

THE POLITICS AND POLLUTION OF BRITAIN'S WATER SUPPLIES

by

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Introduction

Water-supply problems in developed countries such as Britain differ substantially from those encountered in most of the Third World, but in all countries the renewable nature of water resources must be recognised, and they must be treated accordingly.

Only a small fraction of the water around us is directly usable : less than 3% is freshwater, and most of that is 'locked up' in ice or in the ground (1). Man's demands are imposed upon a relatively small volume of continuously recycled freshwater.

Water availability per person per year varies enormously from one part of the world to another, and so too do the uses to which the water is put. There are three main areas of demand for water : agricultural, industrial and domestic. In Third World countries, industrial demand is far less than that of agriculture, whereas the proportion going to industry in developed countries is rapidly approaching 50% of the total. Industrial and domestic waste-water is relatively easy to reuse, but most of the water supplied for irrigation is lost (1). The quantitative supply problems of Third World countries in dry regions are therefore particularly bad, and the need to reuse domestic water over and over again is a major aggravating factor in the widespread occurrence of water-related disease. The World Health Organisation (WHO) comments that "The number of water taps per 100 persons is a better indication of health than the number of hospital

beds" (1), and there is no doubt that the priority for Third World countries should be the supply of clean water to all their people. In attempting to achieve that aim, Third World countries are following in the footsteps of developed countries, which less than a century ago had similar aims.

Quantitative supply is no longer a major problem in developed countries, except in times of drought, but qualitative problems - of a rather different kind - still exist, largely as a result of man's recklessness. The once-problematic pathogens have been 'superseded' as the cause of trouble by a wide range of non-biological pollutants: toxic chemicals from industry and agriculture and from consumer waste. Attention is now focussed on the harmful effects of these pollutants, and on the ways in which contaminated water can be purified. I should like to consider in detail the various

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pollutants found in the public water supply in Britain; their sources; and the controls being exercised over their levels.

The British Situation

A. Pollution and Water Quality

Concern in Britain and the rest of Europe about pollution of the environment in general and of water in particular has greatly increased during the past decade - an increase reflected in the tremendous growth of the green movement. The 'Europeans and their Environment' survey conducted early in 1986 revealed that 'Water pollution... has assumed a greater importance in U.K. public opinion since 1982' (2) - and there is little wonder, since many inland waters in Britain are known to be affected by high levels of nitrates, phosphates, detergents, pesticides and other agrochemicals, organic compounds and metals from industrial effluents and dumped waste, and acid-rain-leached aluminium. In addition, some domestic water supplies are badly polluted by lead from piping, and many people are anxious about the effects of fluoridation. In the view of the German Greens, the quality of water is "the environmental indicator par excellence" (3), and it is a natural worry that the decreasing quality of our inland waters reflects more widespread pollution of the environment.

The nitrate problem in Britain has been getting steadily worse since the end of the Second World War as a result of a steep rise in the use of inorganic nitrogen fertilisers (4). Nitrates occur naturally, at low levels, in most waters, but leaching from farmland, encouraged by deep-ploughing practices, has led to such dramatic increases that in many water supplies the nitrate level now far exceeds the Maximum Admissible Concentration (MAC) of 50 mg/l laid down by the European

Economic Community (EEC) in its 1985 Directive on the Quality of Water Intended for Human Consumption (5, 6). The possible health risks of nitrate consumption are twofold: methaemoglobinaemia, or 'blue baby' syndrome, and cancer of the stomach, both of which are potentially fatal. In the former, which affects only young babies, nitrates are converted to nitrites in the gut, and these combine with haemoglobin in the blood, preventing it from carrying oxygen. The risks are greatest for bottle-fed infants, and it has been necessary in some areas to import low-nitrate water when nitrate in the local supply has risen to dangerous levels (5, 7, 8). The link between high nitrate levels and cancer of the stomach is less certain, but the conversion of nitrates to nitrites and their subsequent reaction with various food substances can give rise to N-nitrosamines, which are known to cause cancer in some species of animals (5). The risk is not one to be taken lightly, but the Government, in the absence of 'complete proof', has adopted a provocatively 'laissez-faire' approach. The nitrate problem could become much worse over the next half-century, with the possible explosion of the 'nitrate time-bomb'; a delayed effect of heavy nitrate-fertiliser use, resulting from the slow percolation of nitrates into underground aquifers (5). The introduction of measures to protect consumers from high nitrate levels is currently in hot dispute, as I will shortly discuss.

