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26 The Telephone

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Some aspects of daily life can be almost unnoticed and invisible, despite having undergone an abrupt change at some point in the past. Technologies are often good examples of this phenomenon, in which individuals and communities acclimatise rapidly to new tools or capabilities. This is not just a matter of passively or unconsciously accommodating to a new invention, though: the users often shape that technology to their particular needs, sometimes in ways that were not anticipated by the original conceivers and designers.

So it was with the telephone. Its potential was discussed and explored very early, long before most individuals had access to one, and its gradual dissemination to more remote communities and lower income users was preceded by social expectations. But, despite its varying accessibility, the telephone faded eventually into the background of cultural life, at least until its reinvention as a portable and stylish communication device in the form of the mobile phone. And it has been socially invisible not just for members of the public but for scholars too. Accounts of the telephone have been dominated by economic and narrowly technological histories, with surprisingly little research on its sociological or ethnological dimensions.[1] There also has been a geographical imbalance. Social histories, beginning to appear from the 1980s, have focused on the North American experience,[2] although a few study the technology as an international social and cultural phenomenon.[3] A handful of local or personal histories have also been written concerning the context of England, but mainly as a celebration of the first century of the invention.[4] This article explores the Scottish experience of the telephone in the light of such prior scholarship.

Despite their constraining perspective, economic and technological accounts nevertheless can provide a backbone for situating the social context. For instance, the patent system, and its potential for controlling economic success, played an important role in shaping historical accounts. This was particularly true in the late nineteenth century, when patents were a crucial tool in the development of influential inventions and networks. Not surprisingly, the telephone has a contested early history. While often attributed to the Scot Alexander Graham Bell (born in Edinburgh 3 March 1847 but moving to Canada with his family at the age of 23), who gained credit for the first successful implementation of the telephone in Boston on 10 March 1876, other plausible claimants include Italian inventor Antonio Meucci in Cuba

and New York and Philipp Reis in Germany, both of whom experimented with voice transmission some years earlier, and Elisha Gray, who submitted an American patent application on the same day as Bell. A year later, Bell formed the Bell Telephone Company to set up and operate local telephone communications.

In 1878, The Telephone Company Ltd was set up in London to exploit Bell's patents, and began to install the first telephone lines outside America. Unlike America, though, the telephone in Britain assumed a governmental dimension almost immediately. In both countries, the electric telegraph, which had been in operation for about thirty years, provided not only a business model but early forecasts of social uses, too.

The growth of early telephone services can be sketched, but few statistics were recorded about subscribers in the early years. The changing social perception of telephones is even more difficult to discern. Carolyn Marvin, writing about the impact of new electrical technologies in the nineteenth century, has observed that they typically were viewed with both enthusiasm and mistrust.[5] This was equally true of expectations of the telephone in Scotland, which promised, or threatened, to transform life.

Even before telephones had appeared in a handful of major cities, their reputation preceded them. Brief stories and letters to the editor discussing its scientific principles and capabilities appeared in newspapers such as the *Scotsman* as early as 1877. The initial forecasts highlighted the potential for point-to-point communications. The first public demonstrations, such as one by Graham Bell in Glasgow in September 1877, conveyed music from one room to another; from such events, the Glasgow Fire Committee proffered the idea of introducing telephones to signal the outbreak of fires.[6] Merchants saw potential for moneymaking, too: two Edinburgh firms were advertising telephones as scientific novelties that year for the impossible price of 1 shilling, and public displays of the telephone were offered in Glasgow for an entry price of 6d. More realistically, a pair of Bell-type telephones, without the intermediary wires or hardware necessary to interconnect them, or labour cost in installing or maintaining the link, cost at least 25s. at the time.[7] To put this into perspective, the cost of sending a telegram could range from under a shilling to many pounds during the late nineteenth century (depending on the length of the message and distance, which could be to the farthest reaches of the empire), and the cost of an average bicycle was about £15 (several weeks' pay for a working man). As these illustrations suggest, telegrams and bicycles occupied different social domains: a telegram message was the province of large businesses, government or urgent family affairs, but the bicycle of the 1880s and beyond was a growing popular pastime affordable by the middle and working classes. By contrast, the telephone was to become a technology between these two, starting as either a business tool or a scientific plaything, and being subverted gradually by its users towards social and eventually recreational uses.

While newspapers tended to portray the invention in commercially buoyant and scientifically progressive terms – views sometimes echoed by

Figure 26.1 An intercommunications telephone, Peel Conner, 1904. It has a selector dial for ten internal lines. NMS T.2003.265.

an uncritical and receptive public – there are hints of other sentiments. A frank indication of early technological fears can be found in the records of the Crichton Royal Hospital and Southern Counties Asylum in Dumfries, where some patients suffering from delusions were complaining of hearing voices, or being listened to, from hidden telephones as early as 1879.[8] Alongside the hopes of improved communications, then, lay the worry of loss of privacy, or even the misuse of telephones by those having power over the technology.

The British Post Office, which had already been managing the electric telegraph system for a decade, began to supply telephones at the request of a handful of commercial customers, and in 1880 the telephone was interpreted legally as being a variant of the telegraph under the Telegraph Act. As a result, the Post Office was granted authority for assigning operating licences and geographical territories, and for researching technological improvements. A number of private companies sprang up to exploit such licences, including the National Telephone Company (NTC) in February 1881

to provide service to Scotland, Ireland and the Midlands of England. The company grew by mergers, and rapidly gained a monopoly over a growing territory. This bred a growing standardisation of service: as each small company was absorbed, its technical distinctions, often introduced to bypass Bell patents, were either dropped or incorporated into the larger system. By 1899 a number of municipalities sought state control of the NTC, or direct competition with it. Glasgow and five English local authorities decided to open municipal telephone exchanges, but all except the Hull exchanges eventually were sold either to the NTC or to the Post Office, which became the sole supplier in Scotland by 1912.

The early technological innovations shaped social uses, and at the same time certain desired applications spurred innovation. One such application was the ability to conduct voice conversations between towns, particularly for the purposes of business negotiations or to obviate travel on busy or inadequate roads. The first British trials of long-distance telephony were conducted between London and Norwich and between Inverness and Wick in 1877, using existing telegraph lines, and, despite the indifferent technical quality, the first permanent trunk (long-distance) line was established between Leeds and Bradford in early 1880. Within a decade, Glasgow had some fifty trunk lines, serving towns such as Linlithgow, Kilmarnock and Falkirk. Two years later, telephone links with London and Dundee were established.

The design of such telephone networks was in part socially determined. The first telephones in Scotland, as elsewhere, were dedicated point-to-point devices linking merely two users, such as a factory with principal supplier, or between two government departments. Telephone companies began advertising ready-made equipment for creating such private links during the late 1870s. Users envisaged installing an individual receiver for each of their telephone contacts. Persons of affluence and influence would thus be surrounded by a cluster of telephones – but even for such individuals this would rapidly become self-limiting. Instead, exchanges were soon in demand to interconnect the growing number of subscribers; Glasgow and Edinburgh opened small exchanges in 1879. The idea of exchanges was based on a growing demand for 'private wires' rented by telegraph users, which were interconnected at the local post office by a telegraphic 'switch'. While there were about 2,000 such private British telegraph lines in 1880, the number of telephones was increasing more rapidly. By 1885 Glasgow had some 1,300 subscribers, and Edinburgh over 400. Telephone exchanges demanded that the operator request information from the caller, patch through the two receivers on a switchboard, and listen for completion of the call. As trunk calls became possible between more towns – usually beginning with those having significant business traffic – the number of potential combinations and the labour of operating exchanges increased. David Sinclair, a Glasgow engineer of the NTC, invented the first automatic telephone switching device in 1883, and set up the first six-line exchange at Coatbridge, near Glasgow. Most exchanges remained manually operated, though, for another two

generations; the first installations of large-scale automated exchanges (for hundreds to a few thousand subscribers) began only at the start of World War I. In rural areas until at least the 1920s, subscribers were connected by small manual exchanges tended by caretaker operators. If serving fewer than twenty subscribers, these normally would not operate at nights or on Sundays. The introduction of small Rural Automatic Exchanges (RAX) later expanded service for rural users and liberated their use of the telephone. By the early 1930s, trunk calls increasingly could be made on demand, rather than having to be booked in advance with the operator. Not until 1958, though, was the Subscriber Trunk Dialling system introduced to automate the process. Over the next two decades, automatic dialling was extended to all exchanges in the UK and to a growing number of foreign countries.[9] Scotland, with its relatively dispersed small communities often separated by geographical obstacles, sometimes retained the old technology longer than other parts of the UK. The last manual exchange in the UK, at Portree on the Isle of Skye, closed only in 1976. A few electro-mechanical exchanges in Scotland were also the last in the UK to convert to electronic systems during the 1990s.

While we can argue that users caused the nature of telephone networks to evolve in unexpected ways, the influence of users on telephone hardware was relatively minor. Telephone design proved remarkably impervious to social influence until the late twentieth century. This was in part because it become monopolistically controlled (by AT&T in America, or government systems in Britain and most other European countries), and was shaped by economies of scale and mass production. The telephone became an element in a rented service, rather than an expression of material culture.
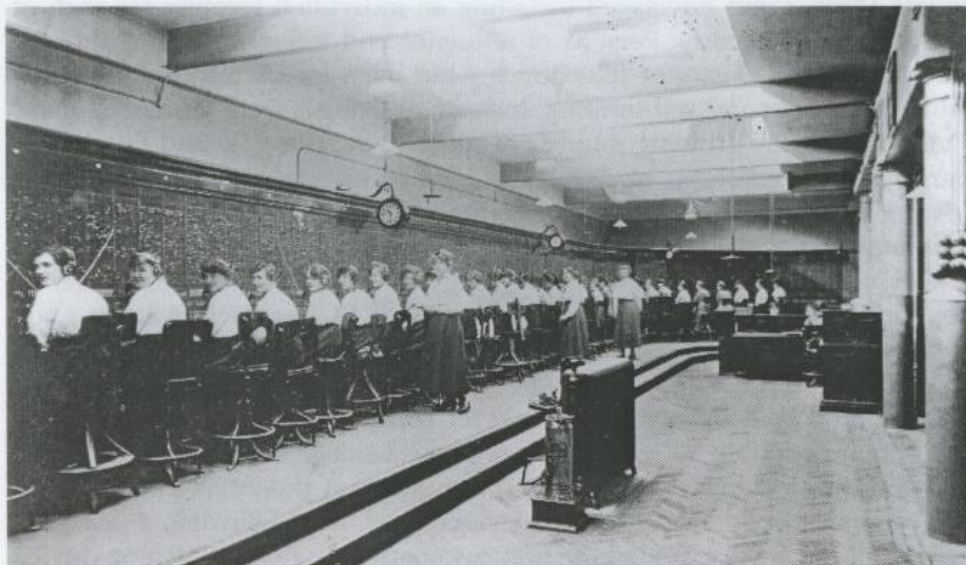

Figure 26.2 Operating staff at Edinburgh's telephone exchange in Rose Street, 1919, working in front of the manual exchange switchboards. SLA 0671.
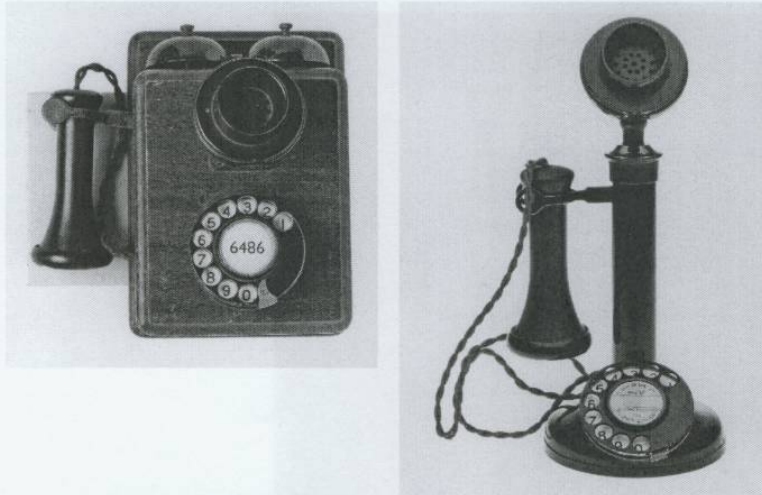
Figure 26.3 Two different styles of telephone from the 1920s: (left) a wall telephone with earpiece, model 127L; (right) a candlestick telephone, type 150, the bell of which would have been mounted in a small box nearby. NMS T.2004.309, T.2003.167.

The ubiquity and uniformity of telephones may be one reason that they became socially invisible, unlike motorcars, which were vaunted by their manufacturers as rapidly evolving in price and features and were almost always privately purchased. Nevertheless, telephone design evolved gradually from a series of interconnected boxes before the twentieth century to candlestick designs until the 1930s, to designs incorporating the mouthpiece and receiver in a single hand-held unit thereafter. Rotary dials, which automated the connection and obviated the need for exchange operators, became common during the 1940s, and began to be replaced by push-button dialling during the 1980s.

Behind these technical improvements, then, lay social shifts. The growing telephone network in Britain demanded telephone operators at the exchanges, but employment declined gradually as automation increased. Most exchange operators, as in America, were female. Women were employed preferentially for this and other rapidly growing industries (such as electric light bulb manufacture, or the telegraph a generation earlier) because of their reputed co-operative social skills, attention to their duties and acceptance of lower salaries. Not infrequently, too, a telephone exchange would be installed in the local shop or in the home of the local manager, and operated by his wife.

But there was also a more subversive element to the social uses of the telephone. An unplanned but rapidly rising use of the business telephone at

Figure 26.4 The manual switchboard exchange at John O'Groats Post Office, Caithness, 1938. SLA 0671.

the turn of the century was its appropriation by affluent homemakers, who found that their ability to telephone and chat with friends and acquaintances freed them from the expectation of personal visits and the corresponding need for suitable attire and transportation. This transformed what initially had been a male preserve into a domain of social life dominated by women. In this way, the availability of the telephone in a home environment transformed it from a mere business tool like the telegraph to a planning, chatting and socialising medium for the affluent homemaker.

As Martin and Fischer have discussed for Canada and the USA, respectively, the telephone also enabled new forms of social communication via the shared or 'party' line. Some early systems caused the telephone to ring for everyone on the local network, which required subscribers to answer to determine whether they were being called. Users of shared lines rapidly learned that they could listen surreptitiously to other conversations either as recreation or as a means of remaining in touch with activities in a small community. This contemporary variant of the 'bush telegraph' had the potential for creating more cohesive clusters of interacting homemakers, and anecdotal accounts suggest that this was an important side effect of telephones until the recent past. Such technologically mediated socialising fell when private lines once again became the norm later in the twentieth century, and was extinguished when digital exchanges appeared during the 1980s.

Such early non-business uses were restricted mainly to affluent households in towns, but usage was also shaped politically in ways that influenced wider social groups. Post Office policy vacillated in the first few years concerning competition with and between private telephone firms. In 1884, though, the postmaster-general liberalised the conditions of licences, which resulted in two important innovations: trunk lines between more towns, and the appearance of 'public call offices'. Located in soundproofed booths in public places such as railway stations and shops, these call offices provided, for the first time, access to telephones for the previously disenfranchised public, particularly outside urban centres. In some regions of Scotland, county authorities granted rights-of-way for telephone wires beside public roads on the condition that the NTC provide a call office for each of the towns and villages along the route. The NTC balked at the demand, which had not been made in their English or Irish territories, but negotiated the opening of call offices at villages such as Penicuik, Roslin and Gorebridge, provided that enough income was forthcoming.[10] By 1886 the first free-standing call offices, or kiosks, were installed, further opening up access for small villages. Nevertheless, the early models used by the NTC had an attendant to collect the fee, and also sold a subscription service and pass-key with which a subscriber could unlock the call office when an attendant was absent. Later models incorporated either a coin-actuated door, or – some two decades later – a coin-operated telephone. By that time, the provision of public call offices was still patchy in villages, with the National Chamber of Trade calling in 1912 for facilities 'in all rural Post Offices where they were likely to be commercially successful'.[11] Not until some years after the takeover of telephone networks by the Post Office was this connection with local profitability gradually eroded.

As in the Canadian Prairie Provinces, private telephone companies in Scotland gave way to a government-operated system. In Canada, this had the benefit of providing a better public service for remote communities but could deter the expansion into private homes in such localities; it is not clear whether the Scottish experience differed substantially. It is certain that there was more individual access to telephones in rural Canadian than rural Scottish regions. In both countries, though, it had the effect of implicitly dictating appropriate usage of the telephone: public telephones, particularly those located in a central location, were employed for brief and urgent communications more often than for socialising or casual chat. Even in affluent private homes, British telephones until after World War II were most frequently located in the entrance hall, emphasising their use as a succinct and formal form of communication rather than as a medium for relaxed social interaction.

This changing environment of technological capabilities and legal and administrative arrangements shaped the social uses and cultural adoption of the telephone in Scotland.

As mentioned above, the telephone was in some respects a direct extension of the electric telegraph system, which had been in use since the

mid-nineteenth century. Initial hopes (and fears, by some investors) were that the telephone would replace telegraph messages. Over a generation, however, the two technologies came to be seen as complementary: the telegraph continued to be employed for business purposes and long-distance communications, while the telephone was increasingly applied for personal shopping and socialising by their relatively affluent private users.

Other technologies acted not merely as a precursor or channel for forecasts, but also as a restraining force for the telephone. Particularly in America, the expanding usage of telephones was constrained when motor cars became increasingly available and less expensive during the early twentieth century, and when the road network consequently was improved. There was a continued growth of telephone usage through the Great Depression in Scotland, however, while in America both car and telephone purchases declined dramatically.

The public reaction to the telephone in Scotland can be understood by its gradual spread to more geographically isolated and economically constrained communities. Into the early twentieth century, use of the telephone, like the telegraph, was dominated by business and government. With its increasing control by the Post Office, the most frequently voiced public reactions to the telephone concerned its high cost and limited availability outside urban centres, particularly rural Scottish communities. These factors concentrated the use of telephones among a privileged élite. A 1921 newspaper article, for example, complained that telephone rates were going up mainly because of government department overuse of their flat-rate service:

> The Government departments in Edinburgh are numerous and widespread, and employ very large staffs. In no other concern is the

Figure 26.5 Trimphone, 1970. This was the first differently shaped telephone available for rent. NMS T.2003.172.

Figure 26.6 The last call on the CSB2 manual exchange at Portree, Skye, 1976. This was the last manual exchange in the United Kingdom. NMS 33394.

telephone so freely introduced as in those Government offices. The telephone is in every room. Junior clerks have telephones on their tables. The messengers' rooms are equipped with telephones. Every possible convenience and facility is introduced.[12]

Thus the advantages of convenience and even social ranking were recognised by all, but the long-standing disparity of access remained. In America, the expiry of Bell's patents in 1893 was followed by a surge in rural telephony. The availability of telephones remained highest in North America through the twentieth century. Despite early trials in far-flung communities, the inequality of telephone distribution endured for generations. As in North America, telephones in Scotland were most economically installed in urban areas, with rural communities relatively late to gain access. As late as 1949 – seventy years after telephones were first introduced in Scotland – a Rural Allocation Scheme was introduced, which allowed councils to recommend the placement of telephone kiosks in rural areas, whether or not they would be profitable.

Because of these economic and policy factors, telephones spread unevenly. In 1922, Bell Telephone statistics showed 122 telephones per thousand persons in the USA, compared to 15 per thousand for Great Britain as a whole. Such statistics, of course, hid gross demographic inequalities: the

Figure 26.7 Rural telephone exchange, Dunscore, Dumfriesshire, 2002. This telephone exchange is a very modest presence in the landscape for a service which revolutionised communications to, from and within the countryside. SLA 0671.

telephone remained limited to prosperous homes until after World War II, and was markedly less available for rural households. Nevertheless, by the late twentieth century telephone access was broadly similar in all Western countries. In contrast to the early figures, by 1999 the respective per capita figures were 993 and 1,037 per thousand in the USA and UK.

The history of the telephone in Scotland is therefore one that flags up the significance of the distribution of population and the effect of geography on disseminating what was widely seen as a valuable and necessary new technology. Class, income and status also were significant in shaping usage, particularly in towns, where the telephone became available earlier to private homes. Although it was relatively slow to become accessible to all social classes, the uses of the telephone in Scotland had stabilised by the end of World War I. By mid-century, it had shifted from being an aspirational tool to a commonplace convenience. In 1963 there were 500,000 telephones in Scotland, and a million a decade later. Over the century, the increasingly ubiquitous telephone ceased to be remarkable.

NOTES

1. See, for example, Baldwin, 1925; Robertson, 1948; and Johannessen, 1991. A rare early exception is Pool, 1977.
2. For the United States, see Katz, 1999; and Fischer, 1992; on eastern Canada, see Martin, 1998; and Martin, 1991.

3. Young, 1991.
4. For example, Clayton, E G. *The First 100 Years of Telephones Viewed from Norwich*, British Telecom, 1980; Earl, R A J. *The Development of the Telephone in Oxford, 1877–1977*, Oxford, 1983; Hanson, S D. *The Telephone Service in Walthamstow*, Walthamstow, 1973.
5. Marvin, 1988.
6. 'The Glasgow Fire Brigade', *Scotsman*, 13 September 1877, 2. Police and fire departments came to rely on call boxes from 1881, when a Glasgow fireman, Charles Eggar, received a patent for a police signal box. Over the following century, Glasgow installed one of the largest networks of such boxes to maintain contact between policemen on patrol and the local station; see Stewart, R W. The police signal box: A 100 year history, availableonline at: http://www.eee.strath.ac.uk/r.w.stewart/boxes.pdf, accessed 14 September 2005.
7. Casson, 1910.
8. #1628 ('J. E.') and #1668 ('M. H.'), Crichton Royal Infirmary, Patient case notes Vol. XV, Crichton Royal Museum Archives, May 1879 and 20 March 1880, respectively; #2483 ('H.E.'), Southern County Asylum, Patient case notes, Vol. 115, Crichton Royal Museum Archives, 14 September 1881. From 1923 such delusions were mapped anew on to the latest technology, wireless broadcasting.
9. Operator-mediated telephone communication to the furthest reaches of the British world was possible much earlier, though: service to Australia was introduced in 1930, to South Africa in 1932 and to Palestine in 1933.
10. 'Telephone extension in mid-Lothian', *Scotsman*, 23 September 1887, 4.
11. 'Telephone administration', *Scotsman*, 23 April 1912, 10.
12. 'Costly telephone – Private users' action', *Scotsman*, 10 January 1921, 21.

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