking these are various communication channels including broadcast or cable television, and public or private telephone.

The Ceefax and Oracle teletext information services insert coded videotex in the broadcast television signals of the BBC and Independent Television. The viewer keys in a number to request that his television screen display one out of 100 pages each consisting of up to 24 lines of 40 characters in colour with limited graphics. The pages are sent out one after another in a cycle so that there may be substantial wait before the page requested is available for display.

Technically, out of the 625 lines of raster-scan video information transmitted to form a television picture 50 lines are unused because they occur in pauses allowing the cathode ray tube electron beam to move back from the lower right corner of the screen to the top left. The teletext coding standard allows 40 8-bit characters of data to be encoded into each of these unused lines. Currently four of the spare lines have been allocated for videotex in Britian and, since the 625-line frame is transmitted 25 times a second, this enables each television channel to transmit 4 000 characters of videotex a second as well as the normal service. This corresponds to 250 pages per minute of 24 lines by 40 characters. Thus if a magazine of 250 pages were sent out in a continuous cycle each page would be available for acquisition and display in the terminal every minute and there would be an average waiting time after requesting a new page of 30 seconds. In practice, often-used pages such as indexes are sent out more frequently than low-usage pages and this brings down the time.

In future more than four lines per frame will be allocated to teletext in the UK to reduce waiting time and increase the size of magazine available. It is also possible to consider the allocation at some time of complete television channels for videotex alone, eg to give access to 5 000 pages with a mean waiting time of less than 10 seconds. In France the equivalent Antiope system operates on a full channel for stock exchange prices. Another way of decreasing access time to the user is to build more capabilities into his receiver; for example a multi-page store in the receiver allows many different pages to be acquired as they occur in the cycle and shown instantly to the user when requested. The delay is then only in updating the pages, not in their availability. Thus there is much scope for further development of broadcast videotex systems.

The Prestel information service makes videotex available on request through the public telephone network. The viewer again



Microcomputer system
A Display screen
B Mini floppy disc storage
C Keyboard
incorporating T.V. receiver and teletext decoder, telephone modem and viewdata communications

requests a page by number but his terminal now transmits this through a normal phone line to the Prestel database, which sends the requested page of videotex on the same line. The format of the information is the same as for teletext but the access to requested pages is more rapid because they are sent out on an individual basis not as part of a cycle. This means that there are no intrinsic restrictions on the size of the magazine and Prestel currently offers access to 250000 pages. However, the cost of using Prestel is higher because the computer has to control individual accesses to the database and the telephone service is also being used. Prestel is also a chargeable publishing medium since the computer system can clock up subscriber requests for individual pages and hence the information providers may charge for access to information. The amount charged can range from zero up to 50p and is indicated prior to access through the many index pages, which are themselves free. Taking into account phone, usage and page costs, it is reckoned that the average user spends about 25p per page accessed in using Prestel.

A key feature of interactive videotex systems such as Prestel is that the user's link to the computer may be used not just to speed page selection but also to access other services. Prestel already provides some *response frames* through which a user can place orders for purchases against his account with a firm or his credit card. It is being developed to provide general *gateways* into other database, communication and computer systems. In future we shall see a clearer separation between Prestel's role as a common carrier providing a computer communications facility and its role as a public data base administrator. We shall also see improvements in the access method with the availability of alphabetic keyword searches as well as the current numeric address, page linkage and index facilities.

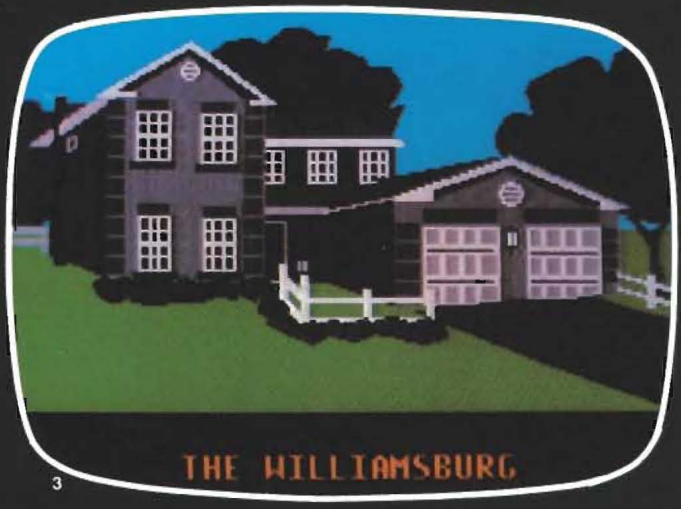
The diagram shows that broadcast and interactive videotex are complementary rather than competitive, and that the utility of both increases with enhanced facilities in the subscriber receivers. We can expect to see major developments in the television set that make it a more effective videotex terminal at little increase in cost and which optimise the relative uses of the broadcast teletext database and the selectively accessed viewdata communications.


