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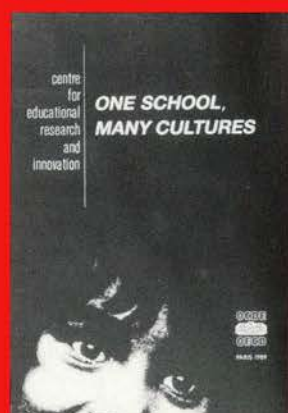
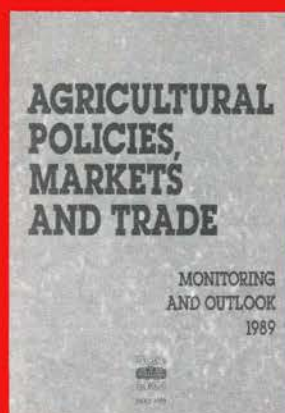
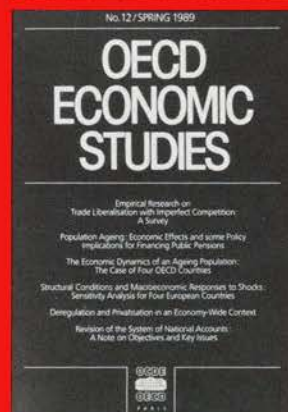
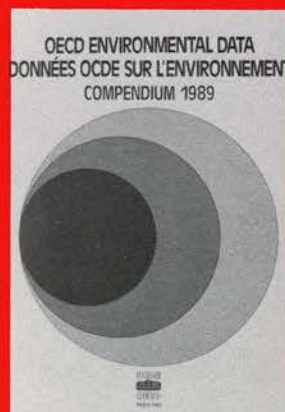
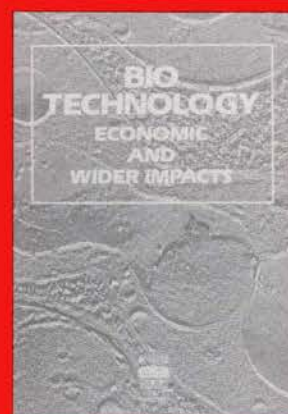
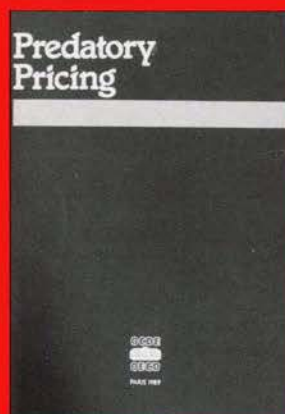
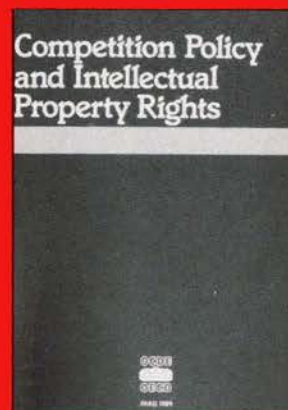
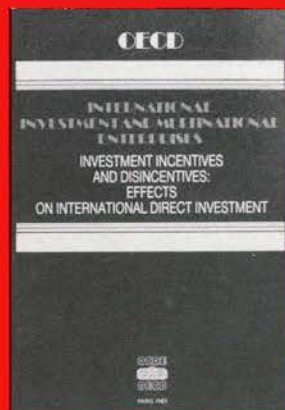
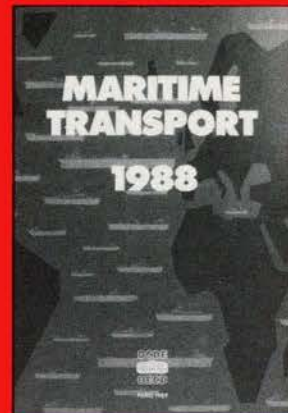
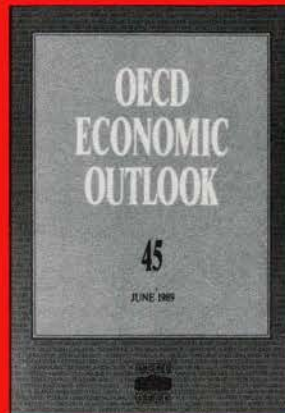
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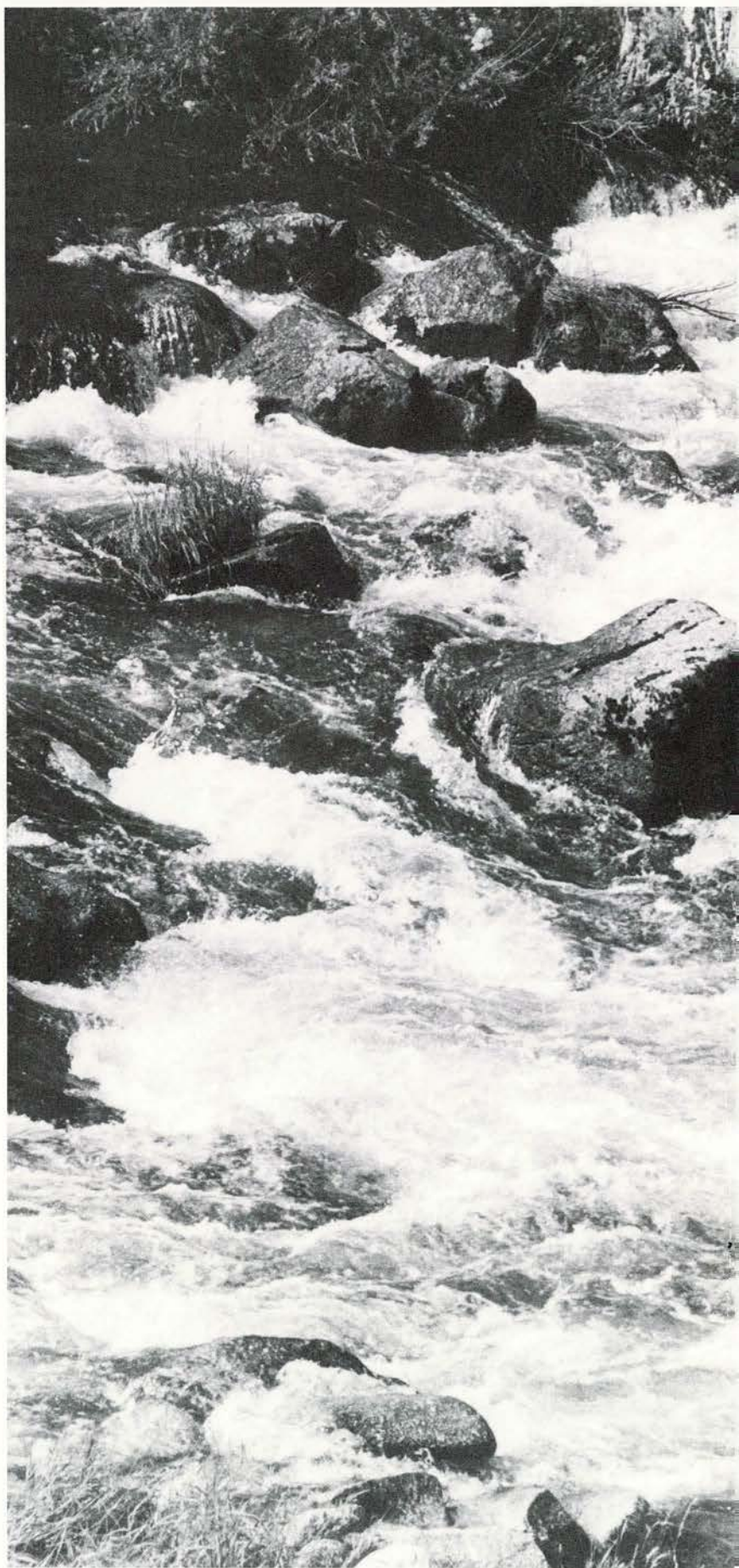


Water, water everywhere – and not a drop to waste. Yet the heavy subsidies paid to water consumption in OECD countries mean that prices do not reflect cost.

Water: Is There a Crisis?

Ferenc Juhasz

Water is both an economic commodity and an environmental asset. The way in which it is managed and maintained influences economic growth, public health, recreation and the enjoyment of rivers, lakes and coasts. One of the most dramatic advances in the health standards of the industrialised world was made with the widespread supply of clean, piped water and efficient sewerage services in the first half of the 20th century. How have water management policies developed since then?¹



The water services provided in OECD countries are many and varied: recreation, navigation, flood protection, land drainage, hydro-electricity generation, wetland management and, most important of all, direct withdrawal from, and direct discharges into, watercourses, including the provision of piped supplies to households and industry and sewage disposal facilities.

Two principal questions must be raised about current practices. First, are OECD countries spending too much or too little on water-related services—that is, how do the cost/benefit calculations for the water sector compare with other services and industries? Second, are water resources being maintained in a condition that will allow them, in quantity and quality, to continue to provide the services that are expected? Are they managed in a sustainable way?

The answer to the first question is obscured by the heavy subsidies paid to water consumption in all OECD countries: prices do not reflect the real cost. The predictable result is that water is often consumed non-economically and inefficiently—for example, in agricultural irrigation in the United States, Australia and Southern European countries, not least Spain. In many OECD countries water use more than doubled between the 1960s and the 1980s.

The answer to the second question is also mixed: in many OECD countries there has been a clear decline in the quality of surface waters (through nutrients) and in

groundwater (nitrate pollution), and the degradation of coastal waters (through sewage and oil pollution) occurs throughout the OECD area; but there have been some recent regional and local improvements in, for example, a number of inland lakes in European countries (Lake Annecy in France, Weissensee in Austria).