Nitrates are the cause of another form of water pollution: eutrophication, in which bodies of water become deoxygenated as a result of the growth of algal blooms (7, 9). Although eutrophication is more serious in ecological terms than as a problem for water supply, the resulting deoxygenation of the water severely reduces its capacity for self-purification (10) so greater treatment

is required.

Another inorganic nutrient responsible for eutrophication is phosphate. Many rivers in Britain are troubled by the release of phosphates from the treatment of synthetic detergents in sewage. Most of the detergents used in Britain are based on phosphate (very few phosphate-free detergents are available) and they account for nearly half of the phosphate found in sewage effluent (9). A few years ago, 'hard' detergents were the norm, and most were released undigested in sewage effluent, causing foaming of rivers and a decrease in oxygen uptake (7, 9, 10). 'Soft' detergents have to a large extent replaced them, and since these are more easily digested by the sewage bacteria, foaming is less common. The main problem now is the release of phosphate - and although 'phosphate stripping' of sewage effluent is possible, most sewage works do not yet have the necessary equipment (9).

Domestic sewage is not in itself acutely poisonous, but industrial effluent often contains highly toxic substances, and there are cases of industrial toxins such as phenols and mercury (5, 11) being released into public water sources. Even if levels of a contaminant in domestic water supplies are low, the cumulative effects of some, especially metals, make repeated reuse dangerous. Up to 80% of industrial water-demand is for cooling (1), but direct return of 'cooling water' to rivers causes thermal pollution - the deoxygenating effects of which are similar to those of eutrophication. Possible utilisation of the heated water in boosting the productivity of greenhouses and fishfarms has not yet been seriously considered.

The dumping of industrial and domestic waste on land often poses a serious threat to the cleanliness of public water supplies, sometimes to the

cleanliness of water which has already passed through the treatment works. Drums of hazardous wastes dumped in tips may corrode, releasing toxins into the soil. Certain liquid wastes such as oil, petrol and phenols are able to permeate plastic pipes, and may contaminate drinking-water supplies (5, 9). The dumping of all waste requires planning permission from country councils and licensing under the Control of Pollution Act. Regional water authorities have to be consulted about licence applications, but water pollution caused by dumped wastes still occurs. Recent reports from the Department of the Environments Hazardous Waste Inspectorate 'have revealed that the management of toxic wastes in Britain is in a dire state' (9). Even ordinary domestic rubbish poses a threat - in the form of liquid leachate oozing from the base of the dump. The organic material in leachate can have a greater polluting effect than raw sewage or industrial effluents, and dealing with it has become an urgent matter (12). Landfill is still the primary method of waste disposal in Britain, and most of the country's landfills are 'dilute-and-disperse' sites, where the soil is permeable and the wastes can seep out of the site. The assumption is that harmful substances will be 'attenuated' as they percolate through the soil, but some are in fact rendered more harmful, and dilute-and-disperse sites are recognised in most countries as major sources of groundwater pollution (5, 12).

Although industrial effluent causes severe river pollution in Britain, a 1986 report compiled by the Ministry of Agriculture and the Water Authorities Association concludes that farmers are responsible for most of the river pollution in England and Wales (13). 'The number of reported agricultural pollution incidents has increased annually since 1979 to reach more than 3500 cases in 1985'. Agricultural pollution includes not only the

nitrate problem discussed earlier, but contamination of water supplies by pesticides, slurry, and run-off from silage.