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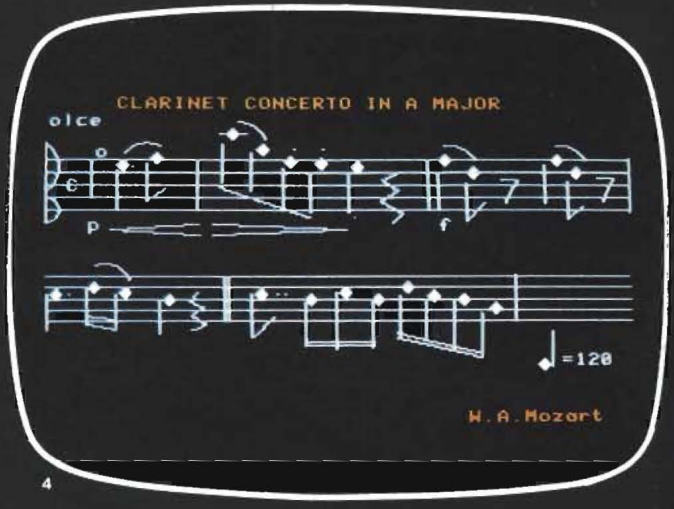
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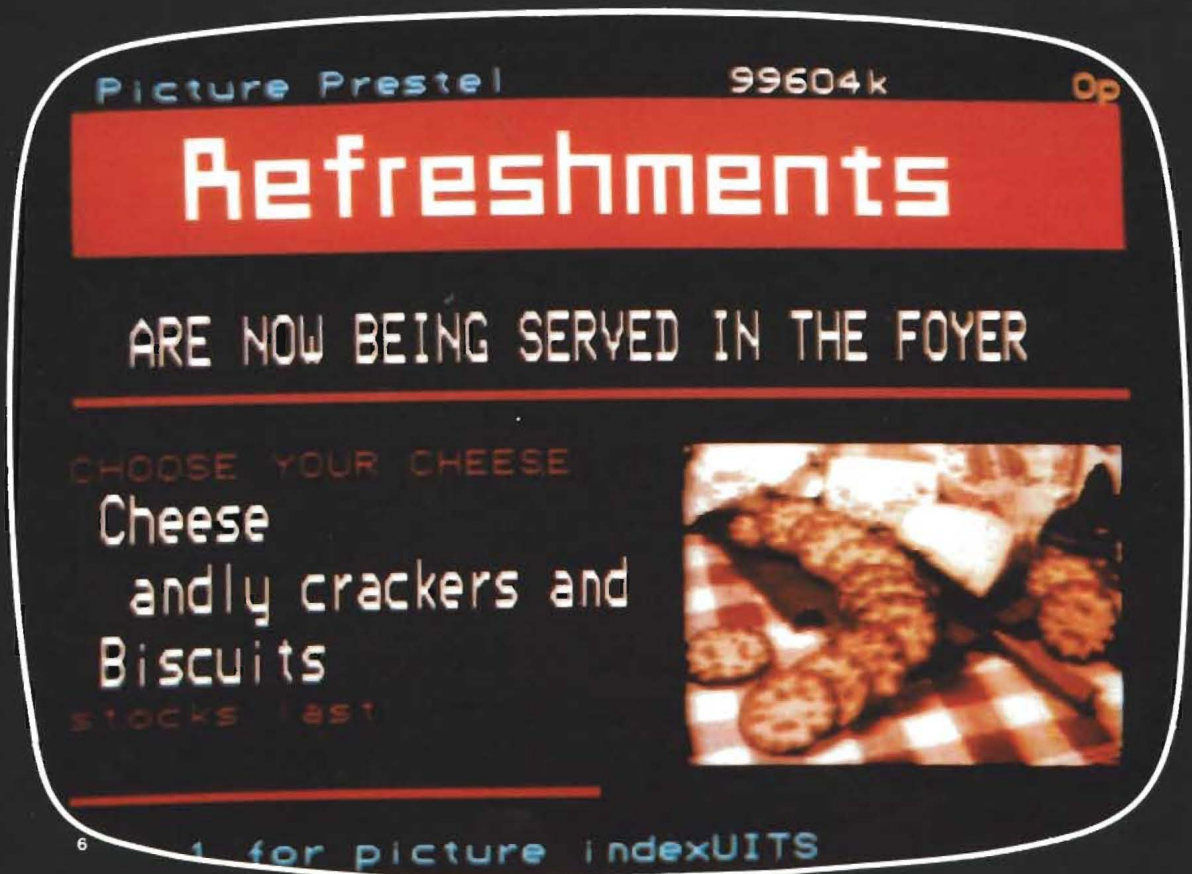
