INTERACTIVE MEDIA have been with us for years. Educational computer software is presented as an alternative to books and to televisual material. A number of firms currently offer interactive video for training purposes. For some time there have been aspirations to translate written fiction into electronic interactive texts. Since any form of reference manual can be presented in software form, some producers even have talked of the product configuration whereby a microwave oven could show a video of the cooking sequence prior to use. Whatever the 'success' of particular products, a range of producers are currently making considerable efforts to develop these new technological forms. Both the nature of the resulting texts, and their conditions of production and consumption, are worthy of examination. This article examines one branch of this new media which already has a history spanning two decades: interactive games.

Games have been by far the most significant manifestation of interac-
Interactive media to date. By 1984, home computer software sales, consisting mostly of games, were about a quarter of the value of recorded music sales in Britain. Current computer game software sales in the UK, once again, are about a quarter of those of recorded video. Thus, we are talking about a substantial industry. If we look back further, to the time when video games were at their peak in 1982, estimates place worldwide home sales of video games at between 2 and 3.8 billion dollars. The arcade game business at that time was even larger, grossing 8 billion dollars. By comparison, contemporary pop music had international sales of 4 billion dollars, and Hollywood films brought in 3 billion dollars of income. Revenue from the game Pac-Man alone was estimated to exceed that from the cinema box-office success Star Wars. In 1981, the home video console from the most successful game company, Atari, accounted for 25 per cent of the sales of what was by then its parent – the media giant, Warner Communications.

This profitability meant that games producing firms had considerable resources to devote to research and development. Atari hired some of the top researchers from the computer and semiconductor fields, bought up patents, and embarked on basic research in a range of fields. Consequently, a range of spin-offs followed which benefited other interactive media – for example, the interactive video used for training purposes. In addition, games were influential as icons for interactive media generally, as well as through contributing to pop videos, films, and TV commercials.

Games also attracted a range of criticisms, some of which relate to qualities shared with other interactive media. For example, it has been argued that the particular experience of these electronic or computer environments is more intense than watching TV. Other criticisms have been based on features specific to the history of this entertainment form. One of the most prominent critiques has been that games have been masculine texts. Certainly, we would want to know why the first form of interactive media to attract a wide audience has developed a greater male following.

Interactive Technology: Some Definitions

The decision to use the term ‘interactive media’ reflects the fact that what is involved is a family of related technological forms. Games span a range of products so that we cannot simply talk about ‘computer games’. One consideration here is that the games technology could itself be constructed utilising more than one circuit design, and even using different components. Another factor is that even those media which have similar underlying technical structures can be represented very differently. In the case of games, both video games machines and home computers eventually adopted microprocessor technology. The former hardware products were not conceptualised in terms of a computer,
while the latter were seen in that light. If the planned interactive compact disc technology takes on games, we may once again drop the 'computer' reference in relation to this medium.

It is important to be sensitive to this fluidity of the technological structures and to the flexibility with which we can label them. In this instance, we can see that it might be slightly misleading to overemphasise the experience of games and that of computing generally – as some commentators have done. On the other hand, to categorise games as simply an extension of television – which is the path other analysts have taken – fails to do justice to the complex history of these cultural products.

This article aims to chart the various lineages through which games have evolved, focusing initially on their development in the US, and then turning to the British context. It is important to understand that there is more than one origin to games, and that there are networks of transfers between the different strands. Only then can we appreciate some of the nuances of the current manifestation of this media form: 'computer games'. The account focuses mainly on the conditions of the production of games, including an examination of the changing technical form of this medium and of the factors influencing textual features. Some outline of the conditions of consumption, which involves noting the debates about games, is essential if we are to understand the relation between gender and games-playing. The following history examines four different games products:

1) **The First Computer Games.** The earliest games originated in US computing institutions in the early 1960s. Since the computers of the '50s were represented as being very serious machines to be used mainly for calculations and administrative work, there is the question of how it was possible for a form such as games to have come into existence in such a location. Additionally, we would want to know how games diffused both within the computer establishment generally and among American and British microcomputer hobbyists from the mid-'70s. These enthusiasts were to play an important role in the later establishment of computer games.

2) **Arcade Games.** The term 'video games' can refer generically to two types which appeared as commercial products from the early 1970s: the coin-operated arcade game, and the home machine. Turning first to the development of arcades in the US, how did games transfer from the computer establishments to this new setting and what were the effects of locating in this milieu? This was the first games product to be discussed as a medium, and here we find many of the early critiques, including those on the issue of gender.

3) **The Home Video Games Machine.** This vehicle for games had a separate origin as an extension of TV. This product provided a paradigm of the domestic 'games machine' which was later appropriated by the home computer. The video games machine, when in the form of a programmable console, differed from the later home computer mainly in its
lack of a keyboard and programming language. These video consoles constituted a precursor to the home micro by creating a general hardware-software division. One issue of interest is the question of how games were seen as a route towards a machine capable of handling a range of interactive media forms.

4) **Home Computer Games.** Manufacturers of home microcomputers have remained ambivalent about the games which simultaneously sustain sales yet thwart producer aspirations for these machines. Under these conditions, why did games emerge to such predominance at all? While not predicting the future of games, we can examine tensions around the role of games in relation to this product and possible trajectories in which they may develop.