Quality Down the Drain

The failure of current policies in many regions can be seen in various ways:

- inadequate land and forest management have led to inefficient drainage and flood protection, with serious damage to property and reduced catchment of surface and groundwater
- demand for additional hydro-electric generation has resulted in reduced river flows, sedimentation, conflict with conservation objectives and the reduction of fish stocks
- important wetlands have been drained, with the loss of unique fauna and flora, and man-made obstructions to the recharging water-bearing aquifers
- direct abstraction and provision of piped water, provided at heavily subsidised prices, has led to its over-consumption, and in some cases to the complete exhaustion of high-quality unpolluted groundwater through low-quality use, such as irrigation
- direct discharges of industrial, agricultural and domestic sewage into surface and groundwater (box, right) have resulted

in pollution with bacteria, toxins and other chemicals and turbidity through sedimentation, making these waters unsafe or inappropriate for other uses without treatment

- opportunities for swimming and fishing in inland and coastal waters are becoming ever rarer because of degradation and reduced flows
- landfills containing household and in-

THE HIDDEN TIME BOMB

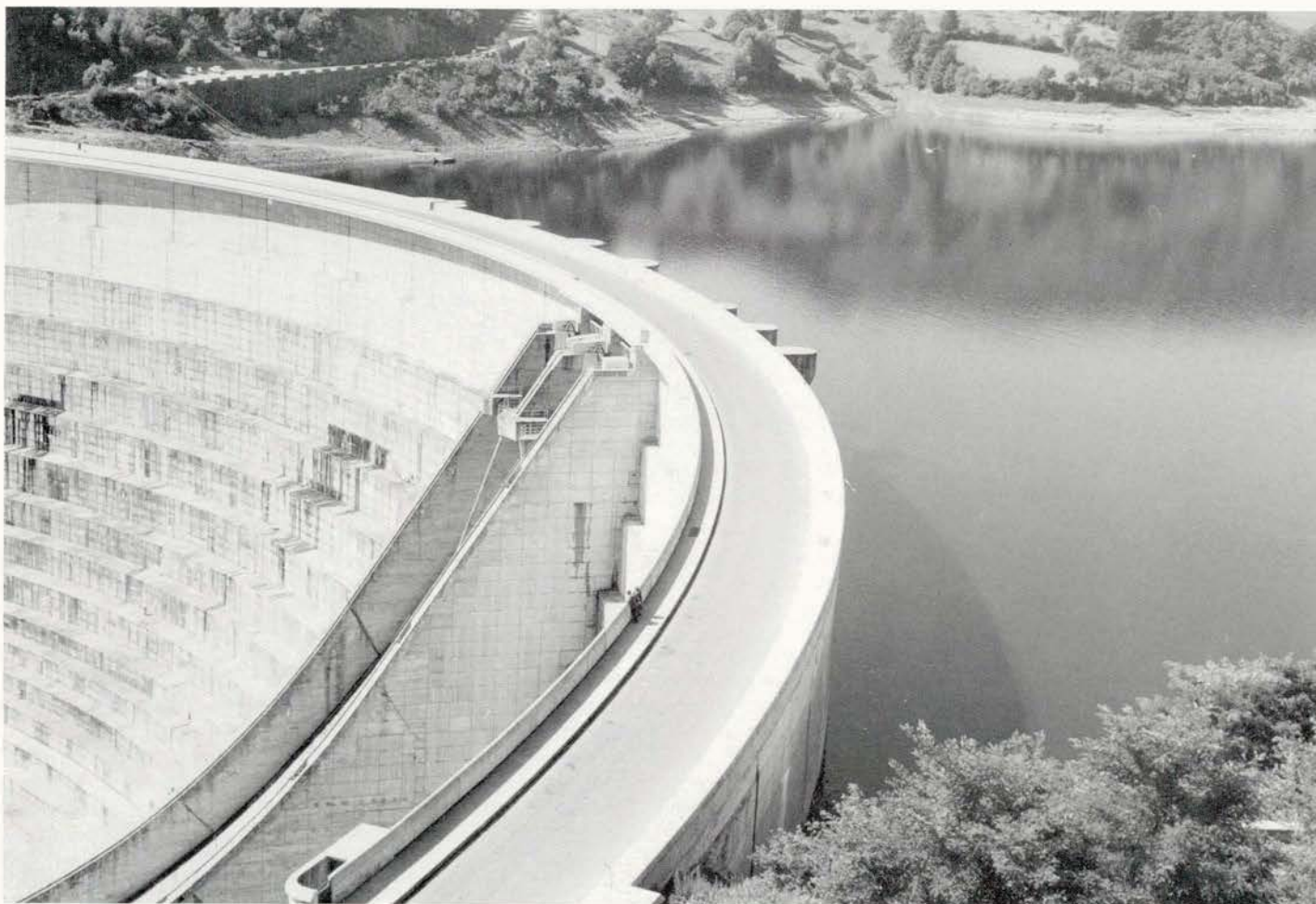
Groundwater, the unseen resource, provides high-quality drinking water and is a major source of irrigation and industrial water. In many areas it is being depleted faster than nature can recharge it. And it is sometimes so polluted that it has had to be abandoned as a reliable source of drinking water.

Groundwater is vulnerable to pollution from many sources: fertilisers, animal wastes and pesticides, septic tanks, underground storage tanks, waste sites, underground injection wells for toxic waste, chemical and other processing plants, mining and saline intrusion. Since some of these pollutants can take up to twenty years to penetrate the water table, the danger of cumulative pollution could be acute.

Rather slowly, OECD countries are waking up to this danger. They are gradually developing comprehensive strategies—in the United States, Spain and France, for example—aimed at long-term efficiency in resource use and at improved environmental controls. Groundwater should be directed only to high-quality uses, not least for drinking and specific industrial uses. Long-term depletion should be prohibited. Proper pricing, abstraction permits, and charges and direct regulations on discharges should be used and protection zones should also be established.

Ferenc Juhasz works on natural resources in the Environment Directorate of the OECD.

1. **Water Resource Management: Integrated Policies**, OECD Publications, Paris, forthcoming 1989.



The response to increased demand for water has been to increase supplies – often through big-budget infrastructure projects – rather than to rationalise demand.

dustrial wastes, septic tanks and underground storage tanks are now threatening the long-term security of groundwater supplies.

Five Sources of Failure

Water rights (box, right), government policies for managing water and for safeguarding its quality, and the administrative arrangements and market forces which affect water services vary dramatically between OECD countries. In spite of these differences, the causes of the present crisis, as it is recognised by several governments (Australia, parts of the United States, and in Southern Europe), are five in number and are common to most OECD countries: institutional failure, supply management failure, demand management and market failure, regulatory failure, and the failure of preventative measures.

Institutional Failure

National water policies might be thought to be well integrated by definition, not least because many of them are hallowed

THE RIGHTS OF SPRINGS

Water rights are among the most ancient in the legal systems of OECD societies and, together with laws and regulations, provide the legal framework management of both surface and groundwater. In many OECD countries (the United States in particular) water resources can be owned privately: the riparian system links ownership of water rights to ownership of the adjacent or overlying land; by contrast, under the doctrine of appropriation the water right is acquired by use. Public—i.e., government—ownership (United Kingdom, Canada, Germany, Australia) resources of water can be direct or indirect. Common ownership is a type of collective ownership by a group of owners, as with irrigation methods in Southern Spain.

Irrespective of ownership rights, governments can and should retain sufficient legislative power to ensure efficiency, particularly for pricing and environmental protection. To allow market forces to operate more efficiently some countries—the United States and Australia—have created markets in water rights and permits for water use, which can be bought and sold thus ensuring that water is used by those who value it most highly.

by age. But they are usually stated in the broadest possible terms, and often it is only during their implementation that contradictions and inconsistencies become apparent. The provision both of a secure food supply and of clean water, for example, might not seem to be contradictory objectives. But increased agricultural output can pollute surface and groundwaters alike.² Encouraging mass tourism without providing sewerage facilities can pollute rivers and coastal waters. In practice, national water policies contain many inconsistencies.

These discrepancies are often unresolved because the government agencies involved lack either the legal power, the incentive, or the institutional means to integrate their work with that of other public-sector bodies. Poor policy integration is common in the water sector: there may, for example, be different agencies responsible for managing ground and surface water, and they will not necessarily co-ordinate their programmes; similarly, there is often little contact between na-

2. See Ferenc Juhasz and David Juckes, 'Cultivating the Environment', *The OECD Observer*, No. 156, February/March 1989.

tional, regional and local water authorities. One of the most serious and damaging failures can result from lack of co-ordination between environmental and water authorities.

Supply Management Failure

The supply of water itself can change only over the very long term. The water cycle, allowing for climatic variation, is broadly constant. But the supply of services may be increased by the construction of more treatment, storage or transport facilities. In the past, indeed, water supplies have simply been expanded in this way to meet new demand—with little attention paid to the economic and environmental costs.

Not the least reason has been the huge degree of subsidisation by central, regional and local governments. As a result consumers and suppliers alike regard basic water services as very cheap. Unlike other public services, the policy response to increased demand for water has always been to increase supply rather than to improve the efficiency of consumption. The result has been systems that are too big, public funds that are wasted, resources misallocated and the environment degraded.

A second way of reconciling demand and supply other than by simple expansion is through supply-management. A supply system may be made more efficient by, for example, artificial recharge of

reservoirs and giving lakes and reservoirs new roles in regulating river flows through releasing water from them in periods of low flow. In this manner, more output may be obtained from a given system. But, for both natural and economic reasons—and because the bureaucratic and political benefits of such measures are not very visible—few countries have used this approach.

Demand Management and Market Failure

OECD countries have generally failed to respond to growing demand by not employing efficient demand-management policies. Such an approach would have kept demand at a volume that could be justified both economically and environmentally. But it has been politically convenient to provide hidden subsidies to various vested interests, in particular to certain branches of industry and to agriculture. The water industry preferred to increase supply rather than reduce demand since this approach provided large budgets for construction, pipelines, and so on. Proper management would inevitably have resulted in reduced demand and the postponement or abandonment of additional capital projects.

Five main groups of policies are at last emerging:

- pricing has been successfully used to influence demand for a number of services—

pipled water, direct abstraction, disposal, recreation, and so on. There is now a large variety of tariff structures: flat-rate charges are widely used in New Zealand, parts of

INTEGRATING POLICY

The integration of water policies with other areas of government activity has been successful in a number of countries, not least the Netherlands, France and New Zealand. What can be learned from their experience?

- Public political commitment by the government is essential—the policy objectives must be obviously compatible.
- The administrative authority and jurisdiction of each agency should be defined by legislation, which should provide a specific mechanism to resolve conflicts of interest.
- The boundaries and responsibilities of each agency have to be clearly defined, and overlapping responsibilities have to be resolved through an umbrella agency or similar mechanism.
- Integration must start at the initial stages of analysis and planning and be maintained up to the process of implementation.
- Incentives should encourage agencies to co-ordinate and penalise them when they fail to do so; their performance therefore has to be evaluated.
- Preventive strategies, from modifying farming practices to zoning groundwater protection areas, should be used more widely.
- Remedial strategies, including managing pollution in aquiferous rock strata, direct treatment of contaminated water, and even temporary abandonment of heavily polluted sources, should be made a coherent part of an overall, integrated policy.
- Links between agencies, often through inter-departmental committees, can use the existing institutional framework and have a good track record—where they have been attempted.
- A comprehensive array of regulatory and economic instruments must be deployed.
- Administrative staff should be properly trained in inter-agency negotiation and bargaining; some governments are actively encouraging this type of education, and staff recruitment occasionally specifies these skills as an essential qualification. In Norway and Finland qualification in public administration is a prerequisite for some jobs in environmental and water resource management.

Thanks to the degradation of coastal waters, a day at the sea-side ain't what it used to be.



Danish Ministry for Foreign Affairs



Siemens

Even though there have been substantial regional failures in water policy, there are many examples of co-ordination, environmental protection and effective demand management to be found in various countries (box, below).

What is Water Worth?

In almost all OECD countries either water is treated as a free good or, at best, the true cost is hidden from the consumer. Often the consumer pays a flat charge, well below the real cost even of delivery, let alone covering that of the water. As a result the consumer is implicitly encouraged to

MODELS FOR MANAGEMENT

Over 100 case studies by the OECD reveal that efficient management of water policies is clearly possible. The common element is the desire for more co-ordinated management. And there have been some spectacular successes.

The Murray-Darling catchment area, Australia

The Federal Government and four States established an inter-ministerial council in 1985 which ensures integrated water resource management over an area of 1 million km². By reaching agreement on allocating water use to each of the States, it has achieved not only sufficient water flows in lower reaches of the basin but also reduced its previously high salinity of the water.