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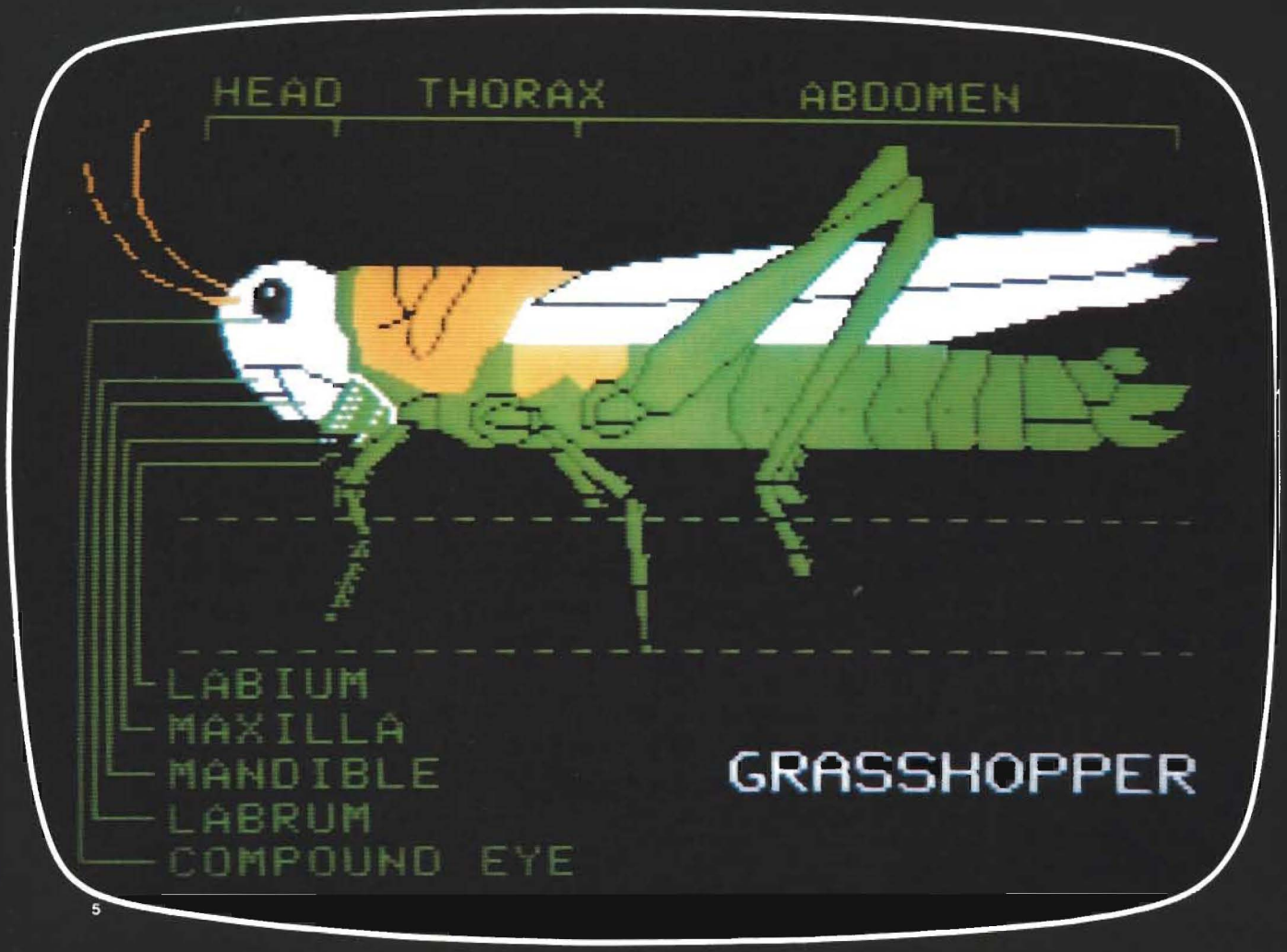
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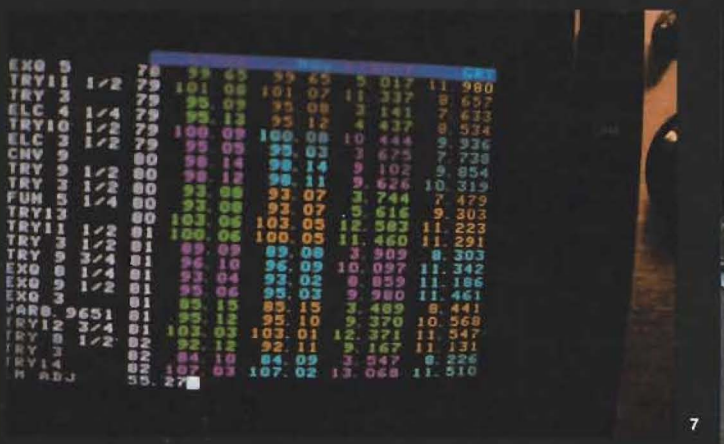
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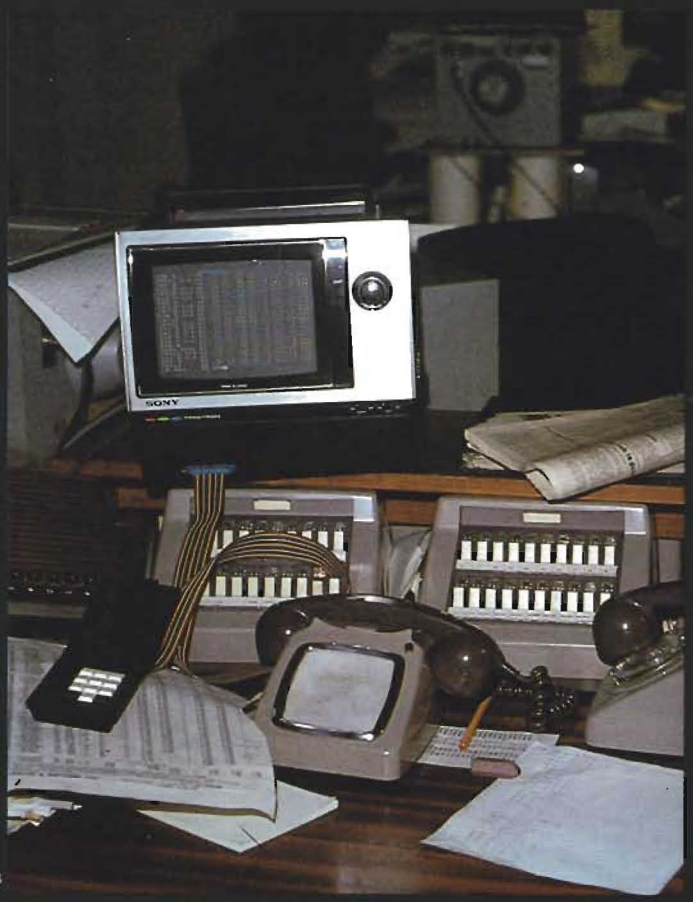
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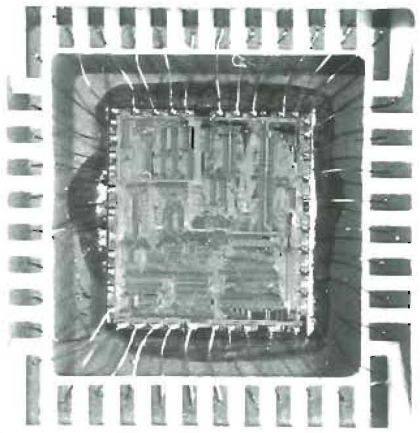
1) A domestic user of Prestel 2) Telidon in music teaching

3,4,5) Telidon graphics showing the enhanced resolution of the alpha-geometric representation of graphics. Telidon transmits picture description instructions that draw lines, rectangles, polygons and arcs, and can fill in closed figures in colour.

6) Experimental high-resolution transmission through Picture Prestel

7) Information on stockbroker's screen

8) Private teletext and viewdata system installed in London stockbroker's office. Up to 70 of the modified Sony televisions connect to a cable TV ring that gives off-air television, radio, Ceefax, Oracle and access to 50 pages of teletext from the firm's computer on a cycle of only 2 seconds. Up to 12 of the sets also have a compatible viewdata facility enabling them to communicate directly with the computer.



1



2

1) The Mullard Lucy Chip: This tiny integrated circuit performs the communications functions for viewdata providing the serial line, modem, auto-dialler and tape-recording facilities. Used with three other chips, one being a microprocessor, it provides the complete electronics for an interactive videotex terminal.

2) The Ace-Telecom Viewdata Adaptor incorporates the Lucy chip and enables any television set to be used as a Prestel terminal. This is one of a number of adaptors at about £200 that have very much reduced the cost of acquiring access to Prestel.

We are in the very early days of videotex systems and the technology is rapidly improving. There was initially much technical rivalry over the British and French specifications but this has been resolved by a recent European agreement. There is now similar rivalry over the European and Canadian specifications particularly with regard to United States and Australian usage. The Canadian Telidon videotex specification is a second-generation development offering better graphics than the current European systems. Whereas the UK teletext and French antiope specifications use alpha-mosaic graphic characters to make up block diagrams, bar charts, and crude pictures, Telidon specifies alpha-geometric line art with coloured infills. However, third-generation systems are already under development that go beyond both these in their capabilities, and arguments over standards are part of a commercial equipment-selling activity rather than long-term debates about the direction of the technology. Each system in turn is leap-frogging the others in its capabilities and we can expect worldwide standards to be established once it becomes more important to move published material about than to gain leverage in selling proprietary equipment. Already there are multi-standard receivers such as that from Nokia in Finland which will work with both alpha-mosaic and alpha-geometric systems.

The integrated circuit manufacturers have become a major force in standardisation since they are tending to put out sub-systems that subsume a range of differing standards in order to create the widest market for their products. This in turn puts pressure on system implementors to make use of the additional features of the circuits and hence to extend and harmonise their standards. The Mullard Lucy chip set is a good example of this in that it is compatible with both UK and French standards and provides additional facilities for features which no one has yet adopted, for example, to allow two Prestel receivers to communicate directly with one another. Lucy looks after the communications and together with microprocessor and memory chips provides complete videotex electronics. Since it is the microprocessor that decodes the videotex data into picture specifications it is easy to cope with alpha-mosaic, alpha-geometric and other variations. Indeed it is possible to interpret some part of the videotex stream as *programming* the microprocessor to interpret later parts of it and hence to change the standard as required.

Such possibilities make nonsense of short-term arguments over standards and are part of a new development of videotex toward *telesoftware*, the loading of computer programs into the local terminal through videotex communications. This is feasible through both broadcast and telephone systems, and the distribution of computer

programs through teletext is a major feature of the BBC's educational computing programme series based on its own microcomputer, which can also act as a teletext receiver. All such developments depend on relaxing the initial artificial constraint on videotex that it be structured as discrete pages of text, and instead regarding it as just a digital communications medium that can carry an indefinite variety of information structures. Because of the limitations of the electronic systems in the early terminals it was necessary to structure videotex in such a way that it resembled the information stored on the pages of a book. However, the new medium of electronic publishing is far more versatile than this—it can mimic a book or newspaper, but it is also capable of operating in new and far more active modes. It can selectively disseminate information. It can tailor information through further processing. It can stimulate processes occurring in other systems. It can interact with us in an active fashion. We can publish material which is far more personal, tutorial, and actively useful than that in a book—we can get closer to publishing active models of ourselves that interact with recipients to play some role such as adviser, competitor or companion. It is a new medium.



The Owl Prestel Adaptor for the Apple II Computer provides not only the facilities of a normal terminal but also the capability to record pages on disc locally and process the information in them for other purposes. Norpak in Canada are developing a similar facility to enable the Apple II to be used as a Telidon terminal.

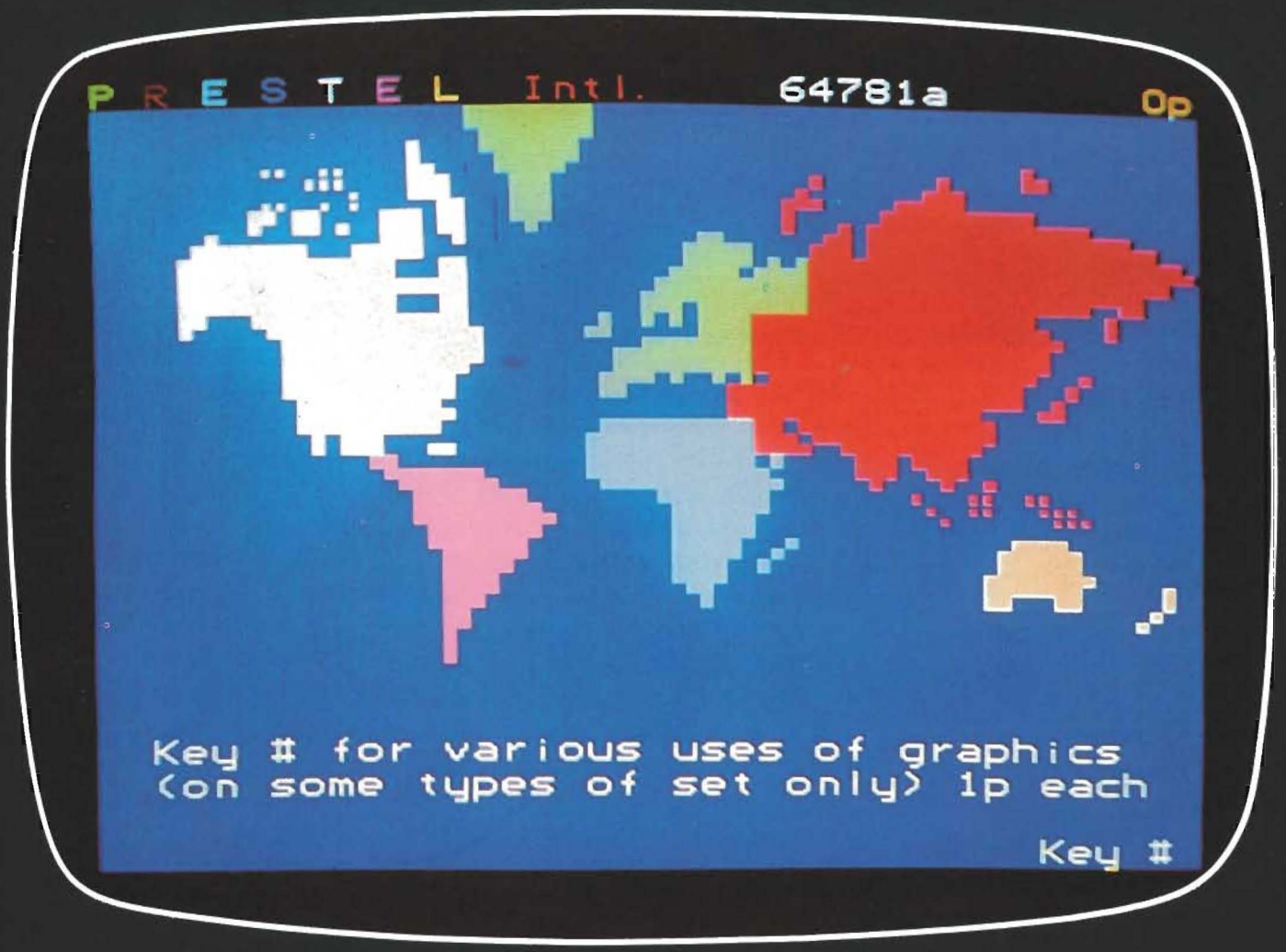
The immediate future for electronic publishing is clearly in the professional markets where rapid selective access to up-to-date information is of direct commercial value. Those publishers who control key reference works for the professions have an immediate opportunity to offer them in electronic database form. Stockbrokers, accountants, solicitors, engineers and other members of the professions, provide a clientele whose own earning potential can be enhanced through the use of electronic information services. However, in the longer term it is mass markets that have the greatest potential as the costs of electronic systems decrease. Indeed, one attraction in the consumer markets will be the opportunity to by-pass direct interaction with professional advisers and obtain legal, accounting, banking, psychiatric and medical information and advice through more impersonal, versatile and cost-effective systems.

One of the most fascinating developments in electronic publishing is that of electronic games. Not the TV ping-pong or space-invaders games but rather the Adventure games that were originally based on the elaborate gaming situations of Dungeons and Dragons, itself based on Tolkien's epics. Recent developments in Adventure games give us a glimpse of what may well be the electronic form of the novel in the future, a novel in which one not only empathises with the characters but can also personally play any role and influence the direction of the development of the plot. Some games are already elaborate and detailed simulations of fantasy worlds in which other characters with


IPC Viewdata
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presents
THE PRESTEL GAME THAT GOES WITH A BANG
If you're tired of life, just tired of Prestel, or if you sat calmly through The Deer Hunter.....?
Then the game for you just has to be.....
Russian Roulette
Press any number to start the game


PRESTEL Intl.
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PUB INFORMATION CENTRE
DETAILS ON PUB INFORM'T CENTRE KEY #
0 TRADITIONAL PUBS
1 RIVERSIDE PUBS Enjoy, along with English ale and food the interesting, picturesque views on the banks of the Thames.
2 RESTAURANTS- for lunches and dinners.
FOR MORE INFORMATION ON THESE & OTHER INTERESTING PUBS PHONE- 01-222 3232



A small sample of some pages from Prestel indicating the range of information providers and services offered. The graphics are made up of an alpha-mosaic of special characters with zero to six rectangular dots in any of six positions. Note the problems created by the fairly small information content of each page. Note also the indexes and the routing information on each page to related pages – about half the Prestel database is concerned solely with accessing the rest. Videotex has generated new problems in information presentation, graphic design and indexing.





Multi-standard videotex terminal from Nokia in Finland that can decode both alpha-mosaic and alpha-geometric formats.

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WOOLFE R *Videotex*. London: Heyden, 1980.

FEDIDA S & MALIK R *The Viewdata Revolution*. London: Associated Business Press, 1980.

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JOHANSEN R, VALLEE J & SPANGLER K *Electronic Meetings*. Massachusetts. Addison-Wesley, 1979.

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ROBERTSON A (ed) *From Television to the Home Computer*, Dorset: Blandford Press, 1979.

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ACARD Report, *Information Technology*. London: Her Majesty's Stationery Office, 1980.

NICHOLSON R & CONSTERDINE G *The Prestel Business*. London: Northwood Books, 1980.

activities and motivations of their own are already populating a world of forests, cities, dungeons and seas in which the game is to take on the role of the principal character and achieve some objective. We can envision a future in which such techniques are used to provide interactive simulations of more realistic environments—for example, that the overall news is presented briefly, but that in-depth access to it is through a dialogue and includes some 'what if?' speculation—'what will happen if the Pope dies?' can be our response to a news item and evoke further explanation.

There is a wide range of other technical developments that interact with that of videotex. The videodisc under computer control offers a large local database facility. Powerful hand-held computers such as that recently released by Quasar and Panasonic can act as videotex terminals. Seiko demonstrated a liquid crystal display at the National Computer Conference this year that has the resolution of a television screen yet is only just over an inch square—the wristwatch Prestel receiver is only a few years away. In looking to the future of electronic publishing we should not be too concerned with the state of current technology since this already has capabilities beyond those in use and its application is limited primarily by our creative imaginations. At one extreme we can see current videotex electronic publishing systems as poor simulations of books with limited characters per page, poor typography, restricted graphics, and high costs. At the other extreme we can see a future where computer and communication technology is advancing at such a rate that not just the printing and publishing industries but the very structure of society itself changes. As experience of videotex and personal computer systems becomes more widely available, patterns of demand are beginning to develop and the next phase of development will be increasingly market-driven. It is then that we shall see a true electronic publishing industry development with the potential for massive revenues, and we are fortunate in the UK in gaining early experience of the new media. However, the momentum, investment and innovation must be sustained if we are to exploit this advantage in both domestic and world markets.