In its 1984 report 'Pesticides : The case of an industry out of control' (14), Friends of the Earth (F o E) refers to a detailed survey of farmers in Somerset, in which 91% of farmers answered 'Yes' to the question 'Does a watercourse flow near the areas of biocide application?' - an answer taken to imply that there is a very substantial water-pollution risk. Water-treatment methods are not capable of removing all organic contaminants, and even the water authorities accept that pesticides are finding their way into drinking-water (8). Chlorine in tap-water may react with pesticides and with other organic contaminants such as drug residues to produce potentially carcinogenic micropollutants (5). With the increase in pesticide usage that has occurred over the past decade (possibly a quadrupling on major crops since Britain joined the EEC), residents in many areas '.... have been subjected to an increasing load of pesticide pollution, such as water contamination....' (15). FoE describes the pesticide industry as being 'far from "high-tech"', 'adolescent' and 'rather primitive' : 99% of the pesticides end up not with the target pest but elsewhere'. In the survey mentioned above farmers themselves expressed awareness of low safety standards.

The problems posed by slurry and run-off from silage have increased with the increase in dairy-herd size and the move to keeping livestock indoors. In the absence of large areas of arable land on which to spread manure, many farmers run animal waste into ditches or spread it too thickly on fields, such that rain washes it into the rivers (7, 9).

I referred earlier to the cumulative effects of industrially-discharged

metals, such as zinc, chromium, copper, cadmium and lead, each of which has well-known toxic properties (16). Lead levels in domestic water supplies in Britain are highly variable, and much of the observed lead pollution comes not from industrial effluent but from lead water-pipes. A survey of lead levels was carried out in 1975-76 by the Department of the Environment (DoE) in conjunction with the water authorities, water companies, local authorities and the Water Research Centre. It was found that, where there was lead piping, lead levels at the tap could exceed the maximum recommended by the World Health Organisation, even though water as put into supply contained levels much lower than the recommended limit (17). Grants were suddenly made available for the replacement of lead plumbing, and water in certain areas was hardened, to reduce its ability to dissolve the metal. The action was belated and incomplete, and when the Royal Commission on Environmental Pollution produced its Ninth Report : 'Lead in the Environment' in 1983, it still found it necessary to call for greater remedial action against lead pollution (5).

Another metal with cumulative effects is aluminium, postulated to be a cause of Alzheimer's dementia. Evidence has come mainly from the study of kidney-dialysis patients, who receive excessive exposure to the aluminium in water (5), but other evidence exists (11). The establishment of a casual connection between aluminium and Alzheimer's disease would be alarming, not least because 'many water authorities in Britain are exceeding EEC limits for aluminium concentrations'. FoE points to the aluminium-leaching effect of acid rain, suggesting that 'acid rain (may be) causing the present rise in numbers of people suffering from Alzheimer's disease' (11).

The connection between aluminium

and Abzehimer's disease has come up in another context - that of water fluoridation. The results of a recent study in Sri Lanka suggest that even trace amounts of fluoride, whether in food or water, cause a significant increase in the release of aluminium from cooking utensils (18).

Water fluoridation itself remains a thorny subject. The case for fluoridation as a means of protection against tooth decay has often been presented, and there obviously are benefits - but there is also much data implicating fluoridated water in dental fluorosis, arthritis-producing skeletal fluorosis, bone deformities, gastrointestinal disorders, and, possibly, mutagenesis leading to birth defects and cancer (19). Despite this, the government continues to claim that the evidence against fluoridation is inadequate, and water supplies in parts of Britain are still subject to fluoridation - an imposition objected to by many people.

The carrying-through of pollutants from water sources into tap-water is giving increasing cause for concern in Britain, as is evident from the recent 'World in Action' television programme 'Poison on tap'. According to the programme, 5 million Britons are receiving water of quality lower than that recommended by the EEC - and one third of the population is dissatisfied with the quality of its tap-water (8).

B. Control and Accountability

Why are Britain's water supplies so polluted? Who determines the extent to which pollution is allowed and who keeps an eye on it? How much do the general public know about the risks they're being exposed to - and what can they do to improve the situation?