Hydro-electricity, Norway

In the early 1980s a new policy approach was taken to co-ordinate energy supply, conservation, fisheries and land-use. The official recognition of the interdependence between these activities is a major step forward in water management, with long-term benefits particularly for the environment. A new administrative structure was established to achieve this goal, with a Steering Group and with sufficient financial resources and specific administrative jurisdiction.

Water supply in Washington DC, USA

Integrated management of the water sources and demand options has led to a reduction in the number of reservoirs to be constructed, thus preserving highly valued natural environment and producing substantial savings in construction costs. Integration was achieved through a complex process, requiring the creation of various co-ordinating bodies and strong local participation in evaluation of the costs and consequences.

Treating polluted water can be very expensive — and the consumer should bear some of the cost.

the Netherlands, the United Kingdom, Norway and Canada;³ average cost pricing with declining block tariffs in the State of Colorado; increasing block tariffs in parts of Japan and Switzerland, and also in Italy

- standards are often prescribed for the manufacture, sale and use of water appliances (e.g., taps, toilets, and the like)
- in peak or drought periods water is often rationed
- emission standards applying to the concentration or volume of discharges are also enforced through a variety of penalties in all OECD countries
- education to provide information on water use and conservation is a form of demand management, often used in conjunction with pricing and regulation
- increased flexibility in transfer of permits for water use can lead to more efficient use of available supplies, and is a new tool being used in certain countries, not least the United States and Australia.

Regulatory Failure

Most countries have environmental standards to protect water quality, but in many cases they have failed to implement them fully or effectively.

Most regulations are reactive, not pre-

ventative, in spite of years of criticism to this effect. But often the cost of cleaning up pollution becomes too high, and the responsible parties are unwilling or unable to pay for it. Groundwater can be prohibitively expensive to clean; or polluters who cannot be clearly identified (farmers, for example) will often refuse to accept responsibility. The 'Polluter-Pays' Principle should be used to pass the cost of clean-up or prevention to the polluters and thereby induce them to reduce pollution.⁴

Prevention Failure

Preventative policies would require government policies to be much more thoroughly integrated than they are at present. Some governments have therefore declared integration as a specific objective of environmental policy (box, p. 7), and have instituted an appropriate administrative framework. In the majority of OECD countries, however, vested interests, not least much of the existing administrative machinery, are actively opposed to it.

3. **Pricing of Water Services**, OECD Publications, Paris, 1987.

4. See pp. 10-11 and Jean-Philippe Barde, 'The Economic Approach to Pollution', **The OECD Observer**, No. 158, June/July 1989.



Unrealistically low water prices – often as a systematic part of government policy – can result in the wasting of high-quality water in low-quality uses.

use as much water as he likes. In other cases, as with agricultural irrigation, for example, water subsidy is a systematic part of government policy and is another form of subvention to the farming sector.

Demand for using water resources as receptacles for waste water is regulated mostly through permit systems. In other words, piped and/or direct discharges of effluents require a permit. These standards must be regularly monitored to ensure that they remain relevant, yet they are often weak, poorly monitored, or the penalties ineffective or not properly enforced.

Water pricing, if properly applied, could be the most effective instrument of demand management, reducing water use (and consequently operating and investment costs) and pollution, and improving conservation. By providing realistic price signals, it would also improve the integration of water-sector and other public-sector policies. If pricing is so wonderful, then, why is it not used more efficiently and more widely?

The 'right' price of water is not easy to calculate, although it is likely to be significantly higher than current prices in most areas. Theoretically, the price should cover the capital, operation and maintenance

costs of providing water services, the associated costs of maintaining environmental standards, and a premium for immediate rather than deferred consumption. This price should equal the value of the last additional unit of supply and thus the long-term marginal social cost. This is the ideal price that would lead to an acceptable volume of consumption and environmental maintenance.

But how can these figures be calculated, if at all? And will voters accept the price increases? Who should pay, and how much, for each service? First, the service has to be metered or measured in some other way than at present and consumers made aware of how much they are consuming. This is already commonplace with other services, like electricity, and the technology now available makes water metering an economic proposition.

Second, the consumer should pay the cost of supply, delivery, depletion and some of the treatment costs. Obviously, the costs of controlling pollution upstream should not be part of the price for water consumption, and a separate charge should be levied on the polluter to cover them. (In some cases, of course, the consumer and the polluter are the same, as with sewage.)

Under this kind of system, costs now paid by the taxpayer would be transferred to industry and agriculture, where they belong. Not surprisingly, these sectors are opposed to such a policy change. In some OECD countries farmers have demonstrated against the implementation of similar 'user pay' systems.

□ □

A strong institutional framework for good water management can be created at little cost. The regulatory and economic instruments are already partly in place, but they have to be applied more vigorously. The exercise of political courage could now help safeguard one of the most basic elements of a civilised existence. ■



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Environmental Accidents: The Polluter Now Pays

The 'Polluter-Pays Principle' (PPP) is now one of the fundamental principles of environmental policy in OECD countries. First adopted in 1972 by the Council of the OECD in the form of a Recommendation, the PPP was embodied in 1986 in the Single European Act. The PPP means, in essence, that a polluter must pay the cost of pollution prevention and control measures decided by the authorities.

But there are two points that, to date, have not been clear: the precise identity of the polluter, and who should pay in the case of residual damage, i.e., damage which arises when pollution has not exceeded the thresholds established by the authorities. The reason for the second of these lacunas is that the PPP was originally conceived in an economic rather than a legal context, with a view to making an economic agent, the 'polluter', pay for the costs arising from continuous, low-level pollution, such as 'normal' releases of gaseous or liquid pollutants.

The OECD Council has now adopted a Recommendation dealing expressly with *accidental* pollution originating from fixed hazardous installations. It provides that the 'potential polluter' is the operator of such an installation and that he should bear the cost of all reasonable measures taken to prevent accidents. If an accident should occur in spite of these measures, the person who must pay, quickly, for any control measures taken by the authorities after the event is the person 'at the origin of the accident'.

The domestic law of member countries usually defines this person as the operator of the installation; the OECD Recommendation supports this approach without

Henri Smets

The 'Polluter-Pays Principle' applies not only to continuous, 'normal' pollution, but also to that which results from accidents. How, and in what circumstances, can it be deployed?

considering it the only one possible. There is nothing to prevent the liability being channelled on to another person, such as the supplier of the equipment involved or the owner of the site, since it is understood that any control costs he incurs will be reimbursed by the person 'liable for the accident'.

The obligation to reimburse the costs incurred by the authorities is not an absolute one. For instance, it would hardly be in the spirit of the PPP for the operator to have to pay for the consequences of events for which he obviously cannot be held liable under domestic law (earthquakes, acts of war, and so on). These are the traditional grounds of exoneration in systems of strict third-party liability, that is, systems which make the operator liable for damage without requiring proof of any fault on his part.

The OECD Recommendation also defines how much 'polluters' should reim-

burse. In practice, they must repay the cost of all measures taken by the authorities to prevent an accident or, after an accident has occurred, to control the spread of pollution or clean up the environment. Two conditions have to be met: the measures must be 'reasonable', and 'directly' connected with the hazardous installation.

Under national law, certain measures taken by the authorities after an accident do not have to be reimbursed. This applies in particular to humanitarian assistance (emergency medical care, police action, etc.). The OECD Recommendation does not propose that this rule be changed; instead, it encourages national authorities to cease providing specialised services, such as the cleaning-up of contaminated areas, free of charge to polluters. The authorities must, on the other hand, bear the general costs of the services—notably health, fire and police—involved in controlling accidents and disasters.

The new PPP makes provision for exceptions designed to improve certain specific situations. Limited financial assistance may be granted to improve accident prevention in existing installations, for example; or preferential terms could be offered

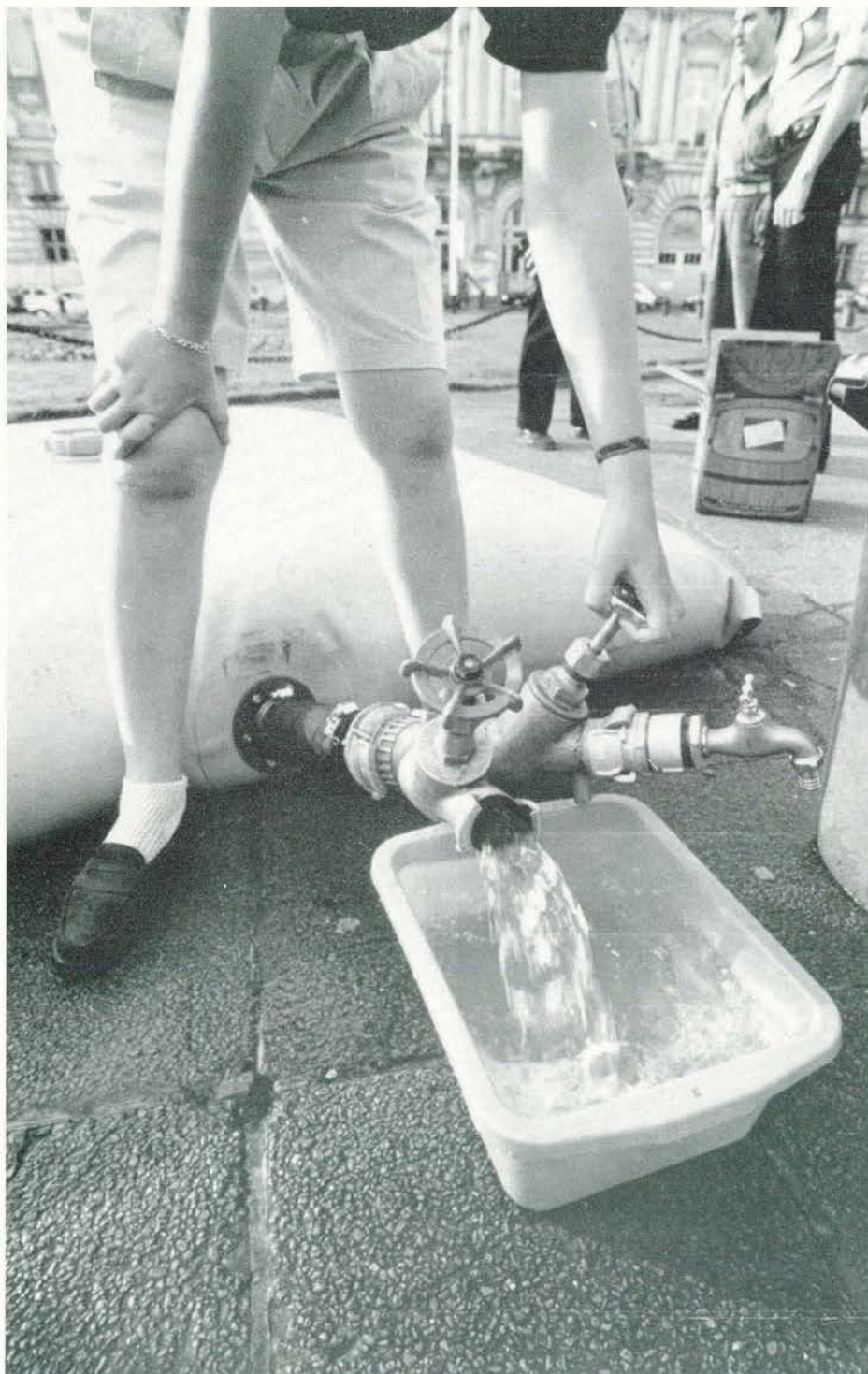
THE ACCIDENTAL POLLUTION OF THE LOIRE AND ITS TRIBUTARIES

In June 1988 a fire in a factory at Auzouer, in France, required the attention of specialised civil and military firemen. The water used to put out the fire polluted two tributaries of the Loire and caused widespread ecological damage along more than 45 km of watercourses. In several communities, the severity of this pollution required an interruption of the distribution of water for a week, notably in the town of Tours, where 155,000 people were affected. As a result supplies of drinking water had to be brought into the area and a large number of activities had to be scaled down or temporarily discontinued. According to the commission of enquiry, the total cost of the accident was 49 million francs, of which 15.5 million concerned direct expenditure. Spending by public services alone was 10.4 million francs.

