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THE REUTERS FACTOR Myths and Realities of Communicology: A Scenario

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I

The *year* is 1848. A young German Jewish intellectual involved in radical journalism is obliged to leave his homeland, and heads for Paris. He is the third son of the Provisional Rabbi of Cassel. At the beginning of the decade he had settled in Berlin, where he was baptised and married the daughter of a banker. Assisted by his father-in-law's capital, he bought a share in an established bookshop and publishing business which then, under his guidance, brought out a number of 'democratic' pamphlets in the year of the Revolution.

in Paris, he joins the staff of a news agency owned by another Jew of letters, Charles Havas; he works as a translator. A year later he leaves his employer and sets up his own rival news-sheet. It fails, and he moves to Aachen, where, on 1st October 1849, Europe's first commercial telegraph line opens: the Prussian State Telegraph line from Berlin. He sets up in business supplying local clients with the news from the Prussian capital, soon expanding to supply clients in Antwerp and Brussels. When the French open a line the following spring from Brussels to Paris, he bridges the gap – first with carrier pigeons, and then with horses. But competition is fierce. In Berlin, another Jewish ex-Havas employee, Bernhard Wolff by name, has set up an agency with the backing of the electrical entrepreneur Werner Siemens. One day Siemens meets our hero, and advises him to go and start a cable agency in London. Born Samuel Levi Josaphat, he is known to history by his baptised name, Paul Julius Reuter.

II

One of the myths that has built up around high technology is the vision of a completely wired-tip society. Everyone's home is to be wired in through their television sets and computers to other computers, which are wired in, in turn, to still more computers, and everyone and everything is fully programmed. You've not just got all the home entertainment you could want, you're also in instant two-way communication with the whole world. You've no need to go out shopping because you can order things and even pay for them through

your tv set and then consult your bank manager at the touch of a button. You'll even – they tell you – be able to work from home. You'll never need to step outside your front door, but if you want to, you'll have portable extensions to all your devices, so you need never be without their wonderful convenience

This is the vision which is promoted by the government of Mrs Thatcher – according to what Home Secretary Leon Brittan said in a BBC Television 'Panorama' report on cable tv (20th February 1984). These people see everything linked in together in a comprehensive system, designed to distribute pre-packaged dollops of entertainment and 'information' on a strictly commercial commodity basis: a 'free market' which they know perfectly well is loaded in favour of authority. They believe this wired-up society is inevitable because the technology for it is already there – a self-fulfilling prophecy as old as capitalism – and they look to the business of developing it as to a panacea. The vulgar materialists among them simply see it as the thing to get into – the fastest growing sector of production with the biggest surplus profits. But in the eyes of the idealists, whether romantics or philosophers, it will renovate the infrastructure, the forms and institutions, the mode of operation, which govern the way things are done, even the way people think, because it will give people new ways to process and communicate information: and it will thus assist their project, which is to restructure the British economy, and reverse the decline of British capitalism.

The new infrastructure will be formed by both extending and replacing different parts of the old, fragmenting and parcelling out bits of state-owned enterprise according to the scheme of the day. They have separated British Telecom, for example, from the Post Office, to make ready for the process they call privatisation. Now, as I write, tv commercials are advertising the prospectus for the sale of British Telecom. There's even been talk of selling off the BBC

They must know (but never let on if they do) that there will be masses of people excluded from participation in this heaven on earth. They are therefore equally set on devising ways of keeping these masses under control, and of nipping rebellion in the bud. Those who warn about the technology of social control which is now being introduced into the police force are right to do so. The police state and the information society are constructed on the same foundations and by the same means. This much is probably already apparent to anyone who reads the newspapers and watches television, for all their disinformation. But the issues this process raises are a minefield, and many disturbing notions seep through the public discourse. One paradox is that a welter of articles and programmes proclaim the new technology as a means of what the hacks have the nerve to call 'liberation' and 'democratisation' – both an end to the drudgery of work and a new promise of instant participation; and yet in Britain in 1984, the real accompaniment to all the talk of an astonishing future is the famous return to Victorian morality of the Thatcherites. Very well, then, let's go back to the nineteenth century, and look at where the new technology started.

III

The apologists are right about one thing. The age of entrepreneurial capitalism didn't just consist of fortunes made from new industrial processes: it also saw the birth of modern communications. Communications are an integral part of the capitalist mode of production. First there's the development of the physical conditions: as goods came to be distributed in distant markets and foreign raw materials were increasingly employed in production, especially those that could be cheaply extracted from the expanding colonies, the improvement of terrestrial transport, which in feudal society was unorganised, became imperative. In due course, 'the feverish haste of production, its enormous extent its constant flinging of capital and labour from one sphere of production into another, and its newly-created connections with the markets of the whole world' (Marx, p. 384), also make improved communications imperative for another reason: it creates a generalised need for the dissemination of a new type of information, consisting in stock market quotations, raw materials prices, credit rates, statistics and news.

In short, by the early 19th century the growth of capitalism had created pressing needs for improved commercial intelligence. The two went hand in hand. Between 1800 and 1913, as modern communications were developing, the value of world trade expanded (according to one estimate) more than twenty-five fold, from £320m to £8360m. The relationship between the two is an aspect of what we can call the Reuters Factor, which functions like a multiplier that turns an increase in the supply of information into an increase in business.

