

Radio as a (Domestic) Medium

Towards New Concepts of the Radio Medium

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The main result of recent media and audience research lies in the remark that the focal concern in this work has been exclusively on television. Television and its characteristics have also dominated the contemporary conceptualization of radio. The distinctiveness of modern radio as a medium and of the radio audience have been largely neglected.

There is little research concerned with listening to the radio in its context. Raymond Williams's (1975) argument of radio's role in 'mobile privatization' is an important step in media research to theorize radio as a medium, but it is not a sufficient step in describing the modern mobile media. Some recent scholars (e.g. Moores 1993a) have drawn attention to the need to 'map the routine time-space paths' of audiences in conceptualizing media audiences generally, but the role of the modern radio or the listener has not been taken into account in recent radio audience research.

However, there is an obvious need in this age of television to reconceptualize radio and listening as a social phenomenon, for people still continue to listen in large numbers. At the same time it seems that some of the functions of radio have been displaced by other media. This is why it is important to approach contemporary

radio in its context among the other media and in the everyday life of modern listeners.

My intention in this article is to explore the changing role of radio as a domestic medium by examining the development of radio from homes to households in the age of television.

The Space and Time of Radio in the Home

Radio started to broadcast music and speech to homes in the 1920s. Since then both radio and households have changed considerably.

After the First World War in the 1920s and 1930s, both the United States and Europe saw some dramatic changes in economic and social terms. Radio seemed to have the right characteristics to spread out into every household. Radio became a domestic medium. This domesticity of radio can be approached in the context of its sociological, cultural and political reality.

In order to understand contemporary radio, it is essential to understand how radio's relationship with the home has evolved historically. From this understanding it is possible to proceed to exploring the ways in which early radio captured time

and space in the home and how this has changed over time.

The primary environment for listening to the radio was the home. The receiver was first brought into the *living room* where families spent their leisure time.

The domestic is not a simple category. The problem is that it includes both *homes, households and families*. Households are not families and families extend beyond households. *Families* comprise the social and cultural stages of society, emotions as well as behaviour.

Homes are related to families and the social environment.

Household has a physical level where its members live; it includes homes and other private places like summer houses and private vehicles. However, the household is also the major unit in modern society because market interests are related to households' consumption patterns.

There are many ways in which we can approach the domesticity of radio. In the early years technology still played a very central part; the quality of the sound on radio and the means of reception were still quite poor. In these early days there was nothing in the technology of radio which made its transmission into individual homes inevitable (Williams 1975, 24).

Early receivers looked more like something out of a science fiction film rather than a simple household item. This is perhaps why the entry of broadcasting into the home appears to have been marked by rather deep social divisions between household members. Audiences tended to reflect the technological novelty of the medium. From this point of view Moores (1993, 77-78) declares that early radio was a 'piece of electronic gadgetry' with which husbands and other male relatives and friends could playfully experiment. To some extent the work that went on among

these male relatives or neighbours to construct their own radio receivers at home was based on financial considerations: a home-built radio receiver was very much cheaper than a manufactured one.

By the late 1920s the technical design of radio sets was becoming standardized (Scannell and Cardiff 1991, 359). This modernization of the radio was not particularly apparent on the outside, and it certainly did not appeal to purchasers.

Most manufacturers tried to transform the radio set into a household apparatus by covering it with a wooden cabinet that looked like any other piece of furniture. Some of them tried to produce a set that looked like nothing else in the room. In the mid-1930s architect Wells Coates came up with the famous design of a circular shape, chromium-plated grille, a prominent tuning dial and conspicuous knobs. The shell of the radio was made of moulded bakelite, replacing traditional wood and metal materials. This effort constituted a new standard that has been followed up to the present time in the manufacture and design of radio and television sets as mediators of modernity (see Scannell and Cardiff 1991, 360-361). Today, 60 years on, these radio sets have become collectors' items.

In the early 1920s the technological difficulties that remained were still so numerous that the place of broadcasting in the domestic sphere was far from assured; it had to go out and win its own place (Moores 1988, 39). The first problem that needed to be addressed was the technology, for reception was still rather difficult and not very aesthetic.

However, the radio did eventually begin to invade people's homes, starting from the living room. The same development was repeated 25 years later with the arrival of television. Both apparatuses were first located in living rooms, where families spent

their leisure time. In the words of Lesley Johnson (1981, 12) the household radio in the 1920s was an 'unruly guest in the home, upsetting daily routines and interfering in family relationships'. The arrival of radio in the living room is remembered as the cause of some considerable disturbance to day-to-day routines (Moore 1993, 77). Part of the reason must have been with the continuing difficulty of reception. However, the new arrival was no longer understood simply as a technical household appliance, because the interest in its influence was due to its programming: the information and entertainment of the time.

The early receivers were not designed for a family audience. They required the use of headphones, with wires connecting the listener to the small receiver. Reception was *personal and individual, and listeners were typically men*. Wives or girlfriends would actually be silenced by the radio; no wonder that radio was regarded as an unruly guest or intruder in peaceful homes.

Moore (1993, 79-80) suggests that the male power and control over the use of wireless headphones in the 1920s is in many ways analogous to remote control usage in modern families (see e.g. Morley 1986). Using earphones in the family listening situation and interpreting the output to other family members gave the men in the family the same sort of authority that we have more recently seen in television families. Just as early radio was masculine in its technology, so too has modern television technology with its remote controls, video and satellites, expressed the very same values.

The radio audience was part of the *mass audience* more so than part of the family, for family members could not listen to the radio at the same time; there had to be a narrator to relay and interpret the pro-

grammes to the other listeners. In 1926 the radio became more of a family object as headphones were replaced with a central loudspeaker, which was operated by electricity (Spigel 1992, 28-29).

In the 1920s the radio was still regarded as a technical novelty and a masculine toy, for the main concern was with the means of its reception. Although it was located from the very outset in the living room, it was used individually. It was not until the mid-1930s that, in the words of Scannell and Cardiff (1991), the radio became sufficiently 'simple and trouble-free' to be regarded as a family household medium.

Family Radio

The radio that the whole family could listen to at the same time marked the beginning of a new era in the domesticity of radio. The new family radio created a new *family audience* in homes.

The family audience differs in important respects from any other group of audiences, such as a mass audience. The domestic characteristic of the family is not just a gathering of people in the same house or in one living room of the home; the family is a social unit where people have *emotional ties* to each other. The social context in listening to the radio with the family is different from any other audience of which the listener can be part.

Social surveys in the late 1930s show how radio significantly increased the attractiveness of the household as a dwelling place and as a site of leisure (Jennings and Gill 1939). Radio became a part of the home; cultural products were now available in the home. Family members no longer had to go out, and they could spend more time together.

The results of contemporary studies on radio listening reveal a shifting relationship

between the private and public settings of social life and highlight the crucial role of radio in those settings. Radio's evolving discourses came to be targeted at the social space of its 'family audience'. Broadcasting itself became one of the family.

In the 1930s one-quarter of all households in Britain had a radio receiver; by 1939 the number had soared to three-quarters (Scannell and Cardiff 1991, 362). In America the one-quarter mark was reached much earlier in 1927 (Page 1975, 472).

In the new situation where the radio was a member of the family, capturing space in the homes, both programming and the nature of listening began to change. Listening became part of people's daily routines and also a leisure pastime (Spigel 1992, 29). Listening peaks (prime-time) were in the evening, just as is the case with television viewing today. Radio captured its audiences when they were engaged in their pastime activities.

Moore (1993) describes how Children's Hour in Britain kept the youngsters amused while the mother of the family prepared the meal. Later, in the television era, children's programmes on television had exactly the same function of guarding the youngest in the family after the parents' working day, or in the early morning before leaving for work.

Both in Britain and in America in the 1930s and 1940s, broadcasting time extended rapidly to cover the whole day and late evenings. This affected not only the amount of time that the radio captured but also its programming policy.

In many other countries, including Finland, audiences had to wait until the early 1950s to get all-day programming on radio. This was mainly due to the rationing of electricity after the war.

In the early 1930s programming in Britain was designed with a view to encourag-

ing attentive listening and to discouraging lazy listening. This was done by varying programme types and contents at short intervals. Each announcer was concerned only with his or her own programme, and there was no standard length or fixed times for programmes (Scannell and Cardiff 1991, 371).

In public service broadcasting, radio was required to cater for all interests and tastes, but this over a period of time (Scannell and Cardiff 1991, 372; Nukari & Ruohomaa 1992, 20-25). The period could be one week, but also the spring season or even the whole year.

This principle caused a fundamental difference between early and modern selection processes. Early radio audiences had to wait for their favourite programmes for days, weeks, even months, while the modern listener chooses his or her favourite programme here and now, without any preselection from the wide supply available.

Evening entertainment consisted of music, quizzes, drama serials and variety performances. Daytime radio features addressed housewives in the homes, especially in America (Herzog 1944). These so-called soaps grew out of American commercial radio, which had become national and had enormous audiences. Advertisers searched for programmes that could sell their products, and the first answer was a daily drama with which women could identify themselves.

The name soap itself came from the biggest sponsors which were soap firms like Palmolive, still known as a trademark today (Kingsley 1988, 3). From the very outset soaps were broadcast daily, often continuing for years and constituting realistic events of life. The role of the soap opera was so comprehensive in America that in 1932 it constituted 90 percent of all

sponsored network radio programming broadcast during the daylight hours (Allen 1985, 3).

As the early, technical radio was very *masculine*, the technical changes and the new programming implied a more *feminine* role. It is hardly surprising that in America, the feminine role of the soaps influenced the whole concept of radio (Spigel 1992, 29).

In Britain, soaps arrived more or less by accident. The BBC declared that it would not have any of that 'cheap American soap opera' on its radio stations. In 1942, the Americans produced a soap called 'Front line Family', which showed the Robinson family at war. It was shown by the Americans in many areas in their Overseas Service, and the Britons began to pick it up.

The first commercial radios in Europe (Radio Normandie, which began broadcasting from the north coast of France in 1931 and Radio Luxembourg, which started up in 1933) broadcast mainly flows of light music, but American soap operas were also supplied (Crisell 1986, 24-25).

The BBC's programming schedule became more and more continuous and regular, following the daily routines of the family. Generally, public service companies were the last to change their ways of programming. That was mostly due to commercial radio both in America and in Europe adopting the new broadcasting flow: more music and more entertainment.

Finally, the invention of the transistor in 1947 changed the space of radio in homes in the early 1950s. While the first radio receivers were massive pieces of furniture in the living room, radio now became unplugged as electricity was no longer needed. The replacement of valves by transistors in the early 1960s made possible the mobile radio because of the smaller size of the equipment. The new spaces for

the radio in the households also had an impact on listening (as was later the case with watching television, Lull 1988).

The arrival of loudspeakers in the 1930s gave families simultaneous access to the radio. At the same time, programming began to expand and became more suitable for the new family audiences. Radio became both leisure entertainment and part of the family's daily routines; in its reception it also became more feminine. The phase of family radio lasted almost 30 years, i.e. until television was introduced and started to take over its space and time in the homes as well as in families.

In America the period of family audiences did not last as long as it did in Europe. By the early 1950s radio had reached saturation penetration in American homes, with additional sets widely dispersed in automobiles. There was multiple penetration in the form of bedroom and kitchen radios, and a growing number of transistorized miniature sets (DeFleur and Ball-Rokeach 1989, 25-26). This development took over ten years longer in Europe, where it was not until the 1960s that mobile radios began to spread.

This development clearly shows how the domesticity of radio quickly extended *outside the home*. For the most part radio remained a household medium, even though family audiences were segmented into more specific audiences in different rooms and in cars. Starting from America, listening became more mobile and individual than before.

Radio in the Age of Television

Radio changed in many ways and in directions up to the arrival television (introduced in Britain in 1946, in the United States 1948-1952, and in Finland in 1956). While it was formerly connected strictly to

homes and families, it now became a more mobile and individual medium. The development of VHF, FM and stereo improved the reception of radio. New transistorized radio sets used less power and were much cheaper than earlier receivers (Crisell 1986, 13).

In these days the use of radio for commercial purposes was confined to the United States; in Britain, commercialization did not start until the 1960s, and in Finland and many other European countries as late as the mid-1980s. In terms of programming, television had all of radio's classical advantages, plus some of those of its other media competitors (like image in film or pictures in the print press, sounds in records). The arrival of television resulted in a revolution in the whole media scene.

Television adopted several traditional radio programme types (news broadcasts, drama, documentaries etc.). Ellis (1982) argues that also the role of voice in broadcasting has changed with television, which in news or talk shows provided a physical body to the abstract human voice. Although television programmes obviously involve nonverbal communication as well, McLuhan argued as early as 1964 that the radio's voice is nothing less than television's voice. However, they are quite different things.

It seems now that radio has become a channel for music and local phenomena, which means that radio is in one sense exceedingly *global*; and in another sense exceedingly *particular*.

In its early days radio was an 'honourable' medium (Briggs 1965), a concept that has to be understood as elitist and as the opposite of popular. The main task of radio was to educate the people, and its most important contents were news and information. It began to gain in popularity a little

later with the expansion of its functions from education to light entertainment, music and advertisements.

Even today radio remains the main medium for crisis situations: this is the medium that the authorities will use to inform the population in the event of conflicts, earthquakes or other catastrophes when electricity is not available. Although television gained widespread popularity from the very outset, it is much more vulnerable in crisis situations than radio.

In crisis situations the radio is a necessity rather than a need. Listeners are not satisfying their needs in this situation, but gathering information and asking for advice. They are not only part of an audience, but part of their surrounding community. Radio is thus a product of community membership. Against this background it seems natural that radio has been able to develop as a local channel for people in the shadow of television.

However, radio is also a pluralistic medium in the sense that it offers different things to different people. The same applies to other media as well, but in the case of radio the form of differentiation has been specific: a case in point is the segmentation of radio channels to different audience groups, music tastes (the American formatted stations), etc.

News has always been one of the strongest programme types in radio. Perhaps one of the most significant changes in the importance of radio since the 1960s has been seen in the radio play (drama and soaps), or more broadly in fictional programming. Films, plays and television serials are now an essential part of the modern television supply. Although they all remain on the radio as well, their role has very much changed and is now chiefly one of supplementing other public service programming. With the possible exception of

dramatized commercials, they have been virtually non-existent on commercial radio.

Wade (1981, 228) declares that this is the preference of human perception: seeing is our first sense and perceiving by hearing is harder, less rewarding, less informative for the human being than perceiving by sight. One main consequence of this was that drama writers turned to the television, leaving only a few writers to write plays mainly for the radio (Wade 1981, 227-237).

There are, however, exceptions to the primacy of sight. Music is one of them. In spite of the dramatic growth of music video production, radio still remains the basic medium for music; and vice versa, music is still one of the main contents of radio.

Starting from 1946 the BBC transmitted radio programmes on three national channels. The old Reithian strategy of scheduling mixed programmes first to one and later to two separate channels (one of which was regional) began to change in the television era. From 1946 the BBC adopted a different strategy: one light channel, one channel for home listeners (middle-brow), and one high culture channel (Tunstall 1983, 51-52).

This represented an early start for segmented channels in Europe. In 1967, with the beginning of local radio, the BBC reorganized its radio channels again. Radio One was dedicated to rock music, Radio Two to light, entertaining programmes, and Radio Three to classical music. Radio Four, a new channel, was devoted to news and talk programmes as well as radio drama (Tunstall 1983, 52). This formula for scheduling radio programming is still applied in Britain today, with just one addition: in 1994 the sports and news channel Radio Five was launched, at the same time as the profile of Radio Four was slightly revised.

As we have seen, radio institutions began to change in Europe after community radio and local and national commercial radio started to expand on the continent in the mid-1960s. The first commercial radio stations had started up without authorization in the 1930s, with audiences reached all across Europe. However, their programming was restricted to evenings, and they also had problems weak signals.

In the 1950s public service monopolies came under heavy criticism, and American-style commercial radios increased tremendously in popularity. Pirate radio stations had been in operation in Europe since 1958 when Radio Mercur was launched in Denmark; other operators were also getting started up, mainly along the Swedish and Dutch coasts (Chapman 1992, 27). There was a conscious effort on the part of those who favoured public service and who were afraid of competition to suppress the new radio styles. By this time television had already arrived, and radio had lost large chunks of its evening audiences.

Pirate radio flourished from 1964 to 1967 on ships moored off the British coast (Tunstall 1983, 45) and finally led to a radio innovation, first with the BBC (Tunstall 1983, 46; Lewis and Booth 1989). Later the same year, independent local radios (ILR) started in Britain.

The pirate stations broadcast a wide variety of radio programmes, mostly oriented to popular music, but the independent radio stations in Britain represented more local and mixed programming (Tunstall 1989, 53).

In Finland the Finnish Broadcasting Company started to broadcast local programmes in 1975, and the first commercial local radio stations were launched in 1985 (Ruohomaa 1992). There had been attempts to start private radios ever since the 1960s, but the government refused to issue

the necessary licences even though there were no legislative obstacles. The political climate was just not ripe. When liberalization finally occurred, as many as 60 local radio stations started up in a space of just five years – in a country with no more than 5 million inhabitants.

During the 1980s commercial local radio systems continued to spread out across Europe. Together with the increasing number of radio channels, this has had a major influence on radio programming. It seems that the myth of the shortage of radio frequencies in Europe has also been done away with (Lewis and Booth 1989).

In Europe, attitudes towards advertising in electronic media were earlier somewhat critical in the sense that commercials were not regarded as appropriate programming material for a public service broadcaster. This critical position has been particularly pronounced in the Scandinavian countries where it is only recently that electronic commercials have been expanding (Finland's first, and for a very long time the only, independent television company called MTV was launched in 1957).

Marshall McLuhan (1964, 1971, 31-33) describes radio as a 'hot' medium and television as a 'cool' one. The hot medium extends one single sense in 'high definition' (being well-filled with data). Little remains to be filled by the audience, and McLuhan says that is why radio is also low in participation. This statement could be understood in connection with the role specified for modern radio as a side-activity.

As often as radio is mentioned as marginalized in policy debates in favour of the newer media, it is mentioned as being displaced by television from its former command of the domestic heart (Lewis and Booth 1989, McQuail 1983). Before the age of television, the radio was still mainly situated in the living room. With the birth

of television, it also started to extend both through and outside the homes.

We are still far removed from McLuhan's world village. Although radio is a modern mobile medium it is still far too difficult to use by its moving listeners. This is due to FM radio, which was never built for mobile listening; it was intended for use in homes only, or otherwise for stationary listening.

The Radio Data System (RDS) was introduced in the 1970s to facilitate radio listening in the car. RDS automatically scans and selects the strongest signal available at each point of the journey so that the receiver remains tuned to the selected channel or programme group. New applications for use at home are expected in the near future: these include automatic search for a new channel when the type of programming changes in the middle of a listening period, or even to turn on the radio when a certain (or a certain type of) programme starts.

Digital Audio Broadcasting (DAB) is now rapidly developing in broadcasting. Its main purpose is in the distribution of radio programmes which finally nullifies the shortage of frequencies. This development also means such changes in traditional programme and channel services that will make listeners almost totally independent of broadcasters' schedules. Future receivers will allow on-demand choice of programming.

The industry is now ready for the removal of the distribution system, but the biggest problem is still represented by receivers, as was the case in the early days of radio. Mass production of the equipment that the new system requires has just about to start. The first price to be is about 1000 American dollars. However, the situation is rapidly changing. The price of the new set (or any new medium) is always a major

problem in connection with the introduction of new technology. Even so, compared with colour TV, the basic radio set has remained relatively cheap during the era of television.

The production of programmes is also going to change completely with digital technology, as we have already seen in the case of video. With digitalization, producers are going to have free hands to change and edit voice, for instance, in the same way as images are now being edited.

Radio broadcasting has also been improved by satellites. The first worldwide satellite radio was launched in the 1980s by SKY Radio. During the 1990s satellite radio has started to replace shortwave distribution in many countries (in 1993 in the Finnish Broadcasting Company).

The Domesticity of Modern Radio

Radio has come a long way from being a heavy piece of furniture in the living room corner; the new mobile, unplugged radio allows people to listen to the radio wherever and whenever they please. Strictly speaking it is of course not so much the radio that has become mobile as the listener: with the increasing multiple penetration of radio sets in the household, radio can now reach its audience in a new, more flexible way.

There is also greater freedom now than before from timetables, even though many (European) broadcasters still continue to publish their supply in the form of detailed programme schedules. This is particularly the case in public service broadcasting (see *Radio Times* or any other modern radio programme magazine), less so with commercial stations. The explanation lies in the information duties that pub-

lic service broadcasters have towards the general public.

With the same kind programmes broadcast at the same time of the day on the same channels with the same speakers, the radio is easy to use and above all reliable. Over the past decades television programming has also moved in the same direction to follow the flow of the radio.

There are two technological innovations that have had a major impact on the historical development of radio: transistor and television. The transistor gave radio its small size and its mobility; at the same time it became affordable, helping it spread to every home. Television arrived to take over radio's place in the living room and in the family's leisure time.

During the era of television radio adapted to the change in its place in the home by *mobility*. Multiple radios started to invade new places in and outside the home: kitchens, bedrooms, cars and, with Walkmans, anywhere. Headphones have returned (in the form of earphones) to make possible undisturbed or undisturbing reception. Listening no longer takes place in the living room as often as it used to in the early days of radio. If someone is using earphones to listen to the radio in the living room, he or she is doing so to avoid the sound of television or to avoid disturbing others who are watching television. The former disadvantage of radio has quite obviously become a major advantage for the radio medium. Listening to the radio in the daytime, in different places and situations, especially with earphones, makes its usage personal and more individual than before.

Radio has not only lost its evening audiences but also its former role as a family medium, which has now been inherited by television. Radio has adapted to the situation by revising its programming, by seg-

menting its channels and by designing its programmes more often in the form of a flow.

Contemporary radio resembles in many ways early radio when listeners had to use headphones and individually receive radio's

output. However, the social context of listening is totally different now when each member of the household may listen to his or her own (personal) receiver (via ear-phones) and self chosen output both inside and outside the home.

References

- Allen, C. (1985) *Speaking of Soaps*. Chapel Hill.
- Briggs, A. (1965) *The History of Broadcasting in United Kingdom*. Volume II. London.
- Chapman, R. (1992) *Selling the Sixties*. London.
- Crisell, A. (1986) *Understanding Radio*. London.
- DeFleur, M. and Ball-Rokeach, S. (1989) *Theories of Mass Communications*. New York.
- Drakakis, J. (ed.) (1981) *British Radio Drama*. Cambridge.
- Ellis, J. (1982) *Visible Fictions, Cinema, Television, Video*. London
- Herzog, H. (1944) What do we really know about the daytime serial listener? In Lazarsfeld, P.F. and Stanton, F.N.: (eds) *Radio Research*. New York. (3-33)
- Jennings, H. and Gill, W. (1939) *Broadcasting and Everyday Life*. London.
- Johnsson, L. (1981) Radio and Everyday Life: The Early Years of Radio Broadcasting in Australia, 1922-1945. In *Media, Culture and Society* 3. (167-178)
- Levis, P.M. and Booth, J. (1989) *The Invisible Medium, Public, Commercial and Community Radio*. London.
- Lull, J. (1988) The Family and Television in World Cultures. In Lull, J. (ed.) *World Families Watch Television*. London. (9-22)
- MacLuhan, M. (1964, 1971) *Understanding Media*. London.
- McQuail, D. (1983, 1987, 1994) *Mass Communication Theory, An Introduction*. New York.
- Moore, S. (1988) "The Box in the Dresser" Memories of early radio and everyday life. In *Media, Culture and Society* Vol. 10 n:o 1 (23-40)
- Moore, S. (1993a) Television, Geography and 'Mobile Privatization'. In *Media, Culture and Society* Vol. 8 n:o 3 (365-380)
- Moore, S. (1993b) *Interpreting Audiences. The Ethnography of Media Consumption*. London.
- Morley, D. (1986) *Family Television: Cultural Power and Domestic Leisure*. London.
- Nukari, M. & Ruohomaa, E. (1993) *From Programme Slots to Broadcast Flow*. Helsinki.
- Page, L.J. Jr. (1975) The Nature of the Broadcast Receiver and Its Market in the US from 1922 to 1927. In Lichty, L.W. and Topping M.C. (eds.) *American Broadcasting*. New York. (467-473)
- Ruohomaa, E. (1992) The Effects of the 1990 Radio Reform. In *The Finnish Broadcasting Company Research Review 1992*. Helsinki. (96-113)
- Scannell, P. and Cardiff, D. (1991) *The Social History of British Broadcasting*. Vol. 1 1922-1939. Oxford.
- Spigel, L. (1992) *Make Room for TV*. Chicago.
- Tunstall, J. (1983) *The Media in Britain*. London.
- Wade, D. (1981) British Radio Drama Since 1960. In Drakakis, J. (ed.) *British Radio Drama*. Cambridge.
- Williams, R. (1975, 1990 2nd edition) *Television, Technology and Cultural Form*. New York.