Source: Ministry of the Environment, France, 1988.

Henri Smets is a specialist in the management of accidental risks in the OECD Environment Directorate.

Christian Bellavial/REA



The pollution of the Loire in June 1988 meant that large quantities of water had to be brought into the area.

to speed up the relocation of hazardous installations from industrial suburbs to more appropriate areas. Temporary exceptions of this type confirm the general rule that governments should not, in the long run, have to incur expenditure as a result of the presence of hazardous installations or of accidents involving them.

The OECD Recommendation follows the general trend towards making the beneficiaries, rather than the taxpayer, bear the cost of certain public services. For example, specific fees or taxes could be used to finance specialised licensing and inspection services for hazardous installations, and polluters could be made to pay the full cost of action taken by public services because of accidental pollution. Transferring these costs, which would not be burdensome for most of the installations concerned, would enable the state to play an effective role in the prevention and control of accidental pollution and to maintain well-equipped services, always ready to intervene.

□ □

From a legal standpoint, the Recommendation foreshadows the widespread adoption of strict third-party liability for all cases of accidental pollution by toxic substances and accidents involving hazardous installations, a development which would further extend the practice adopted for nuclear energy, the shipment of oil, and aviation and space activities. Work is under way in the OECD and other international organisations to ensure that polluters pay not only for public measures after an accident, but also for the damage suffered by victims. ■



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Aging Populations and the Pressure on Pensions



J.C. Thuillier/REA

People in the industrialised countries are living longer, but they are also having fewer children. Virtually throughout the OECD area fertility rates have fallen below the replacement threshold, estimated at 2.1 children per woman. From a very long-term perspective, this situation is necessarily temporary. But in view of the intensity of population aging, serious problems are likely to arise during the transitional period. Increasingly, there will be fewer and fewer workers to support an ever larger number of pensioners. Faced with this trend, unprecedented in the history of the industrialised world, governments are going to have to make choices and, first and foremost, consider the importance of an alternative way of distributing national output between workers and non-workers—one which would not endanger growth.

The OECD population projections are enough to make one's head spin. Assuming the possibility of a gradual increase in the birth rate towards replacement levels by the middle of the century, a small rise in life expectancy and continuation of present migration rates, the results are

Robert P. Hagemann

By the end of the first quarter of the next century, the number of workers for each retired person could fall from five to three in the OECD area, or even to one in some countries. What will be the consequences of such a development, especially for the financing of retirement pensions? A group of OECD economists has sought to answer this question.¹

surprising. By 2050, for example, there would be one-third fewer Germans and Danes than in 1980. Populations in Italy, Belgium and Switzerland would be 15–20% lower than they are today.

Not only are the populations of OECD countries projected to grow much less rapidly, or in some cases even decline—they are also going to age: the proportion of the population under 15 years of age will fall from an OECD average of 23% to 17% in 2030. At the same time the labour force will be aging; and above all, there will be a substantial increase in the number of people aged 65 and older. In Japan, for example, this age-group, which accounted for only 9% of the population in 1980, will reach 20% in 2030. And by the middle of the next century, one-third of the OECD elderly will be aged over 80. In other words, there is expected to be a 'squaring' of the population 'pyramid'.

A New Economic Landscape

Population aging affects the labour market, and therefore, production. But it also markedly changes consumption and saving patterns in those countries affected. In spite of the relatively vast literature on this topic, considerable uncertainty remains about the interaction of demo-

graphic and economic factors. And, in the absence of any historical precedent, only by analysing the ways in which aging affects the economy is it possible to sketch a rough outline of the economic landscape of tomorrow.

The Labour Market

The aging of the population, by altering the size and structure of the labour force, could in some ways benefit the economy. For one thing, since aging will mean a smaller increase in the labour force, it will reduce the supply of labour and could, other things being equal, lower the rate of unemployment. Moreover, an older workforce is, by definition, more experienced, and might therefore be more productive, thus commanding higher real wages.

On the other hand, questions arise as to whether an older labour force would be as able to adapt itself to new technology or, for that matter, whether a population that was growing more slowly would not



D. Dailloux/Rapho

by an increase in the amount of capital per worker and thus generates higher per-capita income. As a result, welfare is increased, and thus more resources can be transferred to retirees. But such models tend not to take into account the possible relationship between population and labour-force growth and technological progress, nor of the impact of national institutional frameworks, such as the tax structure.

Consumption and Saving

Another important question is the impact of aging on private consumption and saving and, by extension, on national saving and investment. Age is per se an important determinant of demand and preferences: an aging society consumes less

transport and education, more services and medical care. People, moreover, tend to save before retirement to finance their future consumption—the 'life-cycle hypothesis'—and thus changes in the age distribution could affect national rates of saving.

Initially—that is, between now and the year 2000—the rate of household saving in the large industrialised countries could increase, therefore, before falling again during the next century, especially in Japan and Germany where the demographic change will be particularly acute. Naturally, countries will not go through this transitional period in a synchronised fashion and there will no doubt be an initial financial flow from countries with surplus savings to those which require capital.

Financing the Transition

Demographic changes are usually slow enough for economic structures to adapt themselves to the new environment. But the transition the industrialised countries

1. Robert P. Hagemann and Giuseppe Nicoletti, 'Population Ageing: Economic Effects and Some Policy Implications for Financing Public Pensions'; Alan J. Auerbach, Laurence J. Kotlikoff, Robert P. Hagemann and Giuseppe Nicoletti, 'The Economic Dynamics of an Ageing Population: The Case of Four OECD Countries', *OECD Economic Studies*, No. 12, OECD Publications, Paris, Spring 1989.



USIS

reduce the rate of technological progress. What workers might gain in terms of jobs and wage increases could be offset by the occupational rigidities inherent in an aging society or the cost, for example, of vocational retraining.

This leads naturally to a question of interest to the whole community: will population aging generate more or less economic welfare? Standard neo-classical models generally emphasise that slower population growth is accompanied

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Bundesbildstelle, Bonn

Table 1

CONTRIBUTION RATES REQUIRED TO FINANCE PUBLIC PENSIONS: ALTERNATIVE POLICY OPTIONS

%	United States				Japan				Germany				Sweden			
1990	12.1	11.1	— ^a	12.1	4.6	5.2	4.6	4.6	13.5	14.3	13.5	13.5	15.8	14.3	15.8	— ^b
2000	11.9	11.5	— ^a	11.9	7.7	9.6	7.5	7.4	16.4	17.6	15.2	14.8	14.8	15.7	14.8	— ^b
2020	12.2	12.9	— ^a	12.2	18.6	15.8	16.1	14.6	22.4	23.0	19.3	18.1	20.4	17.8	19.0	— ^b
2040	16.8	14.8	— ^a	15.8	22.9	19.4	19.2	17.0	28.9	27.1	26.3	23.2	21.5	19.1	18.7	— ^b

a. All simulations for the United States take account of the increase in the retirement age provided for in the 1983 reform.

b. For technical reasons this simulation could not be performed for Sweden.

c. The simulations take account only of legislation already voted, except for Sweden where it is assumed that the rate of replacement remains constant.

Source: R. P. Hagemann and G. Nicoletti, *loc. cit.*

are currently experiencing is of another sort. The sudden increase and equally sudden drop in the fertility rate—the 'baby boom' and 'baby bust'—are important demographic shocks, the effects of which will be felt very rapidly and for a while. Financing this transition represents an economic and political challenge for the industrialised countries, since the elderly are the principal recipients of public transfer payments. Indeed, the 'social contract' for the transfer of resources between workers and the rest of the population is likely to have to be rethought, lest future workers be left to bear the whole burden of an older population. This is a delicate problem: an increase in contribution rates to finance pensions suggests that net wages decline, or at least grow less rapidly.

There are two main ways available to the state for financing a pension scheme.

- *Advance (or full) funding.* The authorities choose to finance the system 'in advance': the premiums paid by the future pensioners are set so that the value of total contributions equals the current value of all future costs. In other words, the pension scheme is fully funded, and each cohort's benefits originate from the stream of contributions and interest payments earned by the fund.

- *Pay-as-you-go financing* (more common than the previous type). Pensions are financed by current contributions paid by the labour force as a whole. This amounts to a transfer of purchasing power from workers to pensioners. Each generation of

workers transfers purchasing power to those already retired, knowing that future workers will do the same for them when the time comes.

Shocks such as the rapid and substantial aging of the population can adversely affect rates of return in either system. But the distribution of such effects across generations differs considerably.



Gerald Blomcourt

Under advance funding, the consequences of population aging are felt by future pensioners: the depletion of the capital accumulated for pensions puts downward pressure on future asset prices for a while, thus depressing rates of return and lowering future retirement 'benefits'. With pay-as-you-go financing, on the other hand, a substantial decline in fertility primarily affects future workers. The reason, of course, is that their contribution rates will have to be raised to maintain the same ratio of average retirement benefits to average current gross wages.

To measure the effects of population aging on public finances, two simulations were performed, first, to determine the likely evolution of contribution rates in four OECD countries (the United States, Japan, Germany and Sweden), and second, to examine three potential policy responses available to governments: constituting a transitional trust fund, raising the retirement age, and reducing benefits.

The first finding is that, although there is some variation between countries, large increases in contribution rates are required to finance future pensions, and that this burden will fall more heavily on some generations than on others. In all four countries studied, sooner or later, an adjustment seems inevitable.

How could this change be achieved under the three policies in question? The constitution of a trust fund to help finance the pensions of today's workers implies, initially, raising contribution rates. This approach, which differs from full funding *per se*, has the advantage of smoothing the transition during certain periods; but to

the extent that population aging becomes permanent it merely postpones the required adjustment problem. Since 1983, for example, the United States has levied higher contributions than currently required and is in the process of constituting a trust fund which should be very substantial. But once this fund is depleted near the middle of the next century, contributions will again have to be increased sharply to meet the requirements of a permanently older population.

Raising the retirement age and reducing benefits should make it possible to limit future contribution rate increases. If the statutory retirement age were raised by two years in Germany, for example, contribution rates would have to rise from 14% to 26% rather than to 29%. While it might be difficult to raise the effective legal age of retirement, a 'moral' justification for such an increase would be that it would increase the ratio of working life to life expectancy, making it more consistent with improvements in longevity.