Big banking houses like Rothschild's started off with their own communications systems, using couriers and carrier pigeons. Newspapers like *The Times* set up networks to provide regular information on market prices in different financial centres, and Havas in France made the reputation upon which he built his news agency by supplying the Bourse with the European exchange rates. On the day that the Prussians opened a state telegraph line between Berlin and Aachen, 1st October 1849, two new contenders, both of whom started with Havas, set up in business: Bernhard Wolff in Berlin and, at the other end, with an overland link to Paris, Paul Julius Reuter. As the telegraph network was extended, Reuter preceded it, and in 1851, he established himself in London in order to exploit the submarine link between Calais and Dover

The process which is described in the present essay is coextensive with the trajectory which Reuters has followed since, from its inception to the present day, when it's become a success story in the application of the latest communications technologies. Although, as we saw, it begins as a conventional business undertaking, Reuters trajectory has been far from conventionally typical of capitalist growth (what is, when you come down to it?). But its very singularities make it typical in a kind of unconventional way:

its discovery that news is a very peculiar kind of commodity, the question of its relationship to the authority of the State. its changing structure of ownership. from entrepreneurial to corporate. All these things. upon examination, draw our attention to internal features of capitalism which are frequently invisible. We find we're dealing with the bloodstream of the system: the flow of information upon which the health of the body depends. News is only part of this.

Reuter realised very early that the supply of news to newspapers by itself could not succeed in generating a profit. For one thing, the newspapers were jealous of their own prerogatives. especially, in London, *The Times*. But the Stock Exchange was a different matter, and Reuters' first English clients were private commercial subscribers. From biographical information (Storey). it is clear that Reuter understood something of the ideological relation between news and commercial information: he knew, for example, that he couldn't compete with the newspaper correspondents form of comment, interpretation and graphic description. Telegraphy was too expensive. So he emphasised the telegraph's advantages of speed and conciseness and constructed a model of reporting 'facts' which came from the criteria of commercial usage, where it was pretty unambiguous – the facts had numbers attached to them. He also talked about objectivity – which was pure expediency. He was a foreigner reporting imperialist wars and diplomacy. so he couldn't afford to incur the displeasure of Her Majesty's Government. He was also trying to satisfy the varying political and ideological inclinations of different newspapers.

To serve the interests of Empire and of them all, Reuter devised a code of practices for his establishment which succeeded in meeting all prejudices. It has essentially changed very little since it emerged in the 1860s and 70s, and lies at the basis of modern bourgeois ideologies of journalism. This is hardly accidental. Reuters made itself essential to the growing press, especially the growing number of provincial newspapers, unable to afford their own foreign news reporting services, who came together in the Press Association in 1865. The relationship was sealed in an agreement by which the Press Association provided the information for Reuters' cables to overseas clients.. (The partnership strengthened Reuters internationally too, and this was the period when the big international agencies were carving up the world among them.) Subsequently, the Press Association were to join the Fleet Street newspaper proprietors in corporate ownership of Reuters, to preserve its independence.

For all this, news for the press alone was no way to make the venture a success. Periodically, throughout its history. Reuters has made investments in the improvement of its basic activities in commercial intelligence. They include especially the acquisition in 1943 of Comtelburo, a commercial and financial service designed to meet the needs mainly of banks and commercial institutions. The introduction over the last decade of specialist computerised financial services, transmitted worldwide by satellite. has turned Reuters into a nest-egg for the company's owners. Masters of an industry in deep trouble – partly brought on by the havoc which new technologies wreak upon its traditional labour processes – they decided to do some selling off when they realised that Reuters was now one of Britain's largest companies. with a

valuation of £1 billion. They've of course been doing their damndest to keep the whole thing low profile.

IV

In Britain, communications, by ancient and semi-inviolable conventions, were a monopoly of the crown. Her Majesty's mails were transported and delivered by Her Majesty's servants. The revenue from the post was income for Her Majesty's Government. The expansion of newspapers in the course of the 18th century had depended on the growth of more effective communications; the development of the press was intimately linked with the improvement of roads, and especially the growing efficiency of the General Post Office, through which newspapers were distributed. The need to rectify abuses of the system had at times contributed to the improvements.

But communications have also always been a matter for the military. Claude Chappe's semaphore telegraph, first introduced by order of Robespierre and the Committee of Public Safety in 1793, gave Napoleon the best military intelligence system in Europe. By the beginning of the 19th century (when the electric battery was invented), semaphore telegraph stations stretched out across the hills, passing messages at considerable speeds: just over four minutes from Calais to Paris, and less than a quarter of an hour from Toulon. They consisted of tall posts holding a pair of thin semaphore arms silhouetted against the sky so that the operator at the next station several miles away could read the signals clearly through his telescope. Torches on the arms made it possible to send messages by night. But the system was cumbersome. The distance between stations was limited by the range of the telescopes. It also required foolproof drill and a signal manual. For such a system to be commercially practical, one of the things it lacked was a simple, easy and efficient form of transmission code, which could be operated by ordinary paid employees. By about 1860 this great semaphore system had been replaced by the electric telegraph.

The telegraph was the first commercially successful application of the new science of electro-magnetism. Electricity came into commercial and industrial use during the course of the 19th century for communication, light and power, in that order. But the successful application of the telegraph involved two aspects: first there was the physical business of sending and receiving signals electro-magnetically. This achievement was the fruit of scores of workers, many of them scientists of lasting fame (Wheatstone, Gauss, Weber, Henry), investigating between them a series of interconnected problems such as current generation, propagation of the current through wires, electrical measurement and so forth. Secondly, there was the ingenuity needed to find the most effective code for transmitting messages in the technically appropriate form of discrete signals, a problem of mathematical logic. A solution, almost universally adopted within a short number of years, was provided in 1832 by an amateur – something that was still possible in those days. A portrait painter by profession, Samuel Morse translated the alphabet into a series of variously combined short or long pulses which gave the dots

and dashes of an easily mastered digital code, in a manner so elegant that it still survives. [NB. Not any longer since this was written.]

It is enough to put it this way – to refer to certain technical properties of the system – to anticipate a succession of problems of this kind which the development of communications technologies repeatedly throw up. whose study is nowadays. among other things. the domain of information theory. This is the academic discipline, mathematically based, concerned with the logical properties of transmitted messages: questions of redundancy. noise, interference, the difference between the digital and the analogue and so forth. This theoretical framework, however, is only very recent—which reminds us that throughout the history of capitalism such problems have usually been solved in practice before they were even posed in theory. The invention and application of the first generation of modern communications was achieved without it.

The intellectual basis of modern information theory lies in the quite unconnected work at the end of this period of mathematicians and logicians like Boole, or Russell and Whitehead, whose work is also the basis of the computer sciences. Of course the idea of the computer is much older. Blaise Pascal, mathematician and mystic, built the first mechanical calculating machine in the mid-17th century.

Two hundred years later, at the very moment, as Harold Perkin puts it, as ‘the minimal, decentralised, regulatory, laissez-faire State of the entrepreneurial ideal was consolidating itself as the norm of political theory, the expanding, centralised, bureaucratic, interventionist State of modern times was coming into being in its administrative practices’ (Perkin, p. 319). The corresponding expansion in statistics and computation imposed severe strains on their established mode of production. The annual Greenwich nautical tables, for example, were produced on an outwork system. by individual human computers. (Until the 20th century, the word computer’ referred to a human being.) Some were highly skilled, but most computation at the time was done by provincial clergymen, who lived on the Bible and seven figure logarithms, did all their work by hand, and were only too apt to make mistakes. To remedy the problem of productivity and accuracy, a Cambridge professor of mathematics conceived the idea of doing it all mechanically, on a machine called an analytical engine Charles Babbage’s efforts were at first backed by the government but ended up in a great Victorian folly which never fulfilled its purpose: it now lies in the Science Museum as a relic. But it was, in its conception, as the poet Hans Magnus Enzensberger describes it.

The first digital computer,

with no vacuum tubes, no transistor

Weighing fifty tonnes,

as big as a room, a gearwork of brass, pewter, and steel,
driven by springs and weights. capable of any
computation whatsoever

even of playing chess, Or composing sonatas

*(C.B. (1792—
1871) in
Mausoleum)*

A third antecedent is the logical idea of a 'universal machine' conceived by a young English mathematician in the 1930s, an immediate conceptual precursor of the electronic computer: the Turing Machine. It needed the Second World War, however, and the impulse of the military quest for a new generation of communications technologies, for computer science and information theory to come into existence. They accompany the development of television, radar, rocketry, nuclear weapons, satellites, telecommunication and microelectronics. And also the hubris of the search by academics and scientists in R&D laboratories, for something called artificial intelligence.

V

The new telegraphic news of the 19th century played an enormous role in shaping the sensibilities of the new and evolving industrial press. The total circulation of daily papers in the UK in 1854 was less than 100,000, of which *The Times* claimed 51,000. Sixteen years later, during the Franco-Prussian War, *The Daily News* alone had 150,000, and the editor of *The Times*, Mowbray Morris, instructed his correspondents abroad that the telegraph had superseded the newsletter and had rendered necessary a different style and treatment of public subjects. These sixteen years cover a tale of resistance by *The Times* to Reuters' growing monopoly in the provision of foreign news to the country's press. But not only was Reuters zealous about its special reputation for accuracy and trustworthiness, *The Times* was finally forced to give in when Reuters also proved more efficient and resourceful in the process of news gathering itself.

One effect of telegraphic reporting, due to the rapidity of transmission, was to establish a daily 24-hour cycle in the production of the news. Indeed, the new simultaneity of events threatened chaos in many departments of the social superstructure, which could only be put in order by international co-operation.

The standardisation of the clock around the world was indexed, by international agreement which records the British imperial supremacy of the epoch, to London and the Royal Observatory in Greenwich. It's a symbolic moment in modern history. You could almost say it represents a definitive break with the past, a change in the very measure of history. From now on, it will be possible not only vastly to improve the regulation of prices, but also to record exactly the moment at which events take place.

A delusion will grow: that it is a real gain in the quality of life to be able to take more effective control of time by measuring it ever more precisely. Such a delusion is fuelled by the growing precision of science. Soon, scientific management' will appear –the technique of timing the segments of the workers labour process by which the output of his or her labour power may be more precisely measured. It is also highly relevant that this new regulation of time – and subsequently, similar international treaties concerned with the regulation of the flow of information in different media – transcends the barriers between nations, from *Realpolitik* to Cold War. The one thing opposing factions do not entirely break off are the channels of communication. The great problem is how to control them, how to prevent the enemy hearing what you don't want him to, how to monitor the enemy's communications, and how to influence his interpretation of what you let him hear. It is significant that the pioneering work in which Alan Turing was engaged during the war, which led to the construction of the first electronic computers at the end of the 40s. was the application of electronics to the mathematical art of code-breaking. (And curious that Turing should have been another eccentric English mathematician.)

VI

Nor did the telegraph serve capitalist interests only passively. By linking distant markets together. the telegraph turned them into one vast interdependent market in which a change in price in one part affected the whole system at once. As it advanced beyond the frontiers of the traditional markets, the telegraph helped to extend the geographical reach of capitalism. It also helped to intensify its operation. As a result of penny postage. railways, telegraphy, in short, the whole improved means of communication (as Marx observed in *Capital*). Britain already carried out five to six times more business with about the same circulation of bank notes. (It was Charles Babbage. several times cited by Marx in *Capital* as an authority on such matters, who persuaded Rowland Hill to introduce the flat-rate penny post in 1840, when he proved conclusively that the cost of collecting. stamping and delivering a letter was far greater than the cost of transporting it, and Post Office operations would be, as we should now say, streamlined, by a charge independent of the distance carried. Enzensberger refers to Marx checking the arithmetic and finding it correct'.) In short. new and improved means of communication were not just a range of products which entrepreneurial capitalism produced in its factories, but a necessary part of its social means of production. More accurately, they constituted an infrastructure, which stands to the individual producer as a precondition to his own undertaking, though at the same time this infrastructure is a product of the whole ensemble of individual enterprises.

Being an infrastructure, however, the development of communications constitute a problem for the development of the capitalist mode of production. They consist in *general conditions of production* which, as Marx explained in *the Grundrisse*, presuppose a stage of development of the forces of production and private capital for which their improvement is itself a necessary condition.

Because of this the matter becomes a special object of interest on the part of the state, in its role of overseer and arbiter of social development in the interests of the capitalist class; and thus it undertakes the necessary enterprises which at any given moment the capitalist class left to itself is unable to. This is already to be seen in Prussian and French government sponsorship of the first telegraph lines. It is a role, however, to which the state has to learn to adapt. When one of the inventors of telegraphy, a man by the name of Ronalds, quite naturally, in 1816, offered his services to the Admiralty, they declined. Half a century later, with anarchic competition between the different private telegraph networks leading to economic chaos, the British government decided to act and empowered the Post Office to take over the entire telegraph system. It was the first nationalisation.

VII

In 1944, the North American business magazine *Fortune* published an article on 'World Communications'. It warned that the future growth of the United States depended on the efficiency of US owned communications systems, just as Great Britain's had done in the past: 'Great Britain provides an unparalleled example of what a communications system means to a great nation standing athwart the globe...'. The ideology of the growth of communications, as represented in the mass media themselves, holds them, like Alice, to have 'just growed'. As *Fortune's* warning demonstrates, they didn't.

Around the 1860s, the most progressive factions in the British ruling classes sensed how important it was to direct the growth of communications. Initially, the telegraph followed the spread of the railways. As modern industrialists themselves, the railway entrepreneurs employed the telegraph to improve their safety and control networks, also offering the service to private users. Soon, there were separate telegraph companies following the different routes of their big brothers, the individual railways companies.

However, there seems to have been a delay before it was generally understood that railways and the telegraph represent different types of infrastructure – the telegraph, though terrestrial, isn't a form of transport – and they were therefore destined to follow different patterns of capitalist development. The change in comprehension is recorded in legislation. During the 1860s, there were three Post Office Acts. The first, in 1863, merely defined the telegraph as a piece of wire. In the second, 1868, the Postmaster General was empowered to acquire, maintain and work electric telegraphs': the third, in 1869, amended the definition of the telegraph to include any apparatus for transmitting messages or other communications by means of electric signals'. This legislation, which effectively licensed a monopoly in an age which was deeply opposed to monopolies, was inspired by Gladstonian Liberalism – a political creed that was responsible for a series of expedient reforms in a number of fields, ranging from the disestablishment of the Church and the Education Act of 1870, to opening up higher civil service posts to examination and the 1872 Ballot Act.

If the case of the telegraph is a strikingly early example of nationalisation. the results were not encouraging. There have always been awkward contradictions in a statist undertaking of this nature. As in almost every example of social—democratic nationalisation ever since, the private companies were over—generously compensated to begin with, and the Post Office was unable to make the service run at a profit. A principal reason for this failure is the constitutional reluctance of the bourgeois state, having adopted nationalisation, to follow the appropriate logic and properly take care of investment. With this very first nationalisation. it also took time before the need for planning was understood. At the start it hardly seemed necessary: when it was nationalised, the telegraph system was still expanding, and for some time, all the Post Office had to do was go on opening telegraph offices all over the country (the number of telegrams sent in England and Wales grew from 7.1m in 1870 to ten times that number four decades later).

Incomprehension continued longer in the civil service than the Post Office itself where new engineering concepts were gaining ground. However, the government's cost accountants, the Treasury, still thought in terms of the world of mechanical engineering, like bridge building and canal construction. When the telegraph had been invented, telegraphic messages. or telegrams, were at first regarded as apparently another form of mail, which is to say, a physical load, and this was still the spirit in which the 1869 Telegraph Act was drafted. When the telephone came along, and the Post Office wanted in. the definition needed to be stretched. They filed suit against the telephone companies under the terms of the 1869 Act, following the advice of government lawyers that telephone communications were telegrams within the meaning of the Act: and they proposed to the Treasury a plan for a comprehensive system of Post Office exchanges throughout the country. This the Treasury thought too expensive. The result was that while the GPO undertook a small number of local exchanges. more at first for business than for private use, much more important was the privately owned National Telephone Company. which grew by absorbing its other competitors. Not until 1912 did the Post Office take over the National Telephone Company and acquire a near monopoly of the whole system. (Meanwhile, the GPO had already become the largest single employer of middle-class women. By 1911. 14,328 women were engaged as telephonists and telephone operators, 20,337 as counter assistants or clerks.)

The establishment of the Post Office telegraph monopoly can be related to the progress of the newspapers and of Reuters. According to one commentator.

The key to Reuters dominant market position in the sale of international news to the British newspaper press was its relationship with the Press Association. the national news agency established by the provincial daily newspapers and formally constituted in 1868 The Press Association adopted the task of disseminating national news to its member-clients. and also lent its support to the Campaign for the nationalisation of the telegraph, which came about in 1870 (Boyd-Barrett. p. 113),

But Reuters' carefully nurtured ideology of objectivity was to come under challenge from the emergence before the end of the century of the yellow press, trading on a radically different set of news values. that came from the world of commercial entertainment rather than the boardroom. The creation of the yellow press debased improved intelligence in the same way traditional popular culture was debased in the growing commercialisation during the last twenty years of the century of music hall entertainment, with the formation of syndicates as the first step in the development of entertainment capital, with its own sectoral interests: what the Frankfurt School people in the 30s called the culture industry.

A profound shift in social sensibilities was involved in this process, which involved major changes in the structure of the press that deeply affected Reuters. The modern press evolved in two main stages: first, to service the needs of the capitalist and professional classes for organs of information, and then, as instruments directed to those social classes and strata over which the capitalist classes needed to extend their domination. The creation of Reuters belongs to the former, that of the yellow press (which appeared in the 1890s) to the latter. As rival agencies grew up to supply the needs of the new mass readership papers in the period leading up to the First World War, Reuters suffered declining profitability, from which it had only partially recovered when the Depression brought fresh financial deterioration.

The 30s produced another worry too: authoritarian currents in government began to talk of the advantages of something more than the kind of informal arrangements between the news agency and the State that came into operation during the First World War. The Fleet Street owners, the Newspaper Proprietors Association, found themselves persuaded to take joint ownership of Reuters alongside the PA. Later they were joined by various Commonwealth Press Associations, and further ownership links were created when Reuters became part owner together with the BBC and the television corporations of the white Commonwealth countries, of the world's foremost television news agency, Visnews.

VIII

The growing interaction of the scientific, the technical (or technological) and the financial (or economic) is clearly demonstrated in the way in which science was beginning in the 1860s to be integrated into the economic system through a number of new companies, the first purely scientific commercial enterprises, which manufactured the equipment for telegraph, cable and the telephone. The development of these companies had a chain of social effects. They created new professions, such as the electrical engineer. They provided what Bernal called 'the stock-in-trade for electrical experimentation – batteries, terminals, insulated wire (Faraday had to use wire from milliners or wind his own insulation), coils, switches, simple measuring instruments – and all at prices which even impoverished university laboratories could afford'

(Bernal, p. 117). Soon these enterprises set up their own research departments, inventing a new business practice nowadays called r&d. The telegraph led directly to the telephone, and later to the wireless telegraph. It provided (Bernal again) 'a nursery for the young science of electromagnetism, supplying problems, part-time occupation, equipment and funds for the academic scientists and ensuring them plenty of students' (Bernal, p.23). The telegraph and cable industries were also the sources of the new electric light, traction and power industries of the 1880s and 90s.

Bernal also makes the observation that the telegraph led to the addition of new electrical units of measurement to the age-old weights and measurements of trade and commerce. This is crucial. The telegraph was the first technology to establish information as a commodity, and therefore the need to measure it. Conceptually, this is the first step towards the modern distinction between hardware and software, and it belongs to the analysis of the peculiarities of the commodity form of all the electrical media, and later electronic media: including the telephone, phonographic recording, film, radio and television, which all got sucked into the same process. With each different medium you get new variants on the basic facts of technical linkage: if you've got something you can call software – the information you're passing around – then you've got to have something called hardware – the medium you pass it through.

This is reflected in the phenomenon of commodity linkage, which takes different forms, like cameras and film, or gramophones and records. Since you can't have one without the other, this gives rise to a general principle, namely, that manufacturers of any new kind of hardware have to concern themselves with the production of the appropriate software without which the hardware has no market. In this way, early producers of cinematograph equipment were also film producers and distributors – the very distinctions took time to appear. Or the early recording companies made both phonograph and phonogram: some still do. This can also be compared with the relationship between broadcasting and programmes. The first manufacturers of radios had set up radio stations *and* produced programmes, as a kind of loss leader, until the means were found to relieve them of the need, and institutional or commercial broadcasting began.

Observe that software becomes an ambiguous term here, on the one hand referring to the content which passes through the medium, on the other to the physical form which the content takes. the record on (or in) which the content is contained (or the modulated radio wave). Or it may not refer to the content at all. In the case of photography, the camera is no use without film, but you take your own pictures.

The ambiguity of the term software isn't just loose thinking: it comes from the fluid and shifting relationships between form and content which are characteristic of the media. Because the content of communication is symbolic, it is possible to translate it between forms in various ways, so that the different media become devoted to preying off each other: newspapers consume photographs, radio consumes records. In fact the relationship between the latter pair is thoroughly symbiotic. Radio needs records to help

fill up its air space, but the recording industry uses radio as an aural shopwindow to publicise and plug its ware.

These patterns relate to another series of peculiarities, in the commodity nature of the media, which have to do with the various different ways of consuming cultural products and therefore the different kinds of exchange value which are yielded. Thus, while cinema imitated the performing arts in collecting gate money – the cash paid in at the ticket window – and gramophone records imitated books, there were no pre-existing equivalent for broadcasting. The first manufacturers of radio not only had to produce programmes, they had to produce them gratis, because there was no way of selling them. Indeed, with the exception of pay-tv, programmes are still not exactly commodities from the point of view of the listener or viewer, but more like a right which comes with the purchase of the set, and in some countries, the payment of a licence fee. To finance broadcasting through a licence fee is one solution. Commercial broadcasting is another, which in the process creates another new kind of commodity: the airspace which is sold to sponsors and advertisers. It has even been said that the real commodity isn't the airspace, but people, the audience, according to the statistical breakdown of the consumer polls.

More recently still, in the ease of video, there is a new upset, because the software already exists – on everyone's television set, in the same way as records and radio are fodder for tape recording. In the United States, the problems which this creates have reached the Supreme Court in an action by Walt Disney against Sony for advertising videorecorders as a way of watching your favourite Disney programme whenever you want to. This alleged violation of Disney's copyright is a reminder that there are special kinds of property rights involved in this whole process. Copyright is a concept which has constantly shifted its meaning ever since it was first defined, in the wake of the invention of printing, to answer the question of the ownership of a text in terms of who held the right to make printed copies of written works – which at the beginning meant the printer-publisher, not the author. The history of copyright is the history of mounting contradictions in the legal superstructure, as the changing forms of cultural production altered the social relations of the author, who gradually became a new kind of intellectual worker (a shift which relatively few of them recognised until after Schiller and Marx). From the intellectual worker there has now descended the alienated mental worker whom Schiller and Marx foresaw; from the critical consciousness of the artist and the scientist, there have descended the programme producer and the computer programmer. Freelance programmers of all kinds, of course, still have an awkward tendency to organise themselves to claim the ancient privilege of copyright.

IX

This whole growing infrastructure has contributed independently to social relations by creating new sensibilities, new ways of relating to the world, and of representing it. Information is the lubricant of the capitalist mode of production, but at the same time it creates its own symbolic domain. If the human being is, as Merleau-Ponty said, condemned to meaning, then our

mental existence cannot but reshape itself around the new languages and dialects which now occupy our world. We should think of this too as part of the Reuters Factor. It isn't just a question of information generating business, but of the nature of the information business itself, the way that gathering information treats the world.

For instance, the growing demand for information has created new metiers. Harold Perkin has suggested that statistics, which emerged as a discipline during the industrial revolution. 'is to industrialism what written language was to early civilisation: at once its product and its means of self-expression' (Perkin, p.326). The Utilitarians, who promoted the Statistical Societies which exploded into activity in the 1830s, saw the role of statistics as, according to Perkin, the 'discovery and examination of "intolerable" facts, often long before they were felt to be intolerable by the press and public opinion'. But statistics also introduced the practice of surveillance, both commercial and bureaucratic. The kinds of information involved in this process come to impose their own terms of reference, which in turn become one of the ways in which capitalism represents itself to itself seeming to impose order and reason where there is none.

x

The strategies adopted by the newspapers relate to their dual character, as organs of information on the one hand, and of influence on the other: their character, in other words, as synthetic forms of cultural production. This is entirely typical of the modern media, one might say symptomatic. It certainly helps to explain how social susceptibilities are shaped in ways that people aren't normally consciously aware of. The social unconscious is formed of many elements, reaching back through the diverse heritage of popular culture as well as the impact on traditional belief of the successive shocks of social 'progress'. The influences which shaped the character of the mass press in Britain include, for example, such features of popular culture as the broadsheet ballads and the art of the patterer, which had both served for the dissemination of news.

The traditions of popular culture were sustained through the development of new forms of popular entertainment, like music hall. To begin with, musical entertainment was subjected to progressive commercialisation without any help from new communications technologies until almost the end of the century. Then, the phonograph, which first appeared in 1877, introduced another peculiarity: it was primarily a cultural phenomenon, which did little to increase the circulation of information – on account of which, it was much slower to develop into a major branch of capital. Its connection with the complex of modern scientific-based industry is amply shown by its birth in Edison's research laboratory, but for several decades it seemed to lead a more or less independent existence as a minor branch of the entertainments industry, and was only recapitalised and reconverted with the development of electrical recording in the 1920s, after the invention of electronic amplification during the First World War.

The phonograph brought about a cultural revolution in the interim nonetheless. At the beginning, after the invention of the first mechanical means of sound recording by Edison in 1877, economic exploitation was impeded simply because there was no mechanism for duplication of the recording. The early cylinder machines made good side-shows in the fairgrounds, and they had the attraction for the private purchaser that you could make and show oil recordings in the home, but this hardly provided a mass market – much more restricted, for example, than the telephone, which was also sold, in its early years, as a luxury item for the home.

But the phonograph added nothing to the communications apparatus, because it didn't carry information; its improvement was therefore less urgent, and didn't attract the same investment funds as other new instruments. That is why its massification had to wait thirty years. The industry only took off after Emile Berliner accomplished a series of improvements during the course of the 1890s, culminating in the first wax disc recording in 1900. The wax disc served as a master for a copper matrix from which copies could be made. Now there opened up a new and enormous market. Its nature can be judged from a trade advertisement put out by the New York-based Victor Company in 1905, with photographs of leading recording artists and a text which explained: 'Three show pictures of operatic artists, one shows pictures of popular artists. Three to one – our business is just the other way, and more, too; *but there is good advertising in grand opera*.' The gramophone now began to do for music what telegraphy had done for information: it created new conventional forms, both standardised and truncated, extended the reach of the market and increased circulation.

Again the Reuters Factor was at work. The record found a much larger audience than the artist could reach in person in theatre or concert hall, both in terms of numbers and of geographical extent, and before long the record industry took on an international character. Music has always travelled – people carry it with them – but now began a process of wholesale trade which transplanted music from one place to another whatever the cultural predilections and differences. It also overrode the musical cultures it penetrated by imposing its own increasingly industrial nature, which Adorno in particular has analysed, seeing it as a process of fetishisation of musical characteristics in a way that negates their aesthetic authenticity. The result has been to transform the social role and functions of music. In 1967 a Mr Joseph Klapper of CBS was able to tell a US Congressional Committee, inquiring into 'Modern Communications and Foreign Policy', that 'the broadcasting of popular music is not likely to have any immediate effect on the audience's political attitude, but this kind of communication nevertheless provides a sort of entryway of Western ideas and Western concepts, even though these concepts may not be explicitly and completely stated at any one particular moment in the communication' (Schiller, p.106).

For all this to happen, however, the gramophone needed the radio. The case of Guglielmo Marconi and the invention of radio is another example of how the interest of the military in improving their communications systems comes to be of crucial importance at the earliest stages of development of a new communications technology. Marconi, like similar pioneers, had been able to achieve primitive wireless transmission over short distances as a very young man working at home with his father's resources, by 1895. But then he needed financial support on a considerable scale. When the Italian navy turned him down, he found the support he needed in England, where his mother came from, and his family connections were the right ones. He rapidly had the Post Office, the War Office and the Admiralty all involved in the development of the invention.

Important early steps for commercial wireless telegraphy included the first ship-reporting service which Marconi supplied for Lloyd's of London in 1898. and in the same year, the first journalistic use, when the Dublin *Daily Express* decided upon a publicity scheme and used the wireless to report the Kingstown Regatta. Two years earlier, when Marconi arrived in London, was a key year in the development of mass communications and mass entertainment in England, the year of the first cinematograph shows and the birth of Alfred Harmsworth's new *Daily Mail*. Marconi made skilful use of newspapers as a medium of publicity in promoting his invention on both sides of the Atlantic, and they were eager enough to be used. New inventions were a great source of public wonder, and even better, of circulation. The latest scientific wonders were showmen's acts. The man the English claim as the inventor of cinematography, William Friese-Greene, who didn't do too well with his invention, was reduced to treading the boards demonstrating the incredible new x-rays. This is extremely ironic when you consider that music hall was the perfect launchpad for the film – together with the fairground and the tradition of the travelling showman – and that once films took off they slowly strangled their host.

It was the cinema, more than any previous invention of new communications technology, which suddenly changed the ground-rules. Film was from the very beginning peculiar in two things: it established itself first with the mass audience, and only then filtered upwards through society. This can be compared with the immediately preceding inventions of the telephone and the phonograph. Both of them found their first markets within the bourgeoisie and only later became working class commodities. You can see this in the earliest publicity announcements for the telephone, which spoke of business needs first of its social usefulness second, and of its value as a personal luxury item third. In the case of the gramophone, as Berliner renamed it its initial appeal was also found among social groups with special cultural interests, since even after discs first appeared, the period of primitive pre-electrical technology in the industry was protracted: with the lack of improvement, the original spontaneous fascination of the populace slackened, and it helped to be able to keep a market of immigrants in New York happy with recordings of Italian opera.

But film had no such problems. Its appeal was not only immediate and huge, but all such cultural differences were submerged in it. The fact that its

characteristics were primarily aesthetic, and it added to the apparatus of commercial intelligence no more than the gramophone. hardly mattered in the face of its rate of growth. Because of this. and because no country in which film appeared was capable of producing enough to supply the market, film was also international from the outset; by the time of the First World War, it had begun to attract the interest of finance capital. It was the equivalent in the sphere of cultural production to the transnational character of the electricity industry, which Lenin held to be ushering in imperialism – the highest stage of capitalism.

XII

We have surveyed the nineteenth century and what do we find? First that the growth of industrial capitalism, and indeed, of imperialism, is intimately linked with the invention and development of new means of communication. It is a process in which military interests play a significant role, though not always as central as in the twentieth century, the epoch of neo-colonialism, the needs of commercial intelligence, however – in other words, of the bourgeois class itself— are constantly very much to the fore and provide the initial markets. Here is a parallel with the Thatcherite approach: Thatcherism looks to the application of the new high-tech in the form most beneficial to corporate capitalism itself A rationale results: to achieve this application, corporate capitalism must be free to do whatever it wants to.

In the nineteenth century. the new communications begin to form a new infrastructure, which stands, however, in contradiction with the ideology of entrepreneurial capitalism, principally because it needs state regulation and control if the piecemeal initiatives of individual entrepreneurs are to be effectively welded together. Hence we find the first steps in international cooperation designed to establish certain basic universal standards. but in each new branch of communications there is a bitter tight between capitalist competitors before the victors are able to establish technical standardisation. This is, of course, extremely wasteful. Yet in the Thatcherite vision of the coming of high-tech, there is to be the same chaos in the marketplace, the same destructive wastefulness.

We also saw that this new infrastructure progressively opened up new economic opportunities for the exploitation of cultural production. For example. alongside the commercialisation of popular entertainment like the music hall, and the creation of the first mass readership markets, the 1 880s saw the hugely successful introduction of the Kodak camera – ‘You press the button, we do the rest’, which made photography the first new popular art form of modern times. As the century draws to a close, the pace of innovation accelerates. Photography waited forty years for its massification. The delay in the case of the phonograph is less than thirty; and by this time. cinematography has burst upon the world. In the course of these developments we find a distinction growing up between communications technologies where the primary function is the transmission of intelligence which has a practical or instrumental use value, and those where the content

is primarily symbolic – which are primarily, in other words, new means and media of cultural production and reproduction. Both, however, operate in certain respects in curiously similar ways. In both cases, there is a necessary distinction between what is later called hardware and software, though to be sure, each technology has its own peculiarities (just as the products of different media have different peculiarities as commodities, in the way they realise their exchange value).

The development of electronics during and after the First World War radically modifies the separation between different media and reshapes the entire communications industry. With radio, talkies and television, there emerges a culture industry in which all branches of communication are implicated, and in which intelligence and information plays second fiddle to the universal levelling of mass consumption. Their function – most starkly seen in the United States – is not to produce an informed and educated population, with a higher cultural level, but to shape their consciousness to the needs of increasing passive consumption, in which the products of the media themselves consume a greater and greater proportion of consumer spending. Thus the economic development of the media – involving, as always, the multiplication effect of the Reuters Factor – extends and intensifies still further both the information network and their own cultural net. To this is now being added the impact of microelectronics, which is profoundly contradictory.

The progressive enhancement of potential cultural production brings inevitable new contradictions. As Hans Magnus Enzensberger observed fifteen years ago, it is wrong to regard the media merely as means of mass consumption. They are always, in principle, also means of production. The contradiction between producers and consumers in the mass media is not inherent but institutional, and it has constantly had to be reinforced by economic and administrative measures (including the appropriate design of the equipment itself). But the original massification of photography was precisely a matter of placing a new cheap means of cultural production into the hands of the masses. Such an enterprise can be very risky; it had been necessary to repress a radical press that appeared during the industrial revolution, and to seek to control the self-education movements which the new industrial proletariat had created. Yet although photography, then 16 and 8mm cine, and now computers, are accompanied by their own sub-industries devoted to the culture of the amateur, there have repeatedly been eager users who fall beyond the pale, and create alternative uses and networks of users. It is to the defence of alternatives at every level that the critique of Thatcherism must be directed.

Many commentators have observed that it is a misnomer to speak of the communications media: the media are used to prevent communication. But this is precisely because what Brecht said of radio in 1932 not only remains true, but in the age of microelectronics and the computer, and the promise of 'interactive information/entertainment', becomes even more pertinent:

Radio must be changed from a means of distribution to a means of communication. Radio would be the most wonderful means of

communication imaginable in public life, a huge linked system – that is to say, it would be such if it were capable not only of transmitting but of receiving, of allowing the listener not only to hear but to speak, and did not isolate the listener but brought about contact. Unrealisable in this social system, realisable in another, these proposals, which are, after all, only the natural consequences of technical development, help towards the propagation and shaping of that *other* system ... If you should think this is Utopian, then I would ask you to consider why it is Utopian.

Brecht, *Theory of Radio* (1932)

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