In 1987, the European Year of the

Environment, Britain - already renowned as the 'dirty old man' of Europe for discharging pollutants into its coastal waters and exporting sulphur dioxide and nitrogen oxides to Scandinavia - has come under renewed criticism for being 'dirty, wasteful and unthinking'. In its environmental-protection policy at home, the British Government has variously been accused of being secretive, using delaying tactics, and breaking the law-accusations which can be substantiated.

Policy on environmental protection is determined by ministers and civil servants in the Department of the Environment (DoE), but the activities of the Ministry of Agriculture Fisheries and Food (MAFF) are often relevant to the control of water pollution, since the influence of agriculture on the quality of our water supplies is so great.

At the practical level, the supply of clean drinking-water, the control of sewage and waste disposal into rivers, the monitoring of water quality and the prevention of pollution, the enhancement of waters for recreational use, the development of fisheries, and the provision of land-drainage facilities are the responsibilities of the regional water authorities and water companies, each of which is concerned with water management in a single river basin or catchment area (7). These bodies are grouped together in the Water Authorities Association and Water Companies Association respectively, so that they can coordinate joint action and discussions with representatives of the Government in 1983, with the passing of the new Water Act, the water authorities became free to exclude press and public from their meetings, and all 9 English water authorities have since gone into permanently-closed session.

Although water authorities are responsible for monitoring and controlling

water pollution, nationally-coordinated inspection and monitoring of environmental pollution is the responsibility of the Government Inspectorates, including the Health and Safety Executive Inspectorates and the various Pollution Inspectorates.

Recommendations on pollution and the environment are made to the DoE by the Royal Commission on Environmental Pollution (RCEP), a standing Royal Commission, 'with full powers to enquire into, and report independently on, any matters within its terms of reference', but without 'executive function' (20). In its various reports, starting in 1972, the RCEP has repeatedly argued for 'greater disclosure of information on pollution issues', but 'many of its essential recommendations have been ignored' (21). In its Tenth Report, it concluded that : 'there is a growing acceptance on the part of industry and pollution control authorities of the need to share information with the public' ; 'the sanctity of official data has become increasingly open to challenge' ; and 'authorities are expected to be more accountable, and the public is less willing to take things on trust' (22). One of the strongest arguments for greater openness put forward by the commission is that 'secrecy stands in the way of environmental improvements, and often produces unjustified public suspicion of both pollution control authorities and industry' (5). In December 1984, the Government accepted the Royal Commission's recommendation of 'a presumption in favour of unrestricted access for the public to information which the pollution control authorities obtain or receive by virtue of their statutory powers, with provision for secrecy only in those circumstances where a genuine case for it can be substantiated' (22).

In a discussion document published in 1985, the Health and Safety Commission expresses reservations about complete openness in regard to health and

safety information, since many industries provide the Health and Safety Executive with information only on the understanding that it remains confidential and that it will be safeguarded from competitors (23), - a reflection of the 'hand-in-glove relationship that has developed between industry, politicians and the Civil Service' (5).

That hand-in-glove relationship has been particularly apparent in the pesticides business, where attempts by FoE to expose the inadequacies in safety-testing were thwarted by industrial secrecy and the refusal of the Advisory Committee on Pesticides (ACP) to disclose information about pesticides it had - sometimes misguidedly - cleared for use (21).

The 1974 Control of Pollution Act was hailed as a responsible attempt to grapple with the problem of pollution, but its effectiveness has been repeatedly undermined by the granting of exemptions, a practice condemned by the RCEP when it becomes 'a mere device for postponing action on the nastier forms of uncontrolled discharge' (22). The provisions made for the opening of public registers containing details of discharges into rivers and estuaries were not made use of until 1985, more than ten years after the Act was passed. Even now, the public's right to examine monitoring data is restricted - mainly because an industry's own monitoring data do not have to be registered, and because certain information may be exempted from disclosure in order to protect trade secrets (5).

The Government's practice of obtaining exemptions has recently been adopted in an attempt to avoid having to take immediate action over high aluminium and nitrate levels in drinking water. The 1985 EEC Directive on the Quality of Water Intended for Human Consumption set an upper limit for nitrate even lower than that originally recommended by the WHO, and which Britain was already

in danger of exceeding (4). In 1983, the Government received a warning from its Standing Technical Advisory Committee on Water Quality that nitrate levels were increasing at an alarming rate, and that Britain would probably find itself in breach of the 1985 EEC Directive. The Committee was hastily abolished, with the Government deciding that reports on water quality would in future be produced only for the advice of ministers, and that they would not be published (5). In the face of the EEC Directive, the Government advised water authorities to 'treat the maximum limit as an annual average rather than a concentration never to be exceeded' (4) and proceeded to apply to the EEC for exemptions from the new standard. Derogations are allowed "in situations arising from the nature and structure of the ground in the area from which the supply in question emanates" - but in a recent British Geological Survey Report, commissioned by the DoE, the principal source of the nitrate problem in groundwater is given as "leaching from arable land" (6) - and even the Government accepts that high nitrate levels have little to do with the nature and structure of the ground (13). Friends of the Earth made a formal complaint to the Government in November 1986, accusing it of massaging the figures for nitrate levels (by averaging them over three months) and of failing, even according to its massaged figures, to comply with the EEC Directive. In addition, the Government is accused of applying for exemptions on false grounds, and in doing so of unacceptably putting public health at risk. The European Commission has threatened to start formal proceedings against the British Government (2), which should force it to take immediate action. The required action is unlikely to be to the taste of the National Farmers Union (NFU) which has been doing its best to suppress the whole debate, nor to that of the Fertiliser Manufacturer's

Association which stands to lose significantly if the intensive high-yield oriented farming practices of the past decade are restricted (6). Restrictions would certainly form a part of any water-protection-zone scheme, and the imposition of quotas or taxes to limit nitrate-fertilizer usage might well be involved. Taxes would help to cover the cost of installing treatment facilities for the removal of excess nitrates - an excellent example of the 'Polluter Pays' principle ostensibly supported by the present Government (4, 5, 24). In failing to tackle the nitrate problem when it presented itself, the Government can be seen as having attempted to save money and protect the interests of farmers and the fertilizer industry.

The nitrate problem is greatly aggravated, ironically, by the EEC's Common Agricultural Policy, which encourages the practice of high-yield farming. Rather than resorting to set-aside policies to tackle agricultural surpluses, the Government should be advocating a return to low-intensive, environment-friendly modern organic farming (9). Not only would that lead to a decrease in nitrate contamination of water supplies, but also in pesticide contamination, and in the extent of soil erosion (25). A spin-off would be the improvement in slurry-disposal facilities. At present, allowing slurry to run into rivers is a criminal offence under the 1974 Control of Pollution Act (9) but with their ability to invoke the 'GAP' ('Good Agricultural Practice') defence, farmers are effectively immune from prosecution, and 'would rather carry on polluting and pay a small fine (a few hundred pounds) than invest in prevention measures' (13). The MAFF's announcement in 1986 that it was to impose 'tighter controls on grants for managing farm wastes' has not helped alleviate the agricultural-waste-disposal problem.

The 'inadequate evidence' ploy sometimes used by the Government to justify its inaction on power-station emissions and acid rain is apparent also in its response to criticism of its landfill policy. Most other European countries now prefer incineration as a method of waste disposal, and landfill sites have to be lined. Despite this, and despite the prospect of having to cope with extensive and irreversible groundwater pollution, the British Government continues to favour the dilute-and-disperse approach (5, 12).

In their 1983 annual reports, five of Britain's water authorities admitted that Britain's water quality is deteriorating. Environmental Data Services forecast that "the prospect for further overall improvements in river quality remains bleak" (15). Little has been done since then to change the picture, mainly because of shortage of money, and the Government continues to procrastinate, to connive with the polluters and to put public health at risk.