Table 2
**VARIATIONS
IN REAL AFTER-TAX WAGES**
1985 = 100

	United States	Japan	Germany	Sweden
1990	101.9	101.0	101.7	101.6
2010	106.3	103.2	112.0	103.1
2030	105.3	99.6	109.2	99.7
2050	105.6	104.7	98.4	103.1

Source: A.J. Auerbach, L.J. Kotlikoff, R.P. Hagemann and G. Nicoletti, *loc. cit.*

workers (whose net wages decrease) and pensioners (whose pensions are lower than if they had been calculated on gross wages). If this policy were adopted in conjunction with a higher retirement age, the increase in contributions would be smaller still, from 5% in 1990 to 17% in 2040 in Japan (compared with 5% to 23% with no policy change) and from 14% to 23% in Germany (rather than 14% to 29% with no policy change).

increase in contributions might have an adverse effect on the rate of private saving.

If allowance is made, on the one hand, for the possibility of higher growth in real wages and, on the other hand, for the reduced financing requirements which might result from the smaller expenditure on young people—of whom there will be relatively fewer in the future—the 'burden' of the aging of the population seems lighter. Assuming a 20% reduction in pensions over a decade or so, and taking account of the new general economic equilibrium resulting from a demographic transition, real after-tax wages could continue to grow (and this is leaving out the additional impact of new technology). In such a way, future generations would find the transition more 'bearable'.

□ □

It is obviously important that the industrialised countries begin to address the question of population aging. Each year, fewer and fewer workers are available to support more and more pensioners, making it necessary to reconsider the 'contract' which unavoidably links the two. The longer governments delay in tackling the problem directly, the more difficult it will become to solve. If, some years from now, a referendum were to be organised on the issue, it is very likely that many inhabitants of OECD countries, a large proportion of whom will then be approaching retirement age, would oppose any compromise endangering their acquired entitlement.



Bundesbildstelle, Bonn

Reducing benefits is another possible approach. This could be achieved by calculating pensions in relation to net, as opposed to gross, wages. In this way, the increase in contribution rates associated with aging would be shared between

Such policies smooth the transition, but cannot altogether remove the difficulties. Nor are they without side-effects. One danger is that a large trust fund might be used not for its original purpose but rather to finance public consumption, or that the

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The Marriage of Broadcasting and Telecommunications

The three strands of the information technology industry—computing, communications and broadcasting—have evolved historically as separate sectors (Figure 1). But conventionally understood boundaries between them are now blurring as these sectors mature. The technical convergence between computing and telecommunications is well documented and, even if the process is taking longer than expected, it has already been widely anticipated through structural changes in policy administration and corporate organisation.

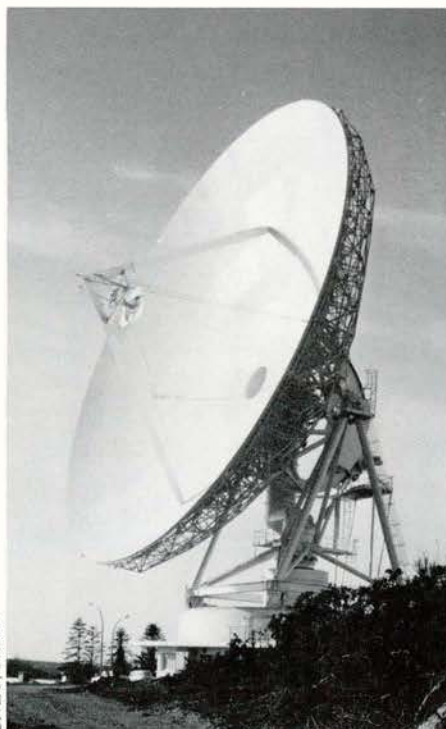
The convergence between telecommunications and broadcasting has been less well publicised but will have far-reaching implications. The boundaries between the two are largely artificial, since they are delineated by regulation rather than by technology itself. As a result it is policy-makers who now have the power to define or foreclose emerging market opportunities. The convergence is occurring in three ways.

First, technical progress in storing, communicating and displaying information in digital form is transforming transmission and reception equipment in both industries. The shift from analogue to digital switching occurred first in telecommunications, and now broadcasting organisations are also preparing for a massive new round of investment necessitated by the introduction of high-definition television (HDTV). Basic infrastructural hardware, such as satellites, fibre optic cable or terrestrial broadcasting stations, can be used to relay either one-to-one or one-to-many communications and the technical distinctions between the two forms of communication are no longer so rigid.

In receiver equipment, too, the use of Very Large-Scale Integration (VLSI) microchips has introduced a whole new range of 'intelligent' products and is forcing faster replacement cycles for established products. The familiar telephone and TV

Tim Kelly

The boundaries that distinguished communications media are disappearing before the advance of state-of-the-art technology. What are the likely implications of the convergence, specifically between broadcasting and telecommunications? What policy changes should be made now to ensure that the benefits of technological change can be fully realised?



CNET, France

set might one day be integrated into a terminal that can be used for either one-way or two-way communications.

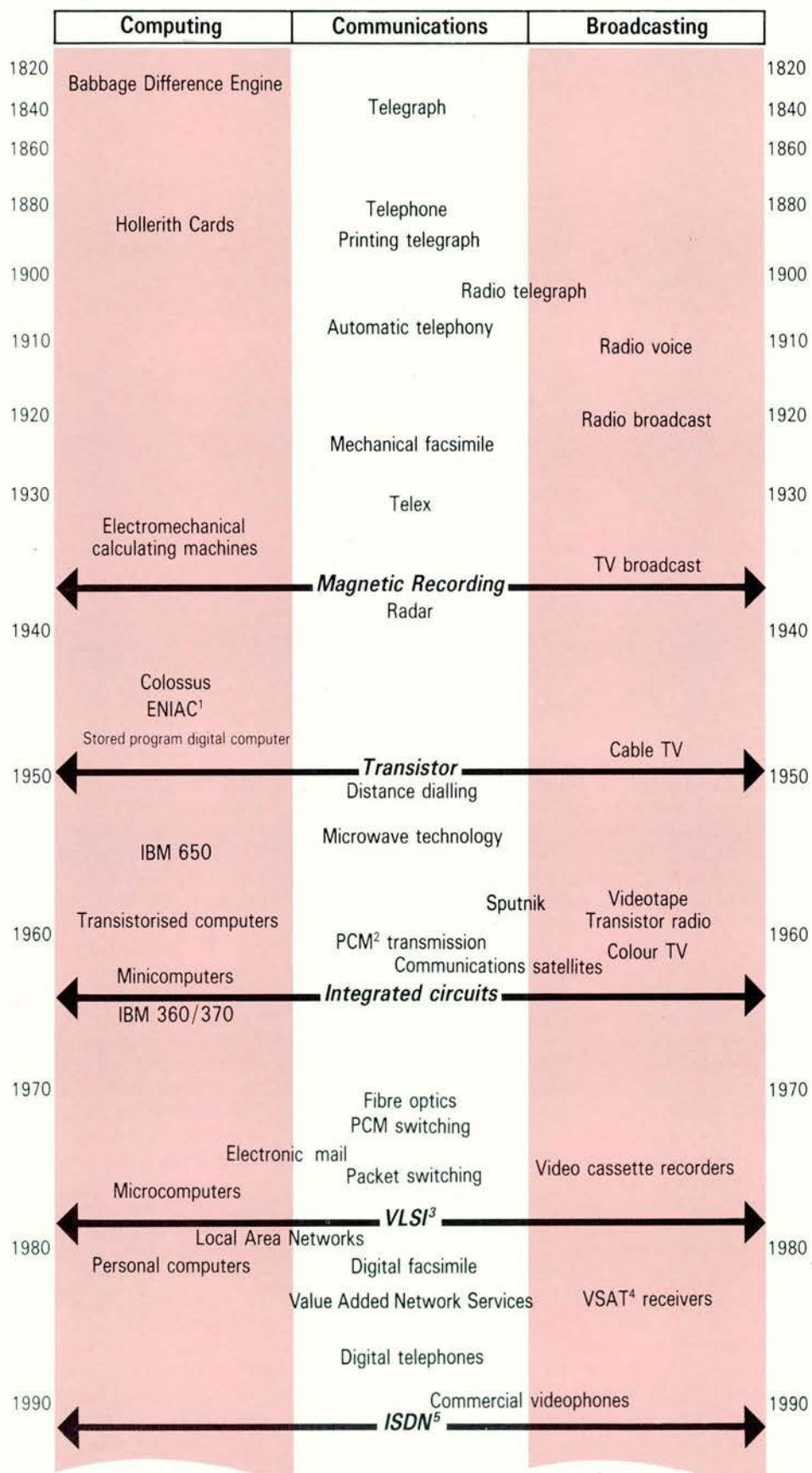
The second form that convergence is taking is in public attitudes to the functions of broadcasting and telecommunications. The convention that one is used for entertainment and education while the other is used for social and business purposes is no longer valid. Closed user-group broadcasting (or 'narrowcasting') is increasingly being used as a business tool (for example, to relay company information to staff) or as an interactive medium (for instance, in tele-shopping). Similarly, data broadcasting is used by a number of organisations to transmit information simultaneously to a wide audience (as with horse racing results).

In telecommunications, on the other hand, the promotion of many new services is being entertainment-led (such as recorded-message telephone services or the 'kiosque' service available on the 'minitel' in France). If the enhanced picture and sound transmission qualities of the next generation of digital public telephone networks are to be fully appreciated, residential applications for entertainment will have to be developed alongside business uses.

Third, there is a corporate convergence between the activities of broadcasting and telecommunications in the sense that individual companies are now addressing both sectors. For instance, the Japanese electronics multinationals in particular are more vertically integrated than their European and North American counterparts, with interests in the manufacture of consumer electronics as well as computing, telecommunications and component production. They may therefore be in a better position to exploit opportunities created through the convergence of communications technologies.

On the services side of the industry there is a clearer separation of functions

Figure 1
THE INFORMATION TECHNOLOGY INDUSTRY, 1820-1990



at present, though the trend for public telecommunications operators (PTOs) to buy minority shareholdings in cable operators and for the emergence of diversified global communications companies (e.g., Maxwell Communications, News International, Berlusconi) may lead to closer integration in future. Similarly, the recent take-over by the Japanese consumer electronics manufacturer Sony of the recording interests of CBS of America may portend a merging of the hardware and software sides of the communications industry.

New Directions for Policy

These three processes—technical, functional and corporate convergence—are posing new questions for policy-makers. In particular, there are substantive policy issues concerning:

- the formulation of an appropriate regulatory framework for competition between telecommunications and broadcasting service operators
- the development of new technology and associated standards
- the promotion of new services.