**The First Computer Games**

In the late 1950s and early '60s, 'Computer Science' was in the process of its construction as an academic discipline. MIT introduced the first courses on computing for undergraduates in 1959, and set up an 'Artificial Intelligence' department of researchers. A military agency had been providing funding for computer development since the early days of the space programme. When this programme was transferred to the civil National Aeronautics and Space Administration, NASA decided to increase its support for computing and, in particular, for projects on basic research. The new AI department was able to deploy these funds with a considerable degree of discretion and employed the first enthusiastic students emerging from MIT's new courses. Meanwhile, the university department was developing a close relationship to the young company DEC, which was at the forefront of the newly emerging minicomputer industry. DEC provided MIT with a free minicomputer and any assistance that was requested. In return, the minicomputer company benefited from MIT research and advice, received a range of free programs from the AI department, and eventually recruited a number of staff from this source.

Within these institutional arrangements, the department was in the process of developing new forms of computing. At that time, the only model of computing was the batch-processing system dominated by IBM. Anyone wanting access to mainframes had to submit programs to operators and pick up the results later. Using a small research computer and a DEC minicomputer, the MIT unit explored a more direct style of computing with these machines, whereby users could receive immediate feedback from their efforts. MIT researchers developed a range of facilities to support this new type of 'real time' computing, formulating some of the principles by which microcomputers were later to operate.

Even prior to the new MIT courses, a male community had evolved in the university's model railway club, where members used their technical expertise to construct and investigate systems: particularly tele-
phone and railway ones. These students continually tried to perfect new features for their systems. The set of values operating in this culture led them to develop their own terminology, the key concept in which was the 'hack'. This term came specifically to refer to a stylish technical innovation undertaken for the intrinsic pleasure of experimenting – not necessarily to fulfill some more constructive goal. From this concept, the community’s members later defined themselves as 'hackers'. The computer system in the AI department soon became their new object of interest. In the course of displaying their programming skills, the hackers explored and enhanced the capabilities of these new machines.

As 'hacks', projects which tested and demonstrated the computer's abilities were often of little use to themselves. For example, these efforts involved programs to play chess and to solve puzzles generated by a form of solitaire. This approach to computing was very different from the traditional 'serious use' of the machine. Rather than treating computers as mundane tools, the hackers played with the machines as if they were toys. While this was a heresy to many of their contemporaries, the AI managers regarded these projects as vehicles for learning about this new form of computing. Indeed, there were tangible spin-offs as these programmers wrote and improved the operating systems for their first machine and DEC's minicomputer, as well as supplying other programs which would have been very costly to produce commercially.

More particularly, the hackers produced innovative software to handle real-time computer graphics and later contributed considerably to the development of time-sharing.

The first games were just such non-utilitarian, exploratory projects. Demonstration programs already existed which created visual effects. One such program controlled a row of flashing lights so that they simulated the motion of a ball in the game of table tennis. Another project involved the construction of a maze on a VDU in which a mouse would search for cheese. One hacker, Steve Russell, was searching for a 'hack' which would be even more visually stunning when he had the idea for a computerized space battle:

I had just finished reading 'Doe's Smith's 'Lensman' series. He was some sort of scientist but he wrote this really dashing sort of science fiction. The details were very good and it had excellent pace. His heroes had a strong tendency to get pursued by the villains across the galaxy and have to invent their way out of their problem while they were being pursued. That sort of action was the thing that suggested 'Spacewar!'. I had some very glowing descriptions of spaceship encounters and space fleet manoeuvres. 

In the first version of Spacewar, two spaceships engage in battle, using torpedoes to shoot each other. The program operated in real time, which meant that the graphics reacted instantly to control. Any motion that was initiated, such as turning or firing, was completed while the player chose the next move. In this sense, action was continuous and there was no pause to stop a spacecraft, other than solar systems.

One of the important points, and this was the secret of the Spacewar! project, was that there was no pause to stop a spacecraft or even to control the motion of the player's ships.

Here we can see how a written narrative can be important in Spacewar! fitted community. One of the hackers was a student of computer art, while another was a student of physics. The first years of S project's development, students were modularizing language. Faster and more patterns were used to create new entities, and one hack was how to talk to a computer.

There were soon two versions: Star Trek because it was easier and Spacewar! because it was more sophisticated and konnte taken with the tax debts. One hacker was a mathematician who had added a new feature: a computerized space battle.

1 Stewart Brand, op cit, 102.
no pause to stop and plan. Once Spacewar was presented to the hacker community, others added new features such as gravity effects and details of solar systems. They also developed the first computer game joy-sticks to control the motion.

Russell went on to note:

"One of the important things in Spacewar is the pace. It is relatively fast-paced, and that makes it an interesting game. It seems to be a reasonable compromise between action - pushing buttons - and thought. Thought does help you, and there are some tactical considerations, but just plain fast reflexes also help.

Here we can see how Russell had translated the fast pace, the "action", of a written narrative into a computerised form, calling on physical reflex as well as strategy. Yet even the author of Spacewar tacitly acknowledged another influence in the construction of the game. Russell later reflected that his product was "really" an elaborate game of pinball. As we shall see, this parallel was picked up by other commentators and was to be important in the subsequent history of the game. Spacewar fitted into the pattern of acceptable projects in the MIT community. One approach to handling interactive graphics on a time-shared computer was even called 'Spacewar Mode' in honour of its origins. As a member of the AI staff, that time later recalled:

The first years of Spacewar at MIT were the best. The game was in a rough state, students were working hard, the entire group was learning how to program. Russell was teaching the course. It was like a computer game, an interactive programming session for everybody in school. One of the first programs was to show how to talk to a computer program and have it answer back."

The Diffusion of Genres

There were soon to be other variations on the battle and shooting theme. Star Trek became perhaps the best known game on a mainframe computer. Yet, even when alternative types were developed, the tastes of programmers in the main-dominated computing field continued to be reflected in these texts. For example, simulations had been one of the earliest uses for computers - especially simulations of battles for military purposes. Lunar Landing, which became widely available on mainframes, was once again located within a space setting. The game simulated control of a spacecraft approaching the moon.

Mathematically-based programs were also popular. One such program, elaborated by the original MIT hackers, was The Game of Life. This simulated ever-changing communities of "cells" as they formed par-
terns over 'generations'. Another well-known genre originated in *Adventure*. Appearing much later, in 1976, this computer game drew on the structure of fantasy war-gaming and, in particular, on the *Dungeons and Dragons* interests of some programmers. The player directed an explorer through an underground world. There, the protagonist fought off enemies and overcame obstacles through clever tricks in order to find some treasure. The latter genre became, like *Spacewar*, a cult game in computer centres. On the home computer, this adventure format was later to provide the main alternative to the fast-action, 'real-time' form adopted by video games.\(^{11}\)

In the intervening years between the first *Spacewar* and the advent of the micro, games became an established feature on larger computers. This was due both to programmers' interest in game-playing and the usefulness of games to computer manufacturers. In 1962, MIT put *Spacewar* on show to the general public. DEC requested a copy, and *Spacewar* was soon supplied to all their clients. Apart from their diagnostic utility in checking that machines were in order, the games were also used by the DEC salesforce as demonstration pieces. *Spacewar*, and later games, showed the accessible and friendly face of the machine. Later, when graphics capability became an important consideration, games were often used to demonstrate the sophistication of the computer. By the 1970s, games had become established as a 'traditional' program.

**Games and Hobby Micros**

As with the early hackers, the electronics and computing hobbyists who built and bought the first microcomputers in the mid-'70s sought out ways to show this black box in operation. The first demonstrations involved controlling sound, and these were soon followed by programs which produced a display of flashing lights. Games played the same role, providing a manifestation of the micro in action and illustrating the computer's capabilities. In fact, games became one of the first forms of software to be sold as a product. Hobbyists converted the classic mainframe and minicomputer games to the smaller machines, as well as copying the arcade favourites.

In addition to this demonstration role, games also constituted a new type of programming challenge: that of squeezing the complex structures designed for minis and mainframes onto the small memory of a micro. Meanwhile, games were still vehicles for learning about the machines. Programs such as *Spacewar* could be justified as an exercise in controlling animated computer graphics, while adventure games involved planning and familiarity with the structure of databases. Moreover, it was possible to program and run games even with very limited equipment.

An early reporter on this microcomputer field, a hobbyist himself,
commented on the popularity of games:

"If you could program them yourself, you could modify them yourself, you could experiment with them. You could write a 'Lunar Landing' which was a very popular game. The first puzzle was, you had to crack the algorithms and play the game. And the first one was to say, 'Well, any fool can play this game. How can I improve the algorithms? How can I make it run in real time?'"

Finally, these male hobbyists also valued games playing for its own sake regardless of the particular narrative content of these products. Games were puzzles within a computerised environment. As such, they were somewhat like programming itself. Thus, early computer magazines presented games playing as an acceptable activity—a source of relaxation in the midst of programming. Their readers were not only to provide a market for the new computer game products. They were also to be legitimising forces, pointing to the potentially constructive side of this software genre in contrast to the commentators who were later to characterise games more negatively.

Arcade Games

Nolan Bushnell was mainly responsible for the transfer of games to the arcades. An engineer who had played the original computer games as a student, Bushnell had also worked in amusement parks. When the price of chip technology fell sufficiently he attempted a coin-operated version of Spacewar. Developed in 1971, Spacewar was not an immediate commercial success. But a subsequent effort devised with the help of a colleague—the electronic table-tennis game Pong—proved very popular. With this product, Bushnell and his colleagues founded the Atari company, a firm which was to become a major force in the new games industry.

Other companies entered this new market very quickly. Within a few years there were 30 manufacturers of coin-op video games, reducing Atari's market share to 10% by the end of 1973. But by the late 70s, an Atari which was now supported by Warner Communications funds came to dominate the industry again, producing both for the coin-op and home video game markets. Following the introduction of Space Invaders in 1979, the arcade game reached new heights of popularity. A measure of this can be seen in the fact that between 1979 and 1981 sales of game machines rose from approximately 40 to 500 million dollars. By this time, coin-op games had become an international phenomenon. Their proliferation and profitability increasingly caught media attention, provoking the considerable critical comment outlined below.

Amusement park owners adopted electronic games as a part of a wider attempt to shed the sleazy image of the arcade. These managers felt that the new product would help to introduce more responsibility to the

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12 Interview with the author's research.

13 For the history of arcade games, see John D. Phillips, "Video Games and the Billion Dollar Business," in strawberries, vol 18, no 1, December 1982, pp 20-33; Glass, "Lunar Landing" which was a very popular game. The first puzzle was, you had to crack the algorithms and play the game. And the first one was to say, 'Well, any fool can play this game. How can I improve the algorithms? How can I make it run in real time?'"
amusement park and turn it into a centre for family entertainment. The homely table-tennis contest may have been particularly attractive in this light. More generally, the electronic hi-tech form of the new games signalled a cleaner, more modern image. Meanwhile, the coin-op machines began to spread from amusement arcades to bars and shops.

Despite these intentions, video games were starting to run into some opposition by the end of the '70s. The criticisms from the anti-games lobby were diverse. In the US, moral panics resulted in some much publicised by-laws to regulate arcades. At a national level, the Surgeon General issued a warning that video games could be dangerous and addictive to children, while the National Coalition on Television Violence extended its area of interest to include the new games. The US was not alone in such actions. Perhaps the most vigorous attack on video games came in the Philippines, where President Marcos ordered 300 machines to be dismantled, smashed or surrendered to military police within 15 days because of their detrimental effect on morals and youth discipline. In the UK, the Labour MP George Foulkes led a campaign in 1981 to curb the ‘menace’ of video games, maintaining that they had addictive properties. His ‘Control of Space Invaders (and other Electronic Games) Bill’ was put to the Commons and only narrowly defeated.

One set of worries focused on the effect of the technology underlying these games. Critics feared what they saw as the ‘compulsive’ behaviour engendered by electronic game forms. Such a concern had already

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This same concern has carried over into writing from an overtly socialist perspective, as in Tony Solomonides and Les Levidow, Compulsive Technology: Computers as Culture, London, Free Association Books, p 6.

Violent narratives: Operation Wolf, in which the player shoots Oriental guerillas.
been raised in relation to other media technology, such as television itself, and to computer environments *per se*, notably in the earlier concern about the attraction of hackers to computer technology.  

Those opposed to games argued that players were becoming adjuncts to the machine, from which anti-social dispositions arose. That concern was intensified because the majority of users were adolescent, and seen as especially susceptible to external influences.

A number of US studies which followed these commentaries attempted to evaluate whether the use of electronic devices was addictive or led to lack of social skills. Even some of the slightly different concerns about content, about the ‘violent’ narratives of games, referred back to the underlying technology of the media. As in the arguments surrounding TV, many argued that the experience of violence through mediating technology would desensitise users to aggression.

In contrast, other critics stressed the very opposite of the fears about isolation with the machine. These worries focused on the collective nature of a video games culture. Many parents and community spokespeople argued that arcade machines were a gathering point for youth. The games were felt to encourage ‘hanging around’, reviving traditional fears about arcades being ‘corrupt and corrupting places’. Video games were seen as the new focus of a separate youth culture, distracting young people from more constructive activities. Consequently, a number of studies framed their analyses of arcade life in terms of delinquency.

These latter worries reflected the fact that the location of video games within arcades incorporated the new machines into the existing social activities of these milieus. Amusement parks, as well as many of the other public sites where coin-op machines were found, were part of street culture. They were mainly male, particularly young male, preserves. Some girls were present in these contexts and there were some girl players – after all, the arcade and other public locations were meeting places. Yet observational studies found that the proportion of boys varied between 70-90%. So, while the new technology may have been brought in to mark changes, it was itself slotted into an existing nexus of social relations. Very traditional fears about ‘deviancy’ and working-class, male youth seem to underlie much of the apparently new alarm about video games playing.

The role which these electronic games specifically appropriated was that of pinball. Within a few years of the introduction of video games, pinball sales had declined by two-thirds. Meanwhile, the major pinball manufacturers were among those companies who were moving into the production of the new coin-op machines. In terms of consumption, the institutions which these young males had built up around pinball – the values, rules and rituals – were transferred to the video game. Many would-be players served apprenticeships as spectators. The public display of skill was important. There were times for discussing tactics and giving tips. Rules governed waiting for a new game. So while the games,
which were increasingly for single users, were played individually, the activity remained grounded within the social life of the peer group. Some analysts could even start to describe this collective appropriation of games in subcultural terms.

As regards form, it has already been noted that the original Spacewar, parallelled pinball in terms of a similar mix of strategy, speed and physical co-ordination. It was with the genre of the 'action' game that was developed on the arcade machines. One difference was that players were now pitted against the machine instead of against each other. The rationale of the coin-operation itself encouraged this form to come to the fore. Meanwhile, the brevity of games (until skill had been acquired) maximised earnings.

Gender and Arcade Games

The new video games were different from their arcade precursor in one respect - that of having at least some narrative content. Although it is possible to subject pinball to some form of textual analysis, the storyline of the games allowed commentators to see the new form as a medium, and thus comparable to other media terms. Indeed, it was this feature which enabled the transfer of concerns about 'violence' from areas like TV and film to the new entertainment machines.

This narrative quality, along with the possibility of different maneuvers on-screen, allowed the rate and form of innovation to be very different from the electronic games' predecessor. Pinball had evolved very slowly and differences between machines at any one time was often cosmetic. In contrast, a continuous stream of new arcade video games started to appear by the late 1970s. These new releases contained not only different scenarios, but whole new configurations of action. The degree of innovation was initially even greater in the coin-op version than in the case of the early home games machines. In other words, the video game manufacturers were now very much on the so-called 'cultural industries', akin to the film and music establishments.

It was this 'media content' which received most attention in explanations of the difference between male and female interest in video games. In particular, the most frequent argument has been that the aggressive, destructive/violent imagery drive of many games is masculinist. 

Early critics also argued that scenarios such as science fiction settings were male orientated. Stereotypical gender roles were identified in the characterisations, or in the subject positions offered to the player. Elements of mise-en-scène, such as colour, were also discussed in gender terms (i.e., more colourful graphics being more attractive to women). Certain, the case for the games' masculine address and identification seems extremely plausible when we consider some of the more pornographic 'adult' titles. The controversial arcade game Leisure Suit Larry A butts had nothing less than rap as its goal. Such developments have often been explained by reference to the conditions of production - that the...
vast majority of game designers are male. Clearly, a number of the early male designers of arcade games emerged from a background of playing *Spacewar* - which seems to have paradoxically restricted their creative horizons.

However, the picture was rendered a little more complicated when, in the late 1970s, *Pac-Man* was found to be nearly as popular with women as with men. This seemed to challenge some assumptions about the masculinity of arcade games. Analysts sought explanations in the particular game content of *Pac-Man*, with one commentator claiming that "directing the faceless featureless Pac-Man through its model-home maze is less threatening and more closely related to hide-and-seek games than to nuclear holocaust".

A different mode of analysis, as suggested by the few female games designers in the industry, emphasised the changing context of games-playing. *Pac-Man* appeared at a time when coin-op games were becoming more pervasive than pinball had been. Video games had managed to achieve some respectability outside the arcade in sites such as lounges and restaurants. The designers argued that these were more socially acceptable places for women. A similar point, in fact, had been argued in relation to pinball itself. It was only when American suburban shopping centres decided that it was profitable to allow arcades into the plazas earlier in the '70s that some of the plusher chains first managed to attract a few women pinball players. The history of pinball thus supports the argument that an important factor in the success of *Pac-Man* could have been the greater accessibility of video games.

Yet, what even this analysis fails to address when discussing the popularity of games is the nature of the 'interest' involved. A particular game
may be enjoyable to a wide range of people on an occasional basis, and *Pac-Man* may have benefited from this less 'committed' form of interest. The situation in which electronic games have a public currency within particular groups of young males is another matter. This involves a continuous interest in the medium in general, and entails a more regular participation in a collective activity. It was to this core of enthusiasts that the constant flow of new game releases appeared to be principally addressed. Their experience in the arcades, and other male-dominated locales, arguably encouraged greater enthusiasm among young males for both home video games and the later computer games. The arcade not only provided a familiarity with games playing skills, but communal practices carried over into the use of domestic machines – despite the image of the isolated game-player in the home. Games developed a currency as a topic of discussion and medium of exchange within schools, while computer clubs, shows, and shops were often appropriated as the new informal arcades. In contrast, games playing remained a far more family-based activity for girls. The coin-op context may have contributed to the development of games as 'masculine texts', but it also structured games playing as a collective male activity.

### Home Video Games Machines

Sanders Electronics, an American defence orientated company, was responsible for developing the first home video game technology. Ralph Baer, one of their staff who had trained as a TV engineer, conducted the first experimentation and later directed the project. In a later account, Baer described the origins of a product which was seen as an alternative use of TV sets:

> The question of how to make use of home TV sets, other than watching over-the-air programmes, had been bothering me since the early sixties. There were well over 100 million TV sets in the US alone by 1965. The idea of attaching some device to even a small fraction of that many TV sets was a pretty powerful incentive for coming up with something, anything, on which people might actually want to spend their money.

The first commercial product, released in 1972, was licensed to the TV distributor Magnavox. The *Odyssey* machine was capable of playing 12 games, including simple hockey, tennis and maze games, many of which were similar to each other. Users had to place plastic overlays on the television screen to provide the background setting for the games. To reprogram the machine for different games, players had to plug in circuit cards. These 'TV games' initially had a much lower profile than the coin-ops, although they were reasonably successful as a consumer electronic.

In 1975, Atari released *Pong* for the US home market. The home version of *Pong* introduced integrated circuit technology – i.e., chips – and

33 Based on the author's interviews with boys and girls and observation of a London boys' computer club.


35 Ralph Baer, op cit, p 496.
added new features such as sound effects and ricochets. From 1974, other companies had also started to enter the games market. These included pinball manufacturers, leisure specialists and semiconductor firms. In 1976 alone, over 30 new companies started producing for this home market. The particular appeal to the semiconductor companies, such as Fairchild and National Semiconductor, was the arrival of TV games at a time when they were branching out from capital goods and in the process of building up a consumer products division. These firms had seen the profitability of utilising chips in digital watches and calculators. Once video games started to use chips, these manufacturers perceived this product as being suitable for their new divisions.

Post-Pong TV games technology had consisted of one chip or a combination of chips on which there were fixed programs. By 1976 several companies were working to replace these chips by a microprocessor. The latter had already been introduced into the coin-ops, where the sale price of each unit justified the cost of this technology. In 1976, Fairchild Camera and Instruments introduced the ‘Channel F’ or ‘Video Entertainment System’, which would accept programmable cartridges. As far as the semiconductors were concerned, video games provided just the type of dedicated application for the new microprocessor technology which they had been seeking. Soon other programmable consoles were available from RCA, Bally, Magnavox, Coleco and Atari.

This changeover to microprocessors affected the nature of the video games product. Programmable machines, or consoles, created a flexible division between hardware and software. A separate software industry could thus emerge, once video games cartridge manufacturers could sell games separately to run on the hardware. Games machines were now potentially ‘software players’ like hi-fis and other home-based delivery systems. Games software could be bought, collected and compared in the same way as records.

Many companies thought these ‘programmables’ might have a wider scope than their games origins. Whereas the earlier and cheaper TV games machines were seen as fashionable toys, the new programmables offered the possibility of permanent use, as a source of entertainment for the whole family. In particular there were hopes that the consoles might develop into more general home entertainment systems. For a time, companies developed software which was not of the arcade form. There were the so-called ‘adult-oriented’ card and board games, and even some educational software. Beyond playing software, wider potential uses were explored. One video game manufacturer publicised its products as mini-home computers which provided some programming facilities. Other firms talked of using them for home control. Mid-70s forecasts similar to those then circulating in microcomputer firms had even tempted companies like RCA as well as several semiconductor companies to enter this field, whereas they had taken little interest in the arcade machines. One reporter, quoting Fairchild’s Vice President of video products noted:
That vision never materialised. It was only from the late '70s that the console market started to boom as the new domestic fad. By this time, many of the disillusioned producers had pulled out of the field. Sales of hardware and software for the industry only peaked in 1982. Furthermore, the appeal of the machines remained firmly based on games. Only Magnavox, Mattel and Atari were still producing TV games by this time, and of these Atari was clearly dominant, with 80 per cent of the US market by 1980. In that year, 5.5 per cent of US homes had consoles. By 1981, this had risen to 8 per cent. Atari was now the training ground for many designers, a number of whom later set up companies to supply the software cartridges for the Atari console and the other machines.

As the boom picked up, a range of new companies entered or re-entered the market. A number of film companies, such as 20th Century Fox, set up software arms and arranged licensing deals. Atari and Lucasfilm arranged joint projects. Games were seen by the film industry as both competing for the same 'entertainment dollar' and as being a new outlet for cross-licensing. For similar reasons, various companies from the toy industry also sought to diversify into this area, Coleco being the most successful newcomer. Meanwhile existing games producers started to branch out into new forms of distribution, whereby telephone companies downloaded the games to homes by telephone.

Although there were always dissenting voices which talked of games as a possible fad, the general view aired in the trade press in the early '80s was optimistic. The one cloud on the horizon was the rising home computer industry. Initially microcomputers were much cheaper, and were felt to be catering for a different market. But as home computer prices fell, the new product started to appropriate the role of consoles and take away sales from the video games market. The consensus in the trade press is that by the end of 1983, a year after video games actually reached peak sales, the video games 'boom' was deemed to be over. In fact, sales did not simply disappear. At reduced prices, the consoles were relegated to toy departments. Here, they continued to sell steadily, albeit in much lower volumes.  

Home Game Texts

Most of the early home games were variations on the bat and ball idea found in the Odyssey machine and in Pong. Pong itself is an example of a game which made the transition from the arcade to the home machine.
Others, such as driving games, also crossed over from the coin-ops. However, the early chip technology caused a considerable delay in the transfer, since the dedicated unregulated circuit chip needed for the home machine could take a year to develop.

The companies who introduced microprocessor-based technology widened the options by adding cartridges which contained other game forms besides those from the arcades: for example, noughts and crosses, black jack and chess. A counter-trend, however, arose from the fact that the coin-op games from the coin-ops was now much quicker with software programming. Home versions could be released while a game was still in vogue in the arcades. Thus, the coin-ops were used even more as a testing ground for products which might then be cross-licensed to the home market.

In fact, many industry commentators consider that it was an arcade game which first boosted sales of the domestic machine. *Space Invaders* enjoyed unprecedented success as a coin-op, helping to increase overall sales in that sector after it was introduced in 1978. After Atari had bought the home license and was able to offer a version for their consoles, home sales also increased considerably.

Licenses also expanded to other areas. By 1982, the increased rate of new releases was supported by video game magazines which carried news and reviews of latest games available. In these circumstances, the games companies and film studios seemed to have felt that video games had become the type of commodity that could be linked into other cultural industries. However, even if not originating directly from the arcade, the overarching form of games – the real-time ‘action’ – was still derived from the coin-op source. The scenario and plot of home games was now simply more varied.

**Home Computer Games**

In the mid-'70s, microcomputers had emerged as a hobbyist product in the US. Some of the leading hardware manufacturers and industry observers saw a potentially lucrative future for this machine as a consumer electronic. The most ambitious long-term scenario, such as those cultivated by the semiconductor giant Texas Instruments, envisaged a micro fulfilling all the promises of the programmable calculator and more. Not only would micros run a variety of software, but they could eventually be connected to telecommunications systems and even home control facilities. The home computer could become a central part of the household, routinely used by all the family, an ‘infrastructural machine’.

In the shorter term, difficulties with implementing telecoms and control functions meant that US producers pitched the micro as a more restricted, albeit still versatile, ‘software player’. The activities of Sinclair Research, in particular, helped to establish a different underlying model of the hobbyists, releasing it as a product to preserve a community reinforced by computer games. Even when the hobbyists were not always acknowledged, their success was not always taken for granted, as they sometimes were what others thought could be potentially more profitable. After all, the hobbyists were only in the market for micros as a more or less alternative form of computing.

Against this background, one could find wide-tuned ambivalence about or even hostility towards the role of micros never overtaken by the successes that were being offered by hobbyists, who, in their enthusiasm and creative output, often ignored the more conventional forms of software that could be released. The earliest in the hobbyists' market, who believed that a micro was a more or less alternative form of computing, were the first home machines to have a complete set of games packaged with the computer. These games were often simple, especially among the early hobbyists, who made less use of them than the more advanced hobbyists who encouraged more extensive game libraries. Some went as far as to sell inexpensive software to hobbyists, selling cheap cassette tapes to other hobbyists, who were much more interested in the hobbyists' products than the hobbyists themselves. By the early 1980s, however, the hobbyists had entered the mainstream of the computer world.
The coin-operated delay in this period for the home computer market had new implications as games and consoles became more widespread. This was due to the fact that with the release of the arcade Space Invaders game, a new genre was introduced. The game was designed to quickly and efficiently engage players, with fast-paced action and addictive gameplay. This led to increased demand for home games, as people sought to recreate the experience of playing at arcades in their own homes.

This increased interest in home games coincided with the rise of hobbyist culture in computing. hobbyist magazines provided a platform for enthusiasts to share information and ideas, and the hobbyist scene became a key driver of innovation in the industry. This was particularly true in the UK, where the growth of a home computer market was driven by a combination of factors, including government investment in computer literacy and the trend towards more user-friendly machines.

The first British home computers, released in 1980 and 1981, were sold very much on the basis of being products to explore the world of computing. Hence, Sinclair pursued a continuity with hobbyist endeavours, which partially reinforced Government and BBC schemes to promote computer literacy. Even when Sinclair and other firms started to provide more applications, and thus move towards the software player paradigm, the undertow of the computer literacy theme remained stronger in Britain than many had originally anticipated.

Against this backdrop, we can now examine the development of computer games. Hardware manufacturers who anticipated that the micro would find wide-ranging application, including the later Sinclair, maintained an ambivalent attitude towards games. In their favour, games provided a familiar use requiring no expensive additional equipment such as printers. Some producers even recognised the possibility of making business away from the profitable video games market. On the other hand, too strong a games identity might threaten the status of the micro as a more general-purpose machine, and indeed push the micro towards the role of a children's toy. Hence, early advertisements for micros never overtly emphasised games as central activity, if anything, the key stress was on the educational function of the machine. Games were always mentioned in advertisements, as well as fostered in software support offered by manufacturers. But games playing was depicted as being only one use within a range of applications.

The earliest interest in these computer games came from the early hobbyists, who both produced and consumed this form of software. The hobbyist magazines had always devoted some space to games and thus provided the software genre with respectability. Within a few years of the first home micros being released, a wave of books introducing programming came increasingly to use games as the vehicle to explain the structure of computer languages. Eventually, even the manuals which were packaged with the hardware adopted this approach.

Games also soon proved to be popular outside initial hobbyist circles: especially among male youth. Since the previous video games consoles had made less impact in the UK than in the US, micros provided many people with their first chance to play home-based games. This demand encouraged more hobbyists to start up their own part-time mail order ventures, selling software for the new home computers. Aided by the cheap cassette technology, these initiatives developed into a small cottage industry. Within a few years, teenagers who had received the early micros as gifts provided a further source of games programmers. Although this software industry was relatively small, the national press carried stories of successful entrepreneurial schoolboys which fuelled further interest. Consequently, software which aided game design proved to be very popular.

By 1983, several substantial publishing, record and video companies had entered the computer games field. These large firms helped to
transform software production for this increasingly lucrative market into an industry organised on the same model as their other interests. In this process of restructuring, a majority of the small start-up firms, as well as others who had tried to cash in on the games boom, either went bankrupt, amalgamated, or otherwise departed from the market.

Under the new regime, games writing became routinised and continuous instead of haphazard and occasional. Active marketing of the latest product guaranteed sufficient chart hits for profitability. This structure operated in conjunction with a new type of computer magazine, which was geared to entertainment and gave far more coverage to game developments than their hobbyist orientated predecessors. The new system had the effect of systematically promoting the games form while often relegating other software genres to the fringes of the industry.

Meanwhile, the newly emerging magazines went beyond reviewing games at face value. There were regular features on how to break into the programming structure of games in order to see how their inner workings operated. There were suggestions about how to make changes so that games operated differently. In this respect, the cassette technology and organisation of the hardware made such alterations possible, whereas this had not been so in the case of video games. In other words, there was an infiltration of the hobbyist project into games playing, which for some users added a new dimension to the activity.