If the Government does not of its own accord monitor water pollution and act upon its findings it must be pressured to do so. As in many other aspects of social welfare, the responsibility for drawing attention to the problems and campaigning for remedial action has fallen upon inadequately - equipped voluntary 'watch-dog' organisations such as Friends of the Earth (FoE) and the Campaign for Lead Free Air (CLEAR). The 1986 'Directory for the Environment' (26) lists hundreds of organisations (voluntary and statutory, governmental and non-governmental) concerned with managing or protecting the environment. Many of them are pressure groups, in the absence of whose activities much malpractice would go unchecked. According to the FoE Handbook their job is 'to pressure elected representatives, ministers, central government and local administrators, by monitoring the actions

of these decision-makers and by assiduously lobbying them to change their ways, by undertaking appropriate research and by submitting evidence, by putting forward constructive proposals as well as by putting the boot in where necessary, and by taking direct action where appropriate' (9).

It is really only through pressure groups that individuals can hope to precipitate the Government into action-but even pressure groups are incapacitated by limited access to relevant information, small wonder that over 25 organisations, including FoE, combined their anti-secrecy efforts in 1984 by establishing the campaign for Freedom of Information, in the hope that they would be able to force the introduction of new freedom-of-information legislation (21).

There are many groups in Britain involved in various aspects of water-quality control - some in campaigning; others in purely research or advisory roles; most at the national but some at the international level. They include the National Pure Water Association, which incidentally, is campaigning against the fluoridation of water supplies; CLEAR, whose interests are not confined solely to lead in air; FoE; the British Effluent and Water Association, which 'provides a forum for the discussion of problems of the water and effluent treatment plant industry by its leaders'; the Institution of Environmental Sciences; the International Society for the Prevention of Water Pollution; the Institute of Water Pollution Control; the International Association on Water Pollution Research and Control..... I could go on, but the message should already be clear; there are many concerned people, and many grounds for concern, and much too little reform.

Conclusion

If the facts of Britain's polluted water supplies were widely known, one might almost expect there to be a mass outcry - but most people live in blissful ignorance of the health risks to which they are exposed, and even if awareness were greater, the power - and even the will - of individuals to do something to improve the situation would probably be inadequate.

The sorry state of Britain's water supplies affects all of us, whether in industry, agriculture, government or the rest of society, and immediate collective action to control water pollution is vital if the health of our own and future generations is to be protected. Collective action means sharing the costs as well as the benefits of pollution control, and even though application of the 'Polluter Pays' principle might seem appropriate in industry and agriculture, neither of which has an inherent right to pollute the environment, the provision of incentives to be environment-friendly is likely to be more effective than the imposition of penalties for bad practice, since execution of the latter policy requires extensive monitoring and inspection. At present, industry is only too well aware of the immediate costs of controlling pollution; much less so of the long-term costs of not controlling it. The benefits of control obviously don't fall solely on industry (though the improvement in its public image is significant), which therefore has a 'strong political interest in opposing control' (27).

Providing industry with financial incentives to clean up its act is little good if the Government itself doesn't set a good example. Fining farmers for allowing slurry and silage run-off to pollute rivers while the Government doesn't do anything to change its groundwater-

polluting landfill policy is surely an hypocrisy - but then, the fines are really only a token, ineffectual gesture of reprimand, while the Government simultaneously panders to farmers and the fertiliser industry over the use of nitrate fertiliser. Seeing connections like that between nitrate pollution and the EEC's Common Agricultural Policy should help us to tackle water pollution more effectively, but in practice, major policy change is stifled because of the large number of vested interests affected. Britain's flouting of EEC directives such as that on water quality makes a mockery of the whole system, since it shows how powerless it is to enforce reform, or at least to enforce it without unacceptable delay. The onus for exposing Britain's failure to comply should not have to fall on the country's pressure groups.

A very real danger is that our belated learning of pollution-control lessons, such as the Green's admonition that "Water is not consumed but borrowed - and borrowed things should be returned in their original condition" (3), will be echoed in developing countries, and that non-biological pollution problems will arise there, if they have not already, even before the problems of fighting water-related diseases and supplying clean water to the whole population have been solved. 'In the scramble for affluence, too many developing governments (have) ignored fundamental issues like agriculture and land reform, the protection of natural resources and improving basic water and health facilities' (9).

'When the well's dry, we know the worth of water' (28) - but it is tragic that where we have come to take clean water for granted, we need pollution to remind us of its worth.

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