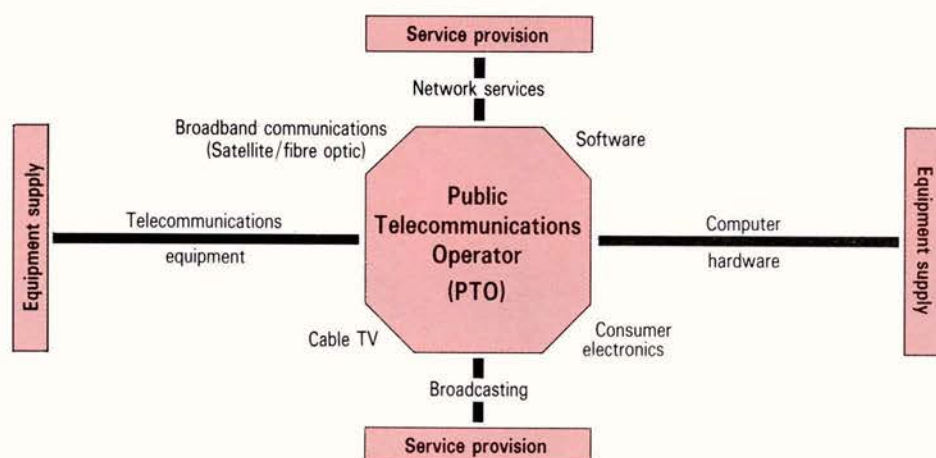
The Information, Computer and Communications Policy (ICCP) Committee of the OECD plans to launch an analysis of the questions of competition and complementarity between communications technologies. The project will aim to determine, for each OECD member country, who are the main players, what are the regulatory limits to their activities and what are the likely markets in which they will compete. The country-by-country analysis will be complemented by a thematic approach focusing on such broad issues as whether there is scope

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1. Electronic Numerical Integrator and Computer.
2. Pulse Code Modulation.
3. Very Large-Scale Integration.

4. Very Small Aperture Terminal.
5. Integrated Services Digital Networks.

Figure 2
**THE PUBLIC TELECOMMUNICATIONS OPERATOR
 IN THE INFORMATION TECHNOLOGY INDUSTRY**



for cable operators to compete in local telecommunications services, whether satellite operators can offer competition in long-distance telecommunications services, and to what extent PTOs can offer moving image (video-based) services.

A second aim of the research will be to assess different policies designed to encourage the take-up and diffusion of advanced communications services, both commercially and domestically. The key question here is whether the provision of new services should be led by demand or supply. In other words, should the basic infrastructure of fibre optic cable and/or satellite links be established in anticipation of, or in response to, consumer demand? Ambitious plans for a transnational broadband backbone (TBB) network have been discussed in Europe and elsewhere, and there have been several projects to calculate the costs and benefits of such investment; the results will provide important inputs to the OECD project.

The third focus of the research will be to describe regulatory procedures in OECD member countries. In a number of countries the regulatory status of the national PTO has changed recently, raising new questions as to the appropriate format for determining and implementing policy objectives.

PTOs are both providers and major pur-

chasers of equipment and services and are therefore in a unique position to influence the wider information industry (Figure 2). Policies aimed at encouraging competition for the PTO are sometimes associated with measures to restrain its power to impede nascent competitors through exploitation of its quasi-monopoly. On the other hand, the PTO may be encouraged to diversify into new activities, both sectorally and internationally, to compensate for lost telecommunications revenue. Policies which attempt to separate the activities of PTOs from broadcast network operators may be inefficient if they deter or duplicate infrastructural investment but they may still be necessary on the grounds of competition policy.

The issue of convergence raises the broader question of how society will cope with the burgeoning demand for, and supply of, information. Broadcasting services have traditionally been highly regulated because of their potential for use as a medium for propaganda or for the transmission of material which most people might find offensive, or because of the fear that the large-scale importing of TV programmes might 'dilute' national cultures or endanger domestic producers.

Ironically, the 'success' of many of the new telecommunications messaging services is based on the fact that they bypass

such regulations and can offer services of dubious morality. Equally, the telephone service offers a highly targeted medium for advertising purposes (tele-sales) but in a manner which intrudes much more on personal privacy than advertising by television or radio. 'Junk fax' messages, indeed, have begun to become a nuisance in the United States, Japan and elsewhere, and there has been much discussion about whether they could, or should, be banned.

The question therefore arises as to whether it is the medium or the message that should be regulated and on what criteria such regulation should be based.

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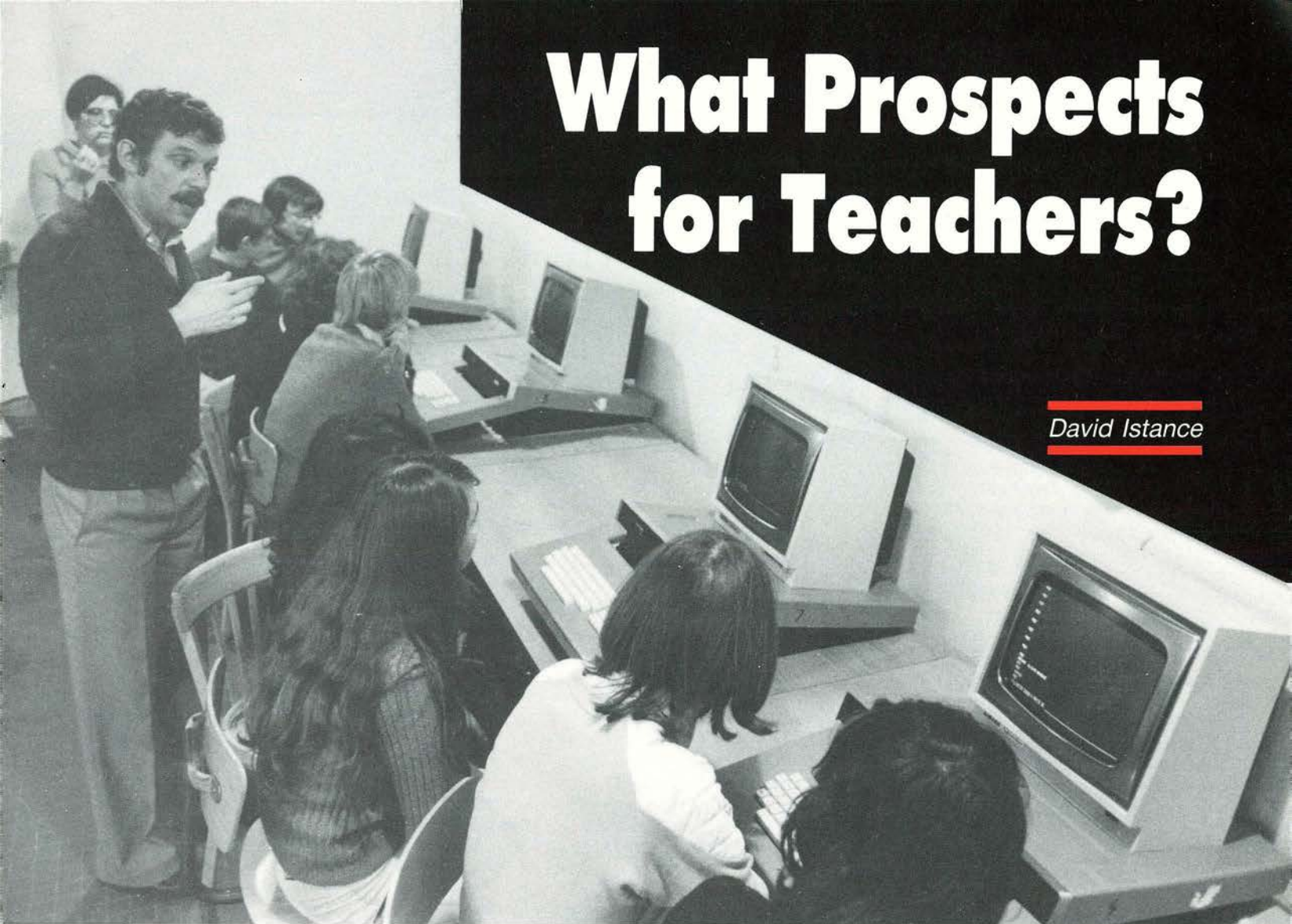
At this stage of the research it is more important to identify the questions that should be asked than to suggest possible answers. The OECD Secretariat is therefore now beginning to contact interested parties with a view to their participating in the research project; it is also starting to investigate research already undertaken in member countries. Preliminary soundings indicate that there is considerable interest in this topic, as well as a sense of urgency. International co-operation will be essential to find solutions to the many cross-border issues raised and to share common experience on effective, and pre-emptive, policy-making. ■

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What Prospects for Teachers?

David Istance



The resurgence of interest in education and training has focused attention as never before on the people directly responsible for ensuring that these services are successfully delivered—teachers. What forms has this attention taken, what are the reasons behind it, and what is the contemporary ‘condition of teaching’ in schools and colleges?¹

The importance now being given to the improvement of the quality of education in many OECD countries has been a major factor behind the attention currently being paid to teachers.² Yet doubts are commonly expressed about the ability of new arrivals to the profession and their readiness for the rigours of the classroom. Critics question the capacity of the teaching force either to maintain established standards or to adapt to the modern world (the criticisms are no less vociferous for being frequently contradictory). More positively, there is a growing awareness among policy-makers and the public at large that improvement can only be achieved through, not in spite of, tea-

chers. Educational reform, no matter how well designed in other respects, is destined to fail in the absence of competent, motivated staff in classrooms and workshops.

The call for increased accountability is felt in education no less than in other policy spheres, which inevitably has repercussions for teachers. Parents are increasingly demanding in their desire for their children's success, and are more closely familiar with the educational world than ever before. In the current political climate, the professional performance of teachers is no longer above scrutiny. The common question is whether they provide value for the substantial public resources devoted by OECD countries to their teachers.

Yet, while more accountability may be sought in order to impose limits on the freedom of action of teachers, the demands made on them imply that they

should function autonomously and creatively, deploying a wide repertoire of advanced professional skills. The knowledge and attitudes of young people are shaped by media and peer-group influences that are well beyond classroom control; nonetheless, scrutiny of learning outcomes focuses attention predominantly on the performance of teachers. Once again, they are caught between conflicting pressures.

A further major reason for the spotlight falling on teachers is the sense of dissatisfaction clearly felt by many of them across a wide range of OECD countries. This has been demonstrated most explicitly through damaging disputes over pay and conditions during the 1980s in settings as diverse

1. Publication forthcoming autumn 1989.

2. **Schools and Quality: An International Report**, OECD Publications, Paris, forthcoming autumn 1989.