The Microcomputer as Games Machine

By 1983, the sudden entry into the market of a range of new hardware companies culminated in considerable competition, price cutting and a strain on the profitability of many firms. As in the case of software houses, a number of these firms left the industry or went bankrupt. In 1984, the Christmas overstocking of micros produced a further crisis in the UK. Following the subsequent price cutting, Acorn Computers had to be rescued, and later even Sinclair ran into difficulties. The British media which covered these developments suggested that the ‘bubble had burst’, giving rise to a widely held public perception that the home computer had somehow faded away.40

However, any assumption that the home micro has disappeared is incorrect. Sales of hardware and software have remained at a high enough level generally to support the software companies that still operate in the market. The temporary financial problems experienced by many firms have by now been resolved, as most companies have gradually moved into profit. There are slightly fewer magazines to be found. Nevertheless, the computer press has a firmly established section of newsagent shelf space. Home computers may have a lower media profile and command less shelf space in the multiple retail departments, but the industry is far from dead. Even by the time of the ‘crisis’, the home micro had
already become established as the new vehicle for electronic games: the computer had been appropriated as a games machine. This is still apparent from all the quantitative data on usage, and from contemporary interview-based research. In my own research, a sample of young users conveyed the impression that perhaps the peak of interest in games had passed, but games were still routinely played by many boys and girls.\(^{41}\) In the face of this, many hardware manufacturers both supported games generally and took pride in particular successes. Yet the original reservations about games still continued. Here, the account manager for Commodore's previous advertising agency summarised his concern in the early '80s:

> We wanted always to see our product as a proper piece of technology: but fun technology. We didn’t want to see it as a toy. For one reason, it would have relegated our product into toy departments, which would have made it a Christmas buy. I mean, it was a Christmas buy anyway. Like, 60% of the market was in 3 months before Christmas. But what we were always attempting to do was to flatten out this wave, or bulge, and if we’d been in the toy route, we would have had to be cheaper anyway. We would have been cornering ourselves right into the Christmas market.\(^{42}\)

Consequently, when advising on how to pitch the manufacturer’s next machine, the Commodore 64, the agency gave the following advice:

> We said that to sell micros as games machines would cheapen this product. It will automatically mean that it will die sooner or later 'cos it will be faddish. This could end up just like the video games that we had taken on three years earlier. You've got to start to broaden its usage.

Others in the industry have shared this broad sentiment. It has occasionally been reflected in a disappointment that early ambitions for a more all-purpose machine were not realised: the technological ‘revolution’ had gone astray. Yet, optimists continue to anticipate and work towards the goal of the infrastructural machine. The two broad paths they have followed constitute different approaches to making a break with the games machine.

The first strategy, as indicated in the above quotation, has involved attempts to broaden the identity of the existing computer product. In the early and mid-'80s, hard- and software producers tried to widen that usage by promoting other, non-game entertainment software, such as art and music packages. For a time, home educational software seemed to be the market just around the corner. Some still have hopes for a telecom and home control revolution that would give the micro a new lease of life.

Currently, many place their faith in some sort of cross-over product from business micros. They look especially at some of the initiatives of the Amstrad firm. These analysts and producers hold that the PC (Personal Computer) series of micros and low-cost business software might
establish a mass market for a 'really useful' computer. Others see the route to an infrastructural machine as lying in general technological improvements in micro technology. They look towards more powerful machines, as exemplified by the Atari ST and Commodore Amiga series. These enhanced models or connections with video and compact disc technology might take micros across a threshold to challenge the predominance of games and establish other interactive media.

The second approach involves abandoning the home micro product on the grounds that this route is beyond redemption. For producers considering this option, the functions of the infrastructural machine could instead be realised by other technological configurations which are not represented as 'computers' – for example, as a new product called an 'interactive compact disc player', or as automated 'smart homes'. In effect, the home computer could then remain the principal vehicle for interactive games.

The Future of Computer Games

In terms of consumption, fears that games would be a fad have certainly not been realised to date. As with hardware, the media coverage of computer games has declined with the number of successful-young-programmer-stories. By the mid-'80s, the shelf space which games commanded had also contracted. However, following the reduction in the number of software houses, the games industry has achieved a degree of stability which has continued to the present. In addition, international sales have become increasingly important to British software houses since the early '80s. The UK is now a major exporter of games to other European countries.

Since the early '80s new marketing strategies have promoted cheaper 'budget' software, given old products a new life via compilations, and retailed software through a wider range of outlets, including garages and corner shops. As regards the software itself, apart from incremental improvements such as enhanced graphics detail, arcade hits and other cultural industries offer continual prospects for conversion. Occasionally, a new sub-genre appears, such as kung-fu, quiz and horror games. Even soap operas like EastEnders have found their way onto the games format. Nonetheless, there is still concern about a perceived failure of innovation within software, and criticism of a lack of creativity in this field.

One basis for this concern lies simply in the mechanism whereby successful new games are immediately followed by a spate of near copies. Yet this process is not very different from the record and film industries, where producers seek successful formulae. Still, while there appear to be enough original releases to keep the games industry ticking over, there is a deep-rooted concern about competition from other cultural industries. Commentators have pointed to the way in which new lower-
priced videos and compact discs have taken shelf space from micros in many multiple-retailers' outlets. Is the current innovation sufficient to keep up with that in other fields competing for that proportion of disposable income? Do changes in scenarios and the playing skills required provide enough novelty?

Under these conditions, some producers and analysts have placed their longer term hopes in hardware innovations. One current development is the re-introduction of the video games console, whose technical merit rests in the enlarged graphics capabilities of the 'dedicated' (microfunctional) machine. More interesting is the tendency for games to expand onto those micros which constitute the very attempts to make a break with the games machine. Thus the new games for the PC family, and even more releases for sophisticated machines such as Atari's. Given current research trends, we can safely predict that computer games will also emerge on any new products using the video and compact disc based technologies. The capabilities of this new hardware would certainly facilitate further changes to games as texts. More contentious is the fear that these latest hardware products might themselves be relegated to the status of the new games machines: and merely that.

43 For example, see Mel Coucher, op cit, 1986, p 8.