

**Motor ecology:  
the political chemistry of urban air**

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I

In interrogating the politics of information, Paul Virilio argues, we must be attentive not just to the content of a message, or its conditions of reception and production, but also to its *velocity*. In the military field, a concern with the speed, the logistics of perception has, in his account, displaced earlier preoccupations with the logistics of armaments. By the time of the 1939-45 war “reports lost their value within a few hours, or even a few minutes. If the secrets of war are always written in air, only high-speed transmission allows their importance to be usefully deciphered”<sup>i</sup>. A similar preoccupation with the instantaneous had, of course, been a key element of the identity and business strategy of the press since the development of the electric telegraph. The information derived from the telegraph was, Virilio notes, “targeted [at] a growing urban public more and more in a hurry: data transmission, the conveyance of travelers and goods for sale...the *literary chronicle*, the serial”<sup>ii</sup>

For Virilio the contemporary preoccupation with speed, however, has had unfortunate consequences. Far from increasing the quality of public intelligence it has resulted in the overproduction of information: an excess of visibility, an overexposure. “The faster the announcement effect, the more the announcement becomes accidental and insubstantial”<sup>iii</sup> At the same time, the zones defined by the flow of information have become detached from physical space. From this perspective, it makes sense to consider the topology of the contemporary city less in terms of the map of its roads and buildings or its architecture, than in terms of the velocity and flow of images, devices and persons. The city should be represented today as much in terms of *vectors* as in terms of lines and areas. In effect, two quite distinct urban strategies and forms have come to confront each other. “The first is primarily material, constructed of physical elements, walls, thresholds and levels, all precisely located. The other is immaterial, and hence its representations, images and messages afford neither locale nor stability, since they are the vectors of a momentary, instantaneous expression, with the all the manipulated meanings and misinformation that presupposes”<sup>iv</sup> In these circumstances, urban topography is now “paying the price” for the proliferation of immaterial technologies of

communication which lead to the “atomization and disintegration of surfaces and of all references”<sup>v</sup>

Certainly, we might wish to question further the justification for such an apocalyptic tone. However, whatever the level of his rhetorical excess, Virilio’s attention to the importance of electronic technologies to contemporary urban politics is an important one, as his recognition of the increasing disjuncture between the electronic and the built environment which may result. It is with these thoughts in mind that I explore the remarkable way in which the acquisition of immediate environmental information is expected to play a critical part in making it possible for both citizens and public authorities to manage the effects of their own behaviour on the urban environment. In effect, the acquisition of up-to-date pollution information is expected to translate both administrations and individuals into *agents* of environmental government. However, as John Law reminds us, agency is a precarious and uncertain achievement<sup>vi</sup>). It is certainly unclear, despite the political enthusiasm for the dissemination of environmental information, whether, or in what way, such information is able to provide the basis for responsible forms of environmental consciousness and action. If the frenetic activity of the city authorities is quite apparent, the agency of citizens is more difficult to ascertain.

This desire for immediate and accurate information about pollution, of course, may seem unsurprising and, indeed, commendable. According to Ulrich Beck we now live in a ‘risk society’ in which industrial and technological developments generate risks which can no longer be controlled by scientific means<sup>vii</sup>. No longer exposed to the same levels of social and economic deprivation which were once prevalent, the populations of the advanced industrial countries are increasingly preoccupied with the risks of scientific and technological development. The public demand and the media supply of information is, seen in these terms, a rational one. It is a reasonable response to the instability and unpredictability of complex and chaotic systems. Rapid and more or less unpredictable changes in such inherently systems are to be expected, so that although we can’t predict exactly when a particular shift will occur we should know it will happen sometime.

But along with a concern with problem of environmental government and the significance of up-to-date information, this chapter has a second, and in surprising ways a related, theme. This concerns the borders between the United Kingdom and ‘Europe’. What does it take for

particular part of the United Kingdom to become part of, or at least to be connected to Europe, and to the rest of the world? How can 'United Kingdom', a state which is so often figured in opposition to 'Europe' become, as political scientists would say, integrated? More generally, how are borders *effectively* redrawn or reconfigured, and not merely redefined in the formal declarations of treaties? How can the formal demands that borders be opened-up between nation-states be realised in practice? There is no doubt, no single answer to these questions. Facilitating the movement of citizens across national borders may be quite easily accomplished through the removal of passport controls, if there is the political will. And the removal of tariff barriers may be equally straightforward, even if it has complex economic implications. However, as the earlier chapters have suggested, the reconfiguration of the internal and external borders of Europe may concern much more complex technical problems. Here, in particular, I explore the way in which the border between the United Kingdom and Europe is being reconfigured through the introduction of a piece of environmental technology. In the case I consider the creation of an effective link between the United Kingdom and Europe is all the more remarkable for, as we shall see, the device in question does not, according to some, appear to work, and it comes from America.

## II

Drivers travelling along the congested main road from the West End of London towards South East England and the Channel tunnel (The Old Kent Road) pass a small sign "You are now entering an air quality monitoring zone". Below this text there are the emblems of the European Union and the local authority, the London Borough of Southwark, and a logo in the middle of which are the words "air aware"<sup>viii</sup>. Interspersed between public housing estates and petrol stations are a few large stores (Toys 'R' Us, Tesco, B&Q), drive-in McDonalds and KFC, and local shops which advertise cheap international telephone calls. This is an area marked by multiple lines of transit. On the other side and a little further along the road from the monitoring zone sign, next to one of the few green spaces in this deprived inner city area, is a much larger electronic notice board which gives information about the quality of the local air "in real time". Elsewhere in the borough there are smaller notice boards (in hospitals, neighbourhood centres and public libraries) which carry similar news.

The sign on the Old Kent Road is the only visible manifestation of the presence of the European Union in this area of London. It is also one

indicator of what has become a remarkable transnational political project. Air, along with a whole host of other objects, from sea water to meat are subjected to increasing levels of *continuous* monitoring. To be sure air quality has been, in London and elsewhere, a concern for some time. As early as 1821 a bill was put before the House of Commons to make it facilitate local prosecutions of owners of steam engines by parties suffering damage from their smoke<sup>ix</sup>. And following the infamous 'smog' episodes of the early 1950s which resulted, it is thought, in thousands of deaths, research on air pollution and its effects acquired a higher profile than it had hitherto<sup>x</sup>. Yet the intensity interest in monitoring, and the extraordinary level of public information which has resulted from it, is a more recent phenomenon. Monitoring stations have been established across London, and, by the early 1990s, had to form part of a series of both London and national monitoring networks<sup>xi</sup>. In Paris, by 1991, there were no less than eighteen air quality monitoring stations which could measure up to fifteen pollutants in "real-time" and thirty more on specific projects<sup>xii</sup>. In Berlin, there were nearly forty stations<sup>xiii</sup>. In the UK, the environmental pressure group *Friends of the Earth* (FoE) has continued to call for an increase in monitoring work, as well as putting in question some of the ways monitoring had been done. Moreover, encouraged by FoE and other groups, an increasingly environment conscious press criticised the Department of Environment for its failure to maintain an adequate monitoring programme despite an annual budget of £5 million<sup>xiv</sup>. More monitoring, it seems, led to greater political visibility of the 'air quality problem', particularly following the notorious smog episode of December 1991. In turn, this visibility contributed to the case for more monitoring. By 1995 the UK government, following a EU directive, demanded that all local authorities set up their own local air quality management strategies and establish air quality management zones. And both in order to promote public awareness and in the interests of open government, Department of Environment air quality data became freely available, in a frequently updated form, from the Department's own web site and telephone information line<sup>xv</sup>. The public needed to know both the good and the bad news. George Myerson and Yvonne Rydin note that a form of 'reassuring realism' is a common feature of official pollution texts<sup>xvi</sup>.

The concern to monitor, assess and inform was not just the product of a national political initiative, even if it has taken quite specific forms in different countries. Indeed, the recent surge in interest political interest in urban air quality may have begun in the state of California which, as Wyn Grant reminds us, "has been a global pioneer in the development

of urban air quality management strategies<sup>xxvii</sup>. But in the wake of the electoral performance of green parties in the 1989 European elections, such North American concerns became quickly translated across the Atlantic. The European Community, in particular, made the quality of the urban environment an object of a whole series of policy interventions and regulations with research programs being established in areas such as epidemiology and environmental telematics<sup>xxviii</sup>. This would lead, as one Commission official put it, to “empowerment through information”<sup>xxix</sup>. In this vein, the Commission’s 1990 Green paper on the Urban Environment called for more comparative information on the state of the urban environment in Europe, and more effort put into informing the “different sectors of the population of the Community’s policies and measures” through setting up a “network of urban local initiative centres”<sup>xxx</sup>. In this way, the environmental concerns of Europe’s urban populations and Europe’s urban administrations would be connected together. Increasingly the World Health Organisation also took a more active and influential concern with the state of the air<sup>xxxi</sup>, establishing a succession of guidelines for Europe, as well other parts of the world. In short, air - and the *urban air* in particular - became the object of a vast if not necessarily integrated global network of monitoring and research<sup>xxxi</sup>.

The ‘air quality monitoring zone’ in South-East London was established originally as part of the European Union LIFE programme<sup>xxxi</sup>. It was true that prior to this Southwark Council “had already invested in ‘state of the art automated pollution analysers to monitor *background* concentrations of significant pollutants (nitrogen oxides, carbon monoxide, sulphur dioxide, ozone and radiation)”<sup>xxxiv</sup>. There is no doubt the reasons for the remarkable interest in air quality in South London was the result of a complex set of quite specific local circumstances, actions and motivations. In particular, the Labour Party in Southwark were, unlike in most other areas of East and South London faced by a strong Liberal Democrat group in the council, and promoting ‘air quality’ provided one way of outflanking the traditional Liberal concern with environmental matters<sup>xxxv</sup>. But air quality was more than just an object of local party politics. For LIFE money would put Southwark not just ahead of other London local authorities in the development of air quality monitoring, but at the leading edge of current European thinking. It would demonstrate the usefulness of “advanced technology” to reduce air pollution *and* increase “public awareness”<sup>xxxvi</sup>. Indeed, the monitoring zone was just part of larger project funded by LIFE in Southwark. There was, for example, an exhibition at the Council’s Livesey museum on the Old Kent Road and videos and an interactive CD-ROM, produced with

the intention of fostering a new culture of environmental awareness amongst local schoolchildren. There was also sophisticated system for real-time air quality information to be networked via computer to local public research organisation: the South-East Institute for Public Health, which coordinated and compared air quality data from local authorities from across the capital. It was the pride of local Labour councillors. “Southwark Council wanted to do something positive for our residents” reported Councillor Nick Dolezal at an impressive conference held jointly by Southwark and the European Commission to demonstrate the achievements of LIFE at the recently opened Rotherhithe Holiday Inn, and attended by local authority representatives from throughout the UK, Commission officials and one Member of the European Parliament and hosted by Nick , presenter of the early evening popular TV show, *London Tonight*<sup>xxvii</sup>. At the conference I met David Lewis, secretary of the Royal Commission on Environmental Pollution. I indicated my scepticism of the excessive reliance on the accuracy and usefulness of the monitoring programme. He agreed. “So you’re a sociologist, very interesting...yes, we have had some discussions about Habermas on the Commission”. Later, a local councillor on his bicycle dodged aside as the television presenter left the hotel in his chauffeur driven Jaguar.

### III

The monitoring zone was important. But perhaps one of the most remarkable features of the local council’s effort to put itself at the forefront of the new air quality movement, were two experimental devices called FEAT and SMOG DOG<sup>TM</sup>. Whether it was due to their lack of any awareness of European developments, or the weakness of the European environmental technology industries Southwark officials had been drawn to the work US manufacturers. The Fuel Efficiency Automobile Test (FEAT) was promoted by its designer Don Stedman from the University of Denver, Colorado who met with Southwark Council officials at an Edinburgh hotel on a visit to Europe in 1993<sup>xxviii</sup>. SMOG DOG<sup>TM</sup>, which was similar in design, was developed and marketed by the American defence and aerospace firm Hughes Corporation at its Santa Barbara Research Center, and applied “advanced technology developed for environmental monitoring from space”<sup>xxix</sup>. FEAT and SMOG DOG<sup>TM</sup> promised to identify individual polluting vehicles and, moreover, to report the results in real-time. An infra-red source made it possible to gain data on instantaneous emissions of carbon monoxide, nitrogen oxides and hydrocarbons as the vehicle past by the detector, and an automatic licence plate reader (ALPR) could “translate and digitally record a vehicle’s alphanumeric

licence plate number from the video image<sup>xxx</sup>. According to its manufacturers, SMOG DOG<sup>TM</sup> had already proved highly successful in the US. Indeed, in April 1996 it was selected for the Association of Commuter Transportation *Best Product Award* at their annual Western regional conference in Los Angeles<sup>xxx1</sup>.

US remote sensing technology certainly played a critical part Southwark's bid for LIFE money. It was, according to Council officials and scientists associated with the project, the feature of the bid which made Southwark's project innovative at a *European* level. At a time when Southwark had almost no contact with the European Commission of whatever kind, and no European strategy, and no track record as a participant in European programmes, Southwark's interest in experimentation was considered to be crucial to the success of the bid. By being able to claim to be able to monitor the polluting emissions of cars *in real time*, Southwark could contribute to the emergence of an environmental (and technologically advanced) Europe at the same time as Europe could contribute to the health of Southwark.

The novelty of remote sensing was, no doubt, not the only distinctive feature of the Southwark bid. Another was the Old Kent Road itself. The Old Kent Road was the entry point for a significant proportion of road traffic from continental Europe coming into central London. It was the beginning of the A2 road which brought visitors to Britain from Dover, the Channel tunnel and the French and Belgian ports. It was a journey which, no doubt, some Commission advisors and officials may have been able, and may have had to experience. A continuous traffic jam for five miles. In maps produced by Southwark Council, the Old Kent Road is represented as a line running from London to the Channel, yet in its evident congestion and pollution it was certainly an unsatisfactory link to the Continent.<sup>xxxii</sup> Viewed in this particular frame, remote sensing could, at more than one level, at least ameliorate the impoverished connections between England and 'Europe'<sup>xxxiii</sup>. Elsewhere on the road, different networks were being maintained by private financial means. A few local businesspeople had taken advantage of the deregulation of telecommunications and opened up shops from which local residents could make cheap international phone calls: to the Caribbean, the USA, Turkey and the Phillipines. Here there was a disjuncture between the ethnoscares marked out by the frequency and destination of international phone calls, and the technoscape which was to be established through the development of a European network of environmental monitoring<sup>xxxiv</sup>.

In Southwark remote sensing technology was actually used in a quite specific way. In principle, FEAT and SMOG DOG™ made it possible to monitor the emissions from individual vehicles. To this end, the first experiments were conducted outside Pursers, the local *Volkswagen* main dealer, situated roughly half way along the Old Kent Road between the Elephant and Castle and New Cross, as well as on a number of smaller roads nearby<sup>xxxv</sup>. As cars passed the infra-red sensor readings were taken of the levels of emissions of carbon monoxide and hydrocarbons. At the same time, speed measurements were taken together with, an estimate was made of the age of the vehicle taken from a frozen video image of the license plate. In this way, the data collected formed one input into a series of studies concerning both the effectiveness of the monitoring and the polluting effects of motor vehicles.

Yet the objects of Southwark's studies were not, however, just the motor vehicles or the behaviour of remote sensing devices but the consciousness and behaviour of the *drivers themselves*. In a speech, British Prime Minister John Major had once declared that "every individual and every group will in future have access to the information they need, *in order to act as an environmental watchdog*"<sup>xxxvi</sup>. At a very immediate and practical level, remote sensing promised to help motorists acquire the information to do just that. Following a high reading by the remote sensing equipment a policeman would be instructed to stop the vehicle further down the road. As a local metropolitan police superintendent noted, apparently reworking the Prime Minister's canine metaphor, the police "added teeth" to Southwark's activities, even if they were not as sharp as they would like<sup>xxxvii</sup>

After it had stopped the vehicle was then subject to a road-side test with an idling engine which took the same form as the 'MoT test' required to be carried out on motor vehicles once per year by law. At the same time, the driver was given an information pack "explaining the polluter pays principle and the aims and objectives of the roadside emissions testing scheme"<sup>xxxviii</sup>. In this way, it was hoped that the driver would become 'exhaust aware', and hence be motivated to modify his or her behaviour. The Southwark watchdog, observing the constraints of the existing law, was intended to be benign in its behaviour to the motorist, however sharp its teeth might be. Indeed, the operation of the remote sensing device, it seemed, provided the basis for the driver to be 'hailed' or

interpellated, as Althusser would say, as a free and environmentally responsible citizen<sup>xxxix</sup>.

How effective could remote sensing be, in realising the complex set of expectations to which it was subjected? There was no single answer. In the United States it was said to have performed well and, indeed, to be in operational use in the state of California. Certainly, in its early publicity Southwark council had extolled the virtues of the new devices. The transport minister, Stephen Norris had launched what was called the 'air pollution machine' on 23 June 1994 at an event which was reported in the national press and national and local radio networks. And in 1995, a reporter from the BBC popular consumer affairs programme *WATCHDOG* was convinced enough to state that the Southwark initiative "was arguably the number one consumer story of the year...because every consumer has to breath this air"<sup>xi</sup>. Many more local and national press reports followed<sup>xii</sup>. This publicity was not just a by-product of the project, but an integral feature of it. For it was intended that remote sensing would not just alert the *individual* driver, but increase *public* awareness of the air quality problem and, hence it was hoped, contribute to a shift in public behaviour in general. A small experimental device was not just an instrument for the insertion of a London borough into Europe, but also for a much more far reaching political project directed at the problem of changing popular environmental consciousness.

Yet would remote sensing really prove as effective in the UK as it was said to be in United States? There were two reasons for thinking otherwise. On the one hand, in North America most vehicles were fitted with catalytic converters which were extremely polluting when the catalyst failed. In these circumstances, remote sensing might be a good way of spotting failed catalysts, but would it be of any use when applied in the UK where catalysts were less common? Second, in the UK, the MoT test, which was performed on a stationary vehicle produced quite different results to the remote sensing device. However, the device was used many vehicles 'failed' the remote sensing test, but passed the MoT test, or vice versa. This was not surprising. For the two test measured different things. In effect, the MoT test measured a particular vehicle, but in a way which could not correspond to the emissions of that vehicle on the road. And remote sensing only measured the concentrations of gasses emitting from a vehicle on the road at a particular moment in time. The results of a remote sensing test did not refer to a vehicle, but to *an event*. Given this limitation, could an image of a machine-event be

translated into an image of a machine at every moment? Was the idea that remote sensing actually detected polluting vehicles (and not just polluting events) an illusion which could be sprung on an unsuspecting public? Would the doubtless dramatic effects of remote sensing subsequently pale when subjected to further illumination by science or the law?

In the UK, a public controversy over the utility or otherwise if remote sensing had developed as early as 1994. The issue emerged during the inquiry by the House of Commons transport select committee into 'transport-related air pollution in London' in the June 1994. Prior to the report the government's own Transport Research Laboratory (TRL ) had already begun to test the new remote sensing technology, seeking to find out whether there was any correlation between the results of remote sensing tests and the (legally significant) measurements taken by the MoT test. According the Department of Transport the results of the TRL research, at the time, were not encouraging and "we see no immediate prospects of such a device becoming a practical reality"<sup>xlii</sup>. But in their memorandum to the committee the motoring organisation, the Royal Automobile Club claimed that the whole approach of the government research project was "misguided". RAC researchers had themselves used American remote sensing technology as "a research tool....to create the largest bank of information on emissions in Europe" which "identified very clearly the existence of 'gross polluters'" for over "half the emissions of carbon monoxide comes from only 12 percent of the vehicle parc" . In the RAC view there was not likely to be any exact correlation between the remote sensing the MoT test (because they measured different things) but this did not mean that remote sensing test was without value. On the contrary. "We see clear potential for the remote sensing of vehicle emissions within a roadside regime targeted at gross polluters"<sup>xliii</sup>. In short, remote sensing could be used by the police to stop and to fine drivers who failed to maintain there cars properly. To be sure, it was not a "technological panacea" but it was one of a number of measures which could make motoring more environmentally friendly.

The select committee agreed with the RAC. Stopping cars randomly was expensive, and in any case, despite the existence of the appropriate legal powers had not been tried to any significant extent. Moreover, the committee had noted the desire of the Metropolitan police to have a "suitable emissions detector" which would provide a reliable basis for stopping polluting motorists, for as the police had observed "people who

fail to maintain their engine also [frequently] fail to maintain other parts of the vehicle”<sup>xliiv</sup>. Far from being a device which little prospects of becoming a practical reality, members of parliament pressed for a vigorous programme of research into remote sensing technology in order to “*permit the Metropolitan Police to receive an early answer to their request for approval of an emissions detector*” (ibid., original emphasis)”. This was essential. For with only “a purely visual test of excessive emissions” (by the police) it would be difficult to fulfil the promise made by the transport minister at the 1994 Conservative party conference who, adapting the traditional vocabulary of law and order, had called for a “high profile national city centre crackdown on vehicles exceeding prescribed [emission] limits” (ibid., xl). If the government was going to be tough on pollution and tough on the causes of pollution, then it would need the appropriate scientific as well as legal instruments. This was completely at odds with the cautious conclusions of the TRL scientists. But they were unaware of the implicit criticism had made of their conclusions. Perhaps not surprisingly. For the duty of the government scientist was simply to give technical advice to ministers, not to engage in public debates about policy. Moreover, increasingly government scientists were seen as something like commercial contractors<sup>xlv</sup>. They simply carried out the terms of a contract to government. They were not responsible for the fate of their work subsequently. The domains of the technical and the political were, in this arrangement, clearly distinguished.

In Southwark, these positions were given a new twist, and different resonances. Southwark, along with most local authorities did not possess specialist scientific expertise in air quality monitoring<sup>xlvi</sup>. They therefore contracted a physicist from the University of Greenwich to conduct her postgraduate research work on the remote sensing device, although they were also able to draw on some support from TRL. The Southwark researcher was sceptical of the value of the remote sensing device. On the one hand, the figure of 12% “gross polluters” was highly misleading and had to be given a “health warning”<sup>xlvii</sup>. To be sure 50% of emissions measured by the detector did come from 10.9% of measurements but this did not imply that 10.9% of cars caused 50% of the emissions. For the emissions measured by remote sensing depended on a complex series of factors, including the speed of the car, whether the engine was cold and whether the road was congested or freely moving. In these circumstances it was quite difficult to determine whether any particular car was a “gross polluter”<sup>xlviii</sup>. This was clear when measurements of the same car were taken on a number of occasions. For according the

Southwark data, approximately 80% of vehicles which exceeded a given threshold for high emissions on two occasions have a third emissions reading that is below the threshold<sup>xlix</sup>. A car which appears to be a “gross polluter” on one or even two occasions is not necessarily likely to be on a subsequent one. There was some correlation between the results of tests on the same vehicle, but not that much. There was no doubt that some vehicles were more polluting than others, but it was unclear whether a particular fraction could be classified as “gross polluters”<sup>l</sup>.

In their official report on the project, however, Southwark council refrained from these rather sceptical conclusions. The various studies of SMOG DOG<sup>TM</sup> and FEAT classified as either “successful” (of which nine were) and “unsuccessful” (as one was). Whereas the researcher appears to have expressed considerable doubts about the utility and cost-effectiveness of remote sensing, these concerns were down-played in the official report which argued that remote sensing devices are “the most promising screening tools currently available” enabling them “to be used as a ‘green’ equivalent to the speed or ‘gatzo’ camera” which had already become a common feature of London’s roadsides. At the same time, remote sensing could provide an effective of acting on the elusive problem of bad driving style through raising awareness amongst polluting drivers of the effects of their behaviour<sup>li</sup>. Moreover, in publicity produced by the European Commission’s ‘Task force on priority information projects’, the inaccurate interpretation of the statistics of remote sensing experiments was repeated. “Research suggests that a minority of vehicles contribute a disproportionate amount of pollution, with perhaps 10% of cars generating 50% of emissions”<sup>lii</sup>.

Moreover, whatever its costs, remote sensing had one further advantage over other methods. It was remote. It did not discriminate on the basis of any *visible* feature of the vehicle and its occupants. Informally, it was remarked by some that SMOG DOG<sup>TM</sup> and FEAT could not be subject to the accusation of racism sometimes levelled at local police officers. Racism was a problem. Two years after the air quality experiments, British National Party posters were placed on the top of Labour election posters on the same stretch of the road. Officially, Southwark Council simply noted that although stopping older cars on sight might be a cost effective way of finding polluting cars but “it would lead to poor relations with drivers reducing the prospect of being able to work positively with motorists to improve awarenesss and change behaviour”<sup>liii</sup>. Remote

sensing was not just at the cutting edge of European environmental technology, it was democratic in its *indifference* to surface appearances.

It might be said, from this account, that Southwark (and before them the RAC) were guilty of a kind of cover-up, whether deliberately or unconsciously hiding the real deficiencies of remote sensing. Perhaps. But from a certain perspective such devices could work better than alternatives, especially given the financial costs of using expensive human policemen for environmental policing and the political dangers of discriminating against motorists simply because their cars were old. However unsatisfactory it was when scrutinised by physicists the authority the remote sensing device looked impressive in public. When given its role as an environmental watchdog, it looked as if it could *perform*. It is sometimes suggested that scientists and experts dominated public debate. But the situation here was that scientists *did not* have sufficient voice in public to question the enthusiasm for remote sensing even if they wished<sup>liv</sup>.

In any case, now that the environment was becoming an increasingly European and not just a national political problem the situation was different. When seen in *European* terms the cars in London could look rather unusual. They caused pollution when they were old, poorly serviced, badly driven, sitting in a traffic jams or accelerating rapidly. But elsewhere in Europe, cars were increasingly similar to American cars. Many had catalytic convertors. Unlike British vehicles, perhaps they could be classified into 'gross polluters' and others. Moreover, in its continuing, and no doubt overdetermined, enthusiasm for environmental telematics the European Commission pressed ahead with its research and development programme. Whether it was needed or not, Europe would be connected together by a dispersed network of real time monitoring devices. Remote sensing could supplement this fixed monitoring network. And, in this way it might have a practical role in improving the European environment after all<sup>lv</sup>.

#### **IV**

In what form should the information generated by all the various forms of monitoring be presented? What was its real audience? For *Friends of the Earth*, the immediate audience of monitoring was clear: the mass media. For the environmental organisation, monitoring provided a critical way of both raising public consciousness of the problem and putting pressure on the political authorities. Of course, FoE did not have, and could not afford to have, the scientific expertise to carry out a continuous

monitoring programme or, for that matter, the more experimental form of remote sensing tested in Southwark. But for many years the organisation had prided itself on the *scientificity* of its analyses<sup>lvi</sup>. Science was regarded as an effective political means of visualising environmental problems in the public arena. In this context, FoE would periodically produce what we might term spectacular measurements of pollution which were intended not so much to be part of any sustained scientific programme of measurement, but to simply display the existence of the problem<sup>lvii</sup>.

But if the audience for the occasional monitoring performances of the FoE was clear what was the audience which desired the regular, detailed and, without doubt, tedious information which could now be produced by the network of monitoring stations now operated by national and local government? There was no certain answer. To be sure, various governments had conducted surveys of 'public awareness' of the problem of smog, finding it, according to one local authority commentator second only to dog fouling in the popular consciousness of environmental problems. In a telephone survey commissioned by the Department of the Environment no less than 40% of interviewees had heard or read news about traffic pollution problems "recently"<sup>lviii</sup>. But knowledge of how or whether pollution information figured in the decisions and calculations of everyday life was very limited. The public authorities knew little about the conditions within which information was received or in what way it might be used by individuals to take responsibility for their actions<sup>lix</sup>. "Market research studies after summer smog episodes...suggested that, respectively, 10% and 18% of drivers surveyed said that they had decided not to use their cars on at least one occasion during the high levels of pollution"<sup>lix</sup>.

In any case there were reasons to doubt whether 'the public' could become *interested* in the monitoring project, at least as it had been first conceived<sup>lxi</sup>. In the first place, according to one report, the chemical terms used to express the results of monitoring were, for the most part, meaningless or misunderstood except by specialists. The public did not classify pollution in terms of entities such as SO<sub>2</sub>, NO<sub>x</sub>, ozone, particulates, PM<sub>10</sub> or VOCs. Detached from their network of connections to specific concepts and devices in the scientific literature the reference of these terms disappeared. Or drifted onto other objects such as the ozone layer. This did not mean, of course, that the lay public had no knowledge of pollution. Indeed, in a certain sense, public knowledge of pollution was as, if not more, complex as that expressed by government

agencies<sup>lxii</sup>. It referred to a whole series of causes (traffic, aircraft, sprays, fires, government policy and power stations), to effects (coughs, asthma, headaches, fatigue and irritability) and to visible forms (dust, haziness, fumes). Set against this complex body of understanding, officials statements on air quality seemed to have limited value. Indeed, far from being induced into action by up-to-date air quality information, the predominant response was one of “fatalism”. Even asthmatics and bronchitics were, according to the report, often indifferent to information for they knew anyway and could not do anything more<sup>lxiii</sup>. Perhaps all the efforts to increase the speed of information flow could have the opposite effect to that intended. Far from fostering a sense of agency and self-government, it seemed, it could lead either to passivity, or worse, to a sense of panic<sup>lxiv</sup>.

## V

Despite the expression of such doubts, they did not undermine the support for more monitoring and public information in policy circles. On the contrary. For in so far as such arguments are listened to they lead, if anything, to a search for a more comprehensible and *user-friendly* ways of presenting the data, and the development of approaches which are attentive to the needs and understandings of specific publics. Anthony Giddens has argued that there has been a general sense of a loss in public trust in abstract systems during what he has termed ‘radical modernity’, although he presents no evidence for this assertion<sup>lxv</sup>. But in this case at least, the problem was (and is) not that the public has lost its trust in science, but that the faith placed by the political authorities themselves in Science was misplaced. The political strategy of the political authorities was based on the idea that scientific techniques could provide precise and irrefutable accounts of the links between polluting chemicals and the health of the population. For only on the basis of such guidelines concerning ‘safe’ levels of pollution could the authorities, and the public, *act*. Yet the basis on which precise guidelines could be established was contestable<sup>lxvi</sup>. Potentially, at least these foundations of political action could be undermined, for good scientific reasons. At the very least they would have to be constantly repaired and replaced<sup>lxvii</sup>. Why? First, because in the case of some pollutants there were no ‘safe’ levels, and in the case of others the existence of particular ‘safe’ levels was simply an artefact of existing measuring techniques. Inevitably any estimate of what was ‘safe’ in the present, would have to be changed in the future. Second, because the link between measurable forms of air pollution and the incidence of some health problems (such as asthma) is difficult to establish or does

not exist, suggesting perhaps that increasing levels of asthma maybe caused by 'invisible' increases in allergens<sup>lxviii</sup>. Third, because existing ways of monitoring pollution do not measure the pollution which individual citizens have to breath. Pollution is monitored at particular *points* in the city yet the level of pollution will give a very misleading idea of levels of pollution in the city as a whole for such levels could vary "radically within metres of each other"<sup>lxix</sup>. Necessarily, an individual wandering through the city, driving a car or working on the streets would experience a quite different level of pollution to that measured by an electrical device operating in one place. What might be required would be an experiment which would estimate not pollution in one place, but measure the concentration of chemicals which might be absorbed into the body of an urban citizen *in motion*. The electrical device would move with the experimental body. Thus, the exposure of bodies to the chemistry of the urban air would have to continuously monitored. In such an experiment, the body of the citizen would be truly integrated into what we might call, following Elizabeth Grosz, the urban "information machine"<sup>lxx</sup>.

Yet there are further problems. For not only is urban space much more complex and multi-layered than one might imagine, so is the space of international scientific relations. Decisions about what should be taken to be good 'quality' air are made at a whole variety of levels - the national, the regional, and the global - and in a complex set of institutions from the World Health Organisation to the European Environment Agency<sup>lxxi</sup>. A gradual movement towards a 'world standard' is certainly desired. Moreover they rely on assessments derived from a series of scientific disciplines and techniques (air pollution chemistry, epidemiology and toxicology), the claims of which are controversial and uncertain in themselves and extraordinarily difficult to draw together. In these circumstances, there is always a possibility that differences in the position taken in an international level may be used to undermine the authority of national or local body or vice versa. Of course, considerable efforts are taken to ensure that there is international *harmonisation*. But this is a difficult achievement. Different administrations have, without doubt, different political cultures and priorities and different ways of deploying and drawing together the claims of different forms of scientific expertise. They face different political pressures, which may have little to do with a concern for the environment<sup>lxxii</sup>. It would be extremely surprising if there was any coincidental agreement between the approaches taken by different political bodies. At the Southwark LIFE conference in 1996, an official and scientist from Paris outline the

extraordinary sensitivity of the city's classification of air quality which was reported in no less than ten bands ranging from "excellent" to "very poor"<sup>lxxiii</sup>. For the majority audience it seemed that this confirmed the inadequacies of the existing British classification of air quality. But there was also, perhaps, a certain defensive amusement. For the extent of the difference between what good quality air meant in Paris and London seemed to undermine the possibility of making the kinds of distinction which, in Paris at least, were thought possible. Ten bands was excessively precise. The real quality of the air, and its effects on the population, has sometimes appeared remarkably elusive.

## VI

What makes it possible for an individual to become an agent? In what ways is it possible to draw on and enhance the capacity and the propensity of citizens to act, *in a responsible way*? There is, no doubt, the belief that, in a liberal society, agency is enhanced through information. If this is true, it should be possible to increase the sum total of (responsible) agency by increasing the quantity, accuracy and rapidity of the flow of information. By feeding information to the population as quickly as possible, the agency of individual members will be enhanced.

In this case, however, it is unclear in what way the agency of the public is enhanced, if at all. The evidence is uncertain. Certainly, the chemistry of exhausts and air has been made increasingly visible, although perhaps less so than some might imagine. And researchers have come to appreciate how complex the relation between this chemistry and the incidence of certain identifiable medical conditions might be. But the ways in which persons breathe, cough and cover their faces with masks is unrecorded. The ways in which individuals negotiate the city streets in a different way are never tracked. And the ways in which air pollution come to understand and experience are unknown. There is, it seems, a dramatic mismatch between what is known about urban life and what citizens are expected to know. It may not be too extreme to support the view, in this particular context at least, of Virilio or Baudrillard: that the quantity and density of information is simply indigestible. The masses may well be, in this context, "unable to make use of this useless hyperinformation which claims to enlighten them, when all it does is clutter up the space of the representable and annul itself in a silent equivalence"<sup>lxxiv</sup>.

But if 'public opinion' constantly referred to but seldom allowed to speak, other actors are given, in the semiotic sense, much more important parts

in this rather minor episode in the European drama<sup>lxxv</sup>. Here, it seems, the air itself and the various media which have been used to make it visible, have acquired more significant, and perhaps lasting, roles. On the one hand, 'air quality' has been turned from being a object of rather limited forms of research and regulation into a major issue of administrative and scientific reflection. It has become a real political problem, albeit one which is largely abstracted from all the other frustrations, dangers, inequalities, illnesses and costs associated with the creaking transport systems of our cities<sup>lxxvi</sup>. A complex set of institutions and instruments has been assembled together if in a way which can appear quite *ad hoc* but is, whatever its deficiencies, intended to make knowledge of the air available to anyone who wants to know, as far as possible and necessary, in real time. In some cases, this project has had further effects. The poor quality of the air has, according to the authorities, sometimes *required or demanded* a response whether on the part of the authorities themselves or the public, or both<sup>lxxvii</sup>. A much more extensive regime of environmental policing may, in these circumstances, come to be thought necessary. New devices may be required who are sharper and more responsive and alert, to supplement existing instruments. On the other hand, the air has been at the centre of a political mobilisation of a different order. It has come to serve, it seems, along with a number of other complex substances, as a critical element in a series of tentative, uncertain, but increasingly numerous connections between instruments of institutions of government across Europe, and beyond. In subtle, and scarcely visible ways the boundaries between the 'United Kingdom' and 'Europe' are, in this way, being reconfigured<sup>lxxviii</sup>.

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- <sup>i</sup> Virilio 1989, p.75
- <sup>ii</sup> Virilio 1995, pp.43-44
- <sup>iii</sup> *ibid*
- <sup>iv</sup> Virilio 1991, p.22
- <sup>v</sup> *ibid*, p.25
- <sup>vi</sup> Law 1994, p.101
- <sup>vii</sup> Beck 1992
- <sup>viii</sup> The display of the European Union symbol is remarkable in itself. Apart from on this sign residents of Southwark are only likely to see this symbol on cars and lorries from *other* European countries driving through Southwark on their way from the Channel ports.
- <sup>ix</sup> Flick 1980, p.22. On nineteenth century concerns with that state of the urban ‘environment’ see Osborne 1996. On the politics of air pollution regulation in other contexts and in relation to other problems see Ackerman and Hassler 1981 and Lundqvist 1980
- <sup>x</sup> Hall et al 1978, DoE 1993, p.i. Measurement of atmospheric pollution a national scale began in the UK in 1961, when a network for measuring black smoke and sulphur dioxide was established, Clark et al 1996
- <sup>xi</sup> Clark et al 1996
- <sup>xii</sup> CEC 1991, p.107-108
- <sup>xiii</sup> *ibid*. 111-113
- <sup>xiv</sup> D J Fisk, chief scientist to Department of Environment, *Independent on Sunday* 17 October 1993.
- <sup>xv</sup> Of course, the increasing concern with air quality was only one aspect of a larger movement of government policy and the emergence of a new ‘politics of pollution’ in the 1980s. For good accounts of this process, within the political science literature see, in particular, the work of Timothy O’Riordan and Albert Weale (e.g. O’Riordan and Weale 1989, Weale 1992).
- <sup>xvi</sup> Myerson and Rydin 1996, p.132
- <sup>xvii</sup> Grant 1995, p.74
- <sup>xviii</sup> See, for example, COST 613/2 on air pollution epidemiology ‘health effect assessment’ E U R 14346, nd. For documentation on European Community legislation up until 1992 see CEC 1992. As European Parliamentarians were right to point out the increasing efforts of the Community in promoting monitoring did not mean that any effective action was taken to reduce pollution levels in practice. See, for example, the debate that took place in the Parliament on 12 May 1992 concerning the Commission’s proposal for a directive on air pollution on ozone which as the Parliament rapporteur noted was really a directive on ‘monitoring air pollution by ozone’ (EP 3-418/98, 12.5.92)
- <sup>xix</sup> Boch 1997, p.14
- <sup>xx</sup> CEC 1990, p. 72
- <sup>xxi</sup> The UK Royal Commission on environmental pollution recommended that the UK should “achieve full compliance by 2005 with World health Organisation health-based air quality guidelines for transport-pollutants” (Royal Commission 1994, p. 36)
- <sup>xxii</sup> This existence various levels of Regulatory authority could cause political problems. For example, during a heat wave in 1995, the UK government was criticised for failing to notify the public when European and World Health Organisation standards were breached. “According to the commission and the WHO peoples lungs are adversely effected if ozone stays above 50 parts per billion for eight hours.....a DoE spokesman conceded yesterday

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that we recognise that adjustments to our warning system could be made” *Guardian* 4 May 1995

<sup>xxiii</sup> LIFE stands for Financial Instrument for the Environment. As is normal with EU programmes, the EU provided half of the funding for the Southwark project; the other half provided by the local authority.

<sup>xxiv</sup> Presentation by Bill Yoxall, Head of Public Protection, London borough of Southwark, ‘Breath LIFE into Europe’ conference, Rotherhithe Holiday Inn, 10 May 1996

<sup>xxv</sup> Interviews with Southwark council officials, Southwark, September 1996

<sup>xxvi</sup> The full title of the Southwark project (UK/93/3098) was “integrated environmental management scheme for air pollution in a strategic corridor” LIFE project directory, DG-X I, June 1995

<sup>xxvii</sup> presentation by Cllr Nick Dolezal, Chair regeneration and environment committee, London Borough of Southwark, Rotherhithe, 10 May 1996. It was also actively supported by local businesses including Sainsbury’s which was in a process of developing a supermarket which was positioned away from the main road in order to accommodate a huge car park, and Pursars, the main Volkswagen dealer in the area, and one of the larger businesses on the edge of the air quality monitoring zone.

<sup>xxviii</sup> Interview with David Solman Bill Legessick, Southwark Council, 20 September 1996

<sup>xxix</sup> Hughes corp 1996, p.1. The involvement of US defence electronics and aerospace firms in environmental monitoring technology dates back at least to the 1970s following cuts in the US defence R&D budget following the end of the Vietnam war (Bromberg 1991, p.211)

<sup>xxx</sup> Hughes Corporation “remote emissions sensor”, nd. The detection of nitrogen oxides was, at this time, very unreliable, Lucy Sadler, personal communication

<sup>xxxi</sup> *The Monitor*, September 1996, Hughes Santa Barbara Research Center

<sup>xxxii</sup> As George Orwell had noted sixty years earlier in returning to London from Paris, the journey through South London seems to symbolise the worst of England (in *Down and Out in Paris and London*)

<sup>xxxiii</sup> cf Strathern 1992, p.128

<sup>xxxiv</sup> Appadurai 1990, see chapter 2.

<sup>xxxv</sup> In total 18 days were spent using FEAT and 13 days using SMOG DOG on four sites in 1995-96. The sites were on the Old Kent Road, Abbey Street, Dog Kennel Hill and Neate Street. In addition one day was spent testing and demonstrating FEAT in Copenhagen (Solman (ed.) 1996 pp.32-40)

<sup>xxxvi</sup> Quoted in Lees 1993, p.110, my emphasis

<sup>xxxvii</sup> Southwark Council 1996

<sup>xxxviii</sup> Solman 1996, p.30

<sup>xxxix</sup> Althusser 1971. Although ambiguously. For, as Donna Haraway notes, interpellation has a double meaning. The subject is addressed as subject of the law. But, in doing so, the law may be asked to justify its actions. Interpellation means to hail, but it can also mean to interrupt. “With a double meaning typical of most interesting words, interpellation is also an interruption in the body politic that insists those in power justify, if they can” (Haraway 1997, p.50). It is a political act.

<sup>xl</sup> On the day of filming the equipment unfortunately did not work. BBC news management did not regard WATCHDOG as political news which was generally not concerned with either environmental or consumer affairs issues. As part of a restructuring of news and current affairs initiated by BBC director-general John Birt in the early 1990s WATCHDOG became

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part of 'features'. Serious *political* news was dealt with by a slimmed down news organisation. I am grateful to Georgina Born for pointing this out.

<sup>xli</sup> Solman 1996, p.76-79

<sup>xlii</sup> DoT 1994

<sup>xliii</sup> RAC 1994, p.2

<sup>xliv</sup> House of Commons 1994a, xxxix

<sup>xlv</sup> During this period, the Transport Research Laboratory had acquired the status of an 'Agency'. This meant that it, along with other government laboratories such as the National Physical Laboratory effectively sold its services to government through an internal market. It was subsequently privatised.

<sup>xlvi</sup> In London this had been carried out by London Scientific Services which was rundown following the abolition of the Greater London Council (GLC) by the Conservative government. Aspects of the LSS's work were taken over by a new organisation, the London Research Centre (LRC). However, in the field of air quality, local authorities derived support from the South East Institute of Public Health (SEIPH)

<sup>xlvii</sup> Lucy Sadler, London Research Centre, personal communication.

<sup>xlviii</sup> The idea that there were vehicles which could be called "gross polluters" was certainly widely accepted. According to Californian newspaper *The Sacramento Bee*, twenty per cent of vehicles on the road emit eighty per cent of smog forming hydrocarbons (Grant 1995, p.35)

<sup>xliv</sup> Sadler 1996, p.73

<sup>1</sup> If remote sensing was not as effective in identifying "gross polluters" as it had been thought then this also had implications for an assessment of its costs. Perhaps stopping cars randomly or by eye was not so uneconomic after all. The Southwark scientist reckoned that when you took into account the capital cost of SMOG DOG and the need for technical staff to set the equipment up one would need to stop between 4000 and 7000 cars before remote sensing became any cheaper than random stopping (Sadler 1996)

<sup>li</sup> Solman 1996, xv-xvii

<sup>lii</sup> 'Environmental protection in the United Kingdom: did you know that....', DG-X Task force on priority information projects Brussels: CEC, 1997

<sup>liii</sup> Solman 1996, p.68

<sup>liv</sup> Of course this is not unique to this issue. The case of mad cow disease or BSE is much more serious in this respect. On BSE see Radford (1996) and Wynne (1996) .

<sup>lv</sup> The 1992 European directive governing the harmonisation of the roadworthiness tests allowed for considerable room for divergencies in national testing regimes (CEC 1992). Remote sensing could play a part in the forthcoming European legislation which would aim to increase the compatibility between different tests. However, at the time of the Southwark experiment there had been little development of remote sensing elsewhere in Europe.

<sup>lvi</sup> cf Yearley 1996

<sup>lvii</sup> Interview with Tony Bosworth, Friends of the Earth, London, 5 September 1996

<sup>lviii</sup> BMRB 1994, p.3

<sup>lix</sup> For further discussion of the public reception of information see Corner 1991 & Barry 1993

<sup>lx</sup> McMullen 1996

<sup>lxi</sup> Actor-network theorists coined the term *interressement* to refer to the ways in which an actor is made into something like an interest (Callon et al 1986)

<sup>lxii</sup> This is supported by broad range of empirical work conducted by sociologists researching the 'public understanding of science'. See, for example, Wynne 1992, Irwin 1995, Michael 1995, Irwin and Wynne 1996

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- lxiii Hedges 1995
- lxiv The latter view was attributed to a senior government scientist
- lxv Giddens 1991
- lxvi Although they are given a formulation in the 1995 National Air Quality Strategy.
- lxvii The ways in which guidelines and regulations are modified in different countries varies considerably. For useful discussions of a growing body of work on regulatory science see Jasanoff 1990 & Wynne 1992. As Wynne notes, the UK approach has generally relied on the consensus of a small groups of trustworthy experts conducting discussions generally outside of any formal or informal public scrutiny (p.757). However, on occasions government scientific advisors do voice their concerns in the public domain. See, for example, the comments of Professor Anthony Seaton on the DoE's labelling of air quality standards 'Air quality levels are misleading' *Guardian* 7 December 1996
- lxviii Interview with Professor Peter Burney, St Thomas's hospital, Lambeth, 18 October 1996
- lxix Penn et al 1996, p.i
- lxx Such experiments have been performed by the Transport Research Laboratory and various other research establishments. According to Grosz "The subjects body will no longer be disjointedly connected to random others and objects through the city's spatiotemporal layout; it will interface with the computer, forming part of an information machine in which the body's limbs and organs will become interchangeable parts" (Grosz 1995, p.110)
- lxxi "New air quality warning thresholds backed by the WHO ...[are] expected to result in more warnings being given to the public" *The Guardian* 31 January 1997
- lxxii In a discussion of the politics of reducing vehicle emissions in Europe two commentators have noted that "the European vehicle emissions debate was about both technology choice and commercial competition....rather than environmental dose limits for ecosystems" (Boehmer-Christiansen and Weidner 1995)
- lxxiii Thibaut and Capporiccio 1996, p.27
- lxxiv Baudrillard 1988, p.211
- lxxv The sense that public opinion is considered to be something that is measured and represented rather than expressed is argued by Habermas 1989. On the semiotic notion of the actor (actant) see Greimas 1987, 106-120. For a fuller discussion of what one might mean in attributing agency to a device see Callon and Law 1994
- lxxvi As Yvonne Rydin has argued "the policy area of urban air quality management has been marked by the attempt of the state to resist pressure to act, to withdraw from responsibility, to turn away from the impossible problem without losing face" (Rydin 1997). The concern to monitor can be seen as a displacement of the problem.
- lxxvii See, for example, the series of measures outlined in the UK government's draft 'Air Quality strategy' which were heavily criticised (DoE 1995).
- lxxviii I am very grateful to Anna Hansell, and to Lucy Sadler of the London Research Centre for their thoughts on air quality science, and to Lucy for her comments on an earlier draft of this chapter.