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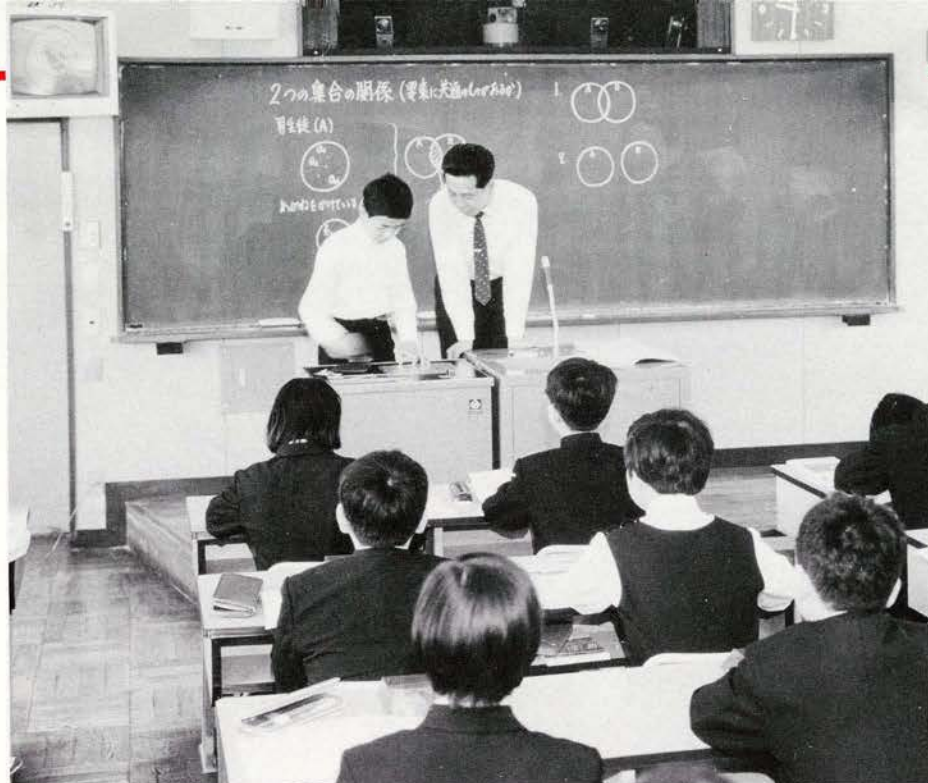
as Greece, Ireland, Italy, New Zealand, Norway, Spain, Sweden, the United Kingdom, and some of the major city districts of the United States. More generally, in most countries teachers are vocal in complaining of problems of status and of insufficient rewards.

Conditions and Rewards

Though the general picture is one of problematic status and rewards, the situation of teachers does vary widely across OECD countries. In some, for instance, the profession still enjoys substantial prestige and competition for entry is keen (as in Japan), and in some countries, especially those in continental Europe (such as Denmark, France, Germany, Greece, Italy, Luxembourg, Portugal, Spain) they are tenured civil servants but not in others. Yet in most there has been long-term slippage of financial rewards of teaching compared with other occupations.

Although public-sector spending restraint limits the scope for significant salary increases in the short-term, especially in view of the sheer size of the teaching profession, in some cases the relative decline has been reversed. In the United States, for instance, where it is commonly acknowledged that their pay is low, the average salaries of teachers in the public sector rose in real terms from \$22,386 in 1979-80 to \$25,313 by 1985-86. The Federal and State initiatives for educational reform of the 1980s risked foundering through difficulties of attracting and retaining good staff. Nevertheless, as shortages become more widespread in the decade ahead, the authorities in those countries affected face little option but to consider making teaching a financially more attractive profession.

Important though salaries undoubtedly are for teachers, non-pecuniary conditions and rewards are crucial, too. Among these, the general isolation of teachers from collegial support and community contact is a continuing source of strain and limits the range of professional response to educational challenges. Few, if any, other occupations place such faith in



The teaching profession still enjoys considerable status in Japan.

the organisational unit of the solitary professional. Nor is it well understood by people outside education how tiring teaching in front of a class really is. A further general problem is that so long as teachers choose to follow their vocation and remain in the classroom, the actual nature of teaching changes little throughout the career even if new materials, tasks, and different groups of students are added.

Extending career opportunities and stimulating diversity in the work are thus vital elements in increasing the attractiveness of the profession and, correspondingly, the quality and flexibility of the education provided. They imply re-examination of the predominant practice whereby teachers continue to work full-time, full-year, up to a fixed retirement age. For experienced teachers, more flexible combinations of classroom teaching with other roles and duties, in schools and outside, with enterprises and administrations, can yield substantial benefits and offer the additional boost to efficiency of reducing fatigue and 'burn-out'.

New Challenges and Demands

In contemporary society, schools and teachers are readily allotted a major role in contributing to the solution of an array of economic, social, and cultural problems that would have seemed quite foreign to their predecessors of decades gone by. The political pressure to quicken the pace of educational reform has inevitable consequences for the demands made on teachers. Alongside worries about salaries and insufficient social re-

cognition, teachers in OECD countries are increasingly voicing concern about the sheer availability of time and about their preparedness as a body to do justice to these different challenges.

Few can doubt that the teacher's task has become more demanding in recent times. In a number of countries, for example, teachers have acquired new responsibilities for designing and implementing curriculum reform and for introducing new forms of student assessment. These call on a wider repertoire of skills, and more active co-operation by teachers with their colleagues, parents, and other bodies in the community.

Current policy priorities call for 'horizontal' strategies that depend on teachers for their success. One is the general expectation that teachers impart an understanding of, and positive attitudes towards, the worlds of employment and work, giving guidance to their students as appropriate.³ Knowledge and understanding of other countries has now to be promoted by teachers, schools and colleges as part of efforts to foster 'internationalisation'. Targeted programmes—such as multiculturalism, equality of the sexes, and the integration of disabled pupils into mainstream schools—each represent far-reaching areas of reform where the teacher's role is central. The successful introduction of information technology into classrooms depends on their informed and imaginative application by teachers. And new moral and social questions are being added to their brief: to enhance awareness of the environment and pollution, to educate about drug abuse

3. See *Education and the Economy in a Changing Society*, OECD Publications, Paris, 1989.

and AIDS, to be watchful for signs of child abuse in the home.

Each of these demands alone implies ambitious programmes of pre- and in-service teacher education and the re-organisation of learning. From the standpoint of the classroom teacher and school principal, what matters is that they are expected to promote these strategies actively, and all at once. It is highly desirable that direct teacher involvement in these new reforms constitutes a source of professionalism based on expertise rather than be simply a burdensome extension of responsibilities.

Signs of Shortage

There is another major reason that teachers have come to the forefront of public and policy attention: there are signs of teacher shortages emerging on a worrying scale. These are most apparent in the very disciplines, such as mathematics and the sciences, different branches of technical and vocational education, and languages, that are currently accorded priority to realise the aims of economic adjustment and the promotion of international understanding. Shortages undermine the capacity of education and training services, now and in the future, to deliver provision of the high quality universally expected of them.

Not all countries are currently reporting general shortages and in one or two cases, such as Germany and Ireland, teacher unemployment remains the dominant pattern. But all OECD countries experience some shortages in certain disciplines and in specific regions, whether inner-city districts or isolated rural communities or areas of high-cost housing, or as manifested through the continued deployment of unqualified staff. And all countries might well expect to be affected, to varying degrees, by trends already visible which threaten to exacerbate shortages over the coming decade. Four of these trends stand out.

The first is the 'greying' of the teaching profession—the consequence of the major

recruitment drives of the late 1950s and '60s followed by severe curtailment of intake from the mid-1970s (the timing differs by country)—which will inevitably result in quickening losses through retirement. In France, for example, it is foreseen that over 200,000 primary and secondary teachers will be required by the end of the century to replace those who retire, implying substantial increases over present annual intakes. This is quite apart from the extra staff required if the ambitious official target is to be attained of approximately doubling the proportion of youngsters who achieve baccalauréat-level qualifications, to reach 8 in 10 by the year 2000. Meanwhile, OECD countries in general struggle with the legacy of years of lean recruitment that substantially reduced initial training capacity and solidified the image of a profession that offers few openings.

Second, the complex interplay between student demand for education and training and demographic trends continues to undermine the long-term planning of teacher numbers. The common pattern is of falling student rolls in lower secondary schools which contrast with a partial revival of numbers at the primary level following a rise in numbers of births in some countries, and a still-growing demand for pre-primary education from working parents in many of them. Larger numbers of students may well stay in upper secondary education and training through the next decade, set against a smaller cohort passing through the higher education systems from which new entrants to teaching are mainly drawn.

Third, for the decade ahead the labour market will almost inevitably be characterised by sharpened general competition and shortages in activities that require advanced skills—which is likely to leave teaching at an even bigger disadvantage in its efforts to attract talented graduates. The availability of more lucrative openings in industry and commerce is a matter of concern not only to education authorities, of course; it affects equally other types of service employment that traditionally rely on substantial inflows of young adults, such as the health sector and military services. To avert major shortages, therefore, teaching must be a profession attractive

enough to compete with all these sectors.

Fourth, the changing labour-market behaviour and experiences of women⁴ could well mean that they become a less reliable source of supply of new or returning teachers. As their work aspirations and behaviour come more closely to resemble those of men, women can be expected to share more closely with them a negative assessment of the career potential of teaching. Women should thus constitute an important focus of policies to combat teacher shortages. This in turn implies redressing radically the imbalance of the sexes in promotions and positions of leadership. Not only is the general picture across OECD countries one of the very serious under-representation of women as vice-principals and, especially, principals of schools but in some their position in this regard is actually deteriorating.

□ □

Teacher supply thus looms as a major issue for the years ahead. Addressing it should not be a matter of trying mechanically to match supply with demand at the expense of quality. It would be a tragically retrograde step if the dominant issue of the 1990s ceased to be a continuation of the concern of the '80s to ensure the qualitative improvement of teachers and teaching, heralding instead a return to the overwhelmingly quantitative problem of the 1960s—how to fill vacant posts. ■



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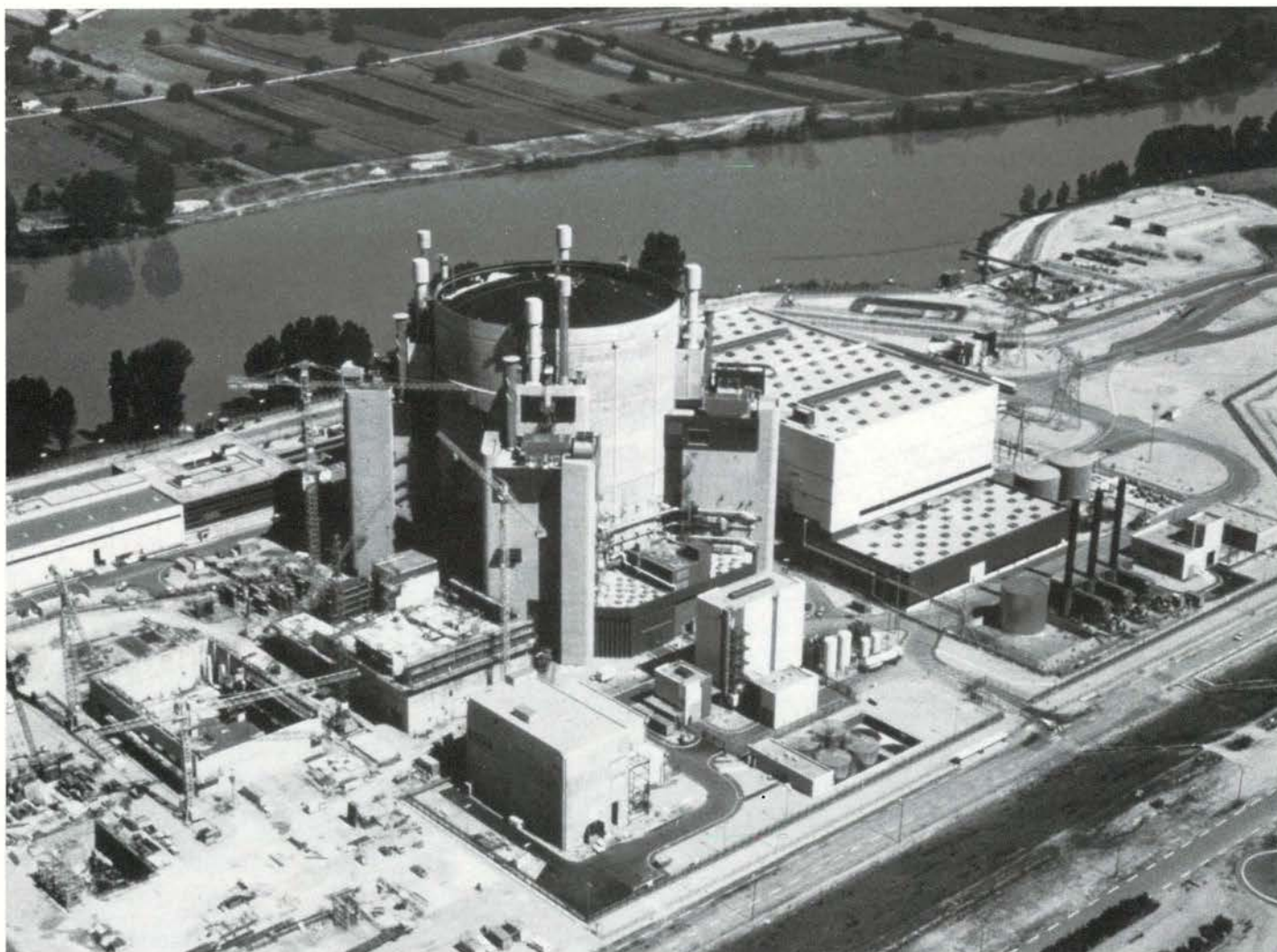
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Plutonium: A Fuel for the Future?

Geoffrey H. Stevens

Weight for weight, plutonium yields three million times more energy than coal.

Not surprisingly, it is seen as an important fuel for future use, particularly if nuclear energy is to make a strong contribution to sustainable development through the next century. There are acknowledged dangers in using plutonium but, after several years of tests and demonstrations, it is now being used to fuel reactors on a routine basis. A recent report from the Nuclear Energy Agency (NEA) of the OECD¹ presents information on the physical and chemical characteristics of plutonium, on how the risks of using it compare with other industrial hazards, and on the economics of its use in current reactors.



M. Brigaud/EDF

The Super-Phénix at Creys-Malville in France, the largest commercial fast breeder reactor in the world.

Plutonium is a hard, silvery-white metal like cast iron which can be melted, moulded and machined into any shape desired. It is very dense, and has a melting point of 640°C. It is chemically very reactive and oxidises rapidly when exposed to air, like other reactive metals such as magnesium or uranium. A solid lump of plutonium is stable, although finely divided powders of all three metals can catch fire spontaneously if exposed to air. Because of its chemical reactivity, metallic plutonium is normally handled in an inert atmosphere such as dry argon or nitrogen inside a 'glove box', sometimes with the use of remote handling equipment. The chemical reactivity and relatively low melting point of metallic plutonium, amongst other things, make it unsuitable for direct use as a reactor fuel. Indeed, the metal is not normally produced in any of the stages of manufacturing or dealing with nuclear fuel—the nuclear fuel cycle.

Plutonium is extracted from spent nuclear fuel at reprocessing plants, either as plutonium nitrate in nitric acid solution or plutonium dioxide powder. The dioxide is the principal compound used in manufacturing fuel. This is a ceramic substance with a very high melting point (2,390°C). It is blended with uranium dioxide to produce mixed oxide (MOX) fuel.

Plutonium is widely regarded as a uniquely hazardous material. It is, indeed, one amongst many toxic materials that have to be handled with due caution to minimise the associated but well understood risks. Experience over the last thirty years has shown that it can be safely managed and used as a nuclear fuel. In practice, ingested plutonium is less acutely toxic than many common poisons (such as strychnine, lead-arsenate and cyanide) and even on inhalation its acute toxicity is not very different from heavy metals like cadmium and mercury which have many industrial uses. And the main risk from plutonium contamination is indeed from inhalation, particularly in the working environment or in case of fire.

Safety measures are therefore taken to limit strictly the levels encountered in nor-

mal occupational conditions in the nuclear fuel cycle—for example, through the use of ventilation systems and glove boxes. The principal concern, therefore, lies in the possibility of accidental releases of plutonium which may cause radiation exposure of the public or workers at levels higher than the agreed international limits. To date, there are no records of cancers occurring in man that can be attributed with confidence to plutonium, even in the rare cases where individuals have, through accidents, absorbed abnormally large amounts.

Whence Plutonium?

In essence, plutonium is entirely man-made, although, to be pedantic, it could be considered as occurring naturally, as minute amounts are being made continuously through the interaction of cosmic rays with isolated atoms of naturally occurring uranium. Larger quantities must have been produced in a geological oddity which can be considered as a natural uranium reactor that burned spontaneously at Oklo in Gabon some 2 billion years ago.

It is produced in nuclear reactors fuelled with uranium principally through a process in which Uranium-238, an isotope with 238 heavy particles in its nucleus (92 protons and 146 neutrons), captures another neutron. Several isotopes are produced in various stages of the process but the main one leads to the production of Plutonium-239 after the ejection of two electrons, effectively converting neutrons into protons (Plutonium-239 has 94 protons and 145 neutrons in its nucleus). When left to itself, a small mass of Plutonium-239 would very gradually decay with half of its atoms becoming Uranium-235 every 24,390 years by the emission of alpha-particles (each with two protons and two neutrons).

Another isotope, Plutonium-238, decays more rapidly, with a half-life of 87.7 years, producing sufficient heat to enable it to be used to power small electric batteries that have been used in heart pacemakers, space satellites and land-based navigational beacons. Plutonium-



The safety measures taken in the handling of plutonium include the use of glove boxes, here at Dounreay in the North of Scotland.

powered batteries also supported seismic and other equipment placed on the moon's surface by the Apollo mission, and the cameras that enabled the Voyager space-craft to send back pictures of Saturn, Jupiter and Neptune. They are also being used on the Galileo mission to Jupiter in October 1989.

In the reactor, sufficient Plutonium-239 atoms are brought together to give them a significant chance of capturing a neutron which causes them to split, producing smaller atoms (such as iodine, krypton, palladium and strontium) and releasing energy and more neutrons. In fact, about 30% of the energy in a modern reactor fuelled with uranium actually comes from the fissioning of plutonium atoms which are produced *in situ*. Nevertheless, the bulk of the plutonium produced in the reactor remains there when the spent fuel is removed. About 0.9% of the heavy atoms in the spent fuel are plutonium.

As this plutonium is a compact source of energy—fuel containing 1 kg could re-

1. **Plutonium Fuel: An Assessment**, NEA/OECD Publications, Paris, 1989.

Geoffrey Stevens is Head of the Nuclear Development Division of the OECD Nuclear Energy Agency.

place about 3,000 tonnes of coal in the generation of electricity—there is an incentive to extract it from the spent fuel to recycle it in fresh fuel. Even in the early days of the use of nuclear power, plans were made to do this in order to derive the utmost benefit from scarce resources of uranium. Natural uranium contains only 0.7% of the fissile isotope, Uranium-235, which sustains the energy-releasing reaction. By cycling the plutonium as fuel in a breeder reactor, it would be possible to convert the non-fissile Uranium-238 into plutonium, which substitutes for the Uranium-235, and thus enhance the po-

tential yield of energy from the uranium resources by a factor of 50 to 60.

Reprocessing and Breeder Reactors

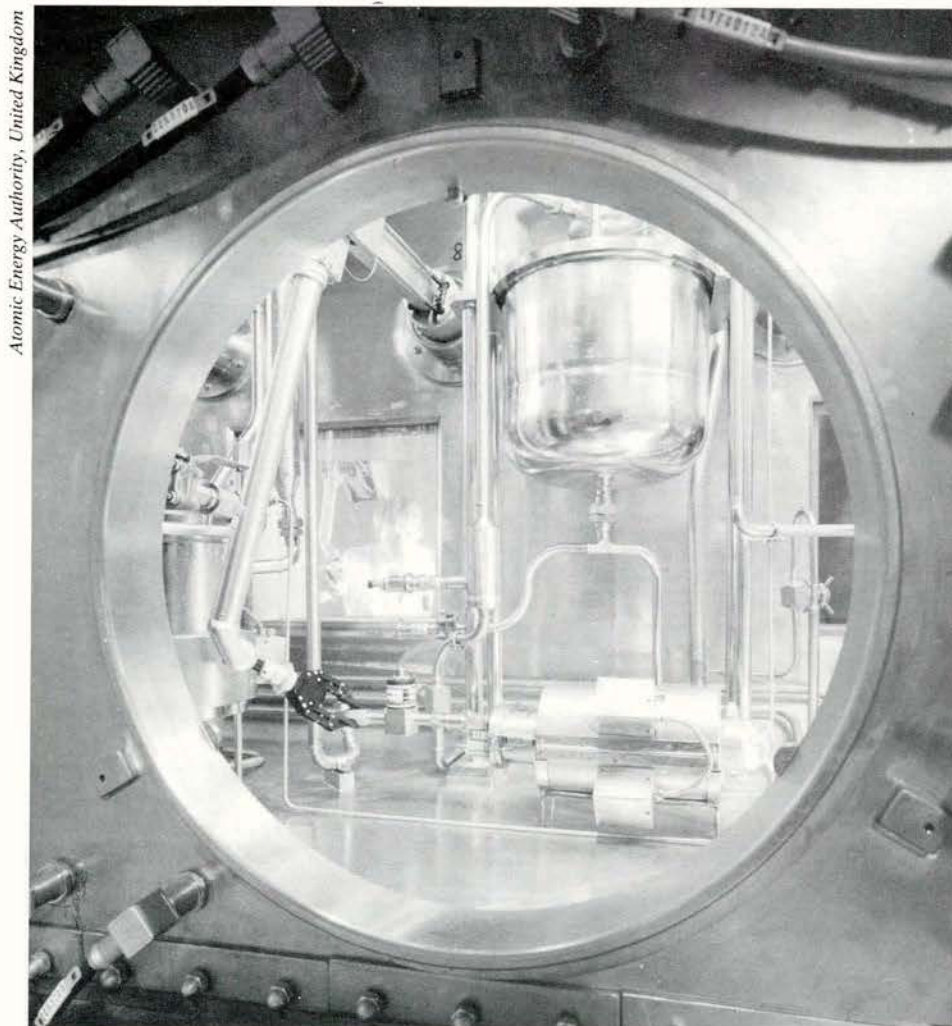
To achieve this end required the establishment of two new technologies—separation of plutonium and breeder reactors. The separation technology, generally known as reprocessing, had already been developed on a small scale for military purposes by 1945. It was scaled up and put to commercial use during the 1950s in the United Kingdom, in the 1960s in

France, and at the Eurochemic pilot reprocessing facility at Mol in Belgium, which was the first NEA Joint Undertaking. Today further huge reprocessing plants are under construction at Sellafield in the north of England and Cap la Hague in France; they will be capable of processing spent fuel containing 700 and 800 tonnes of heavy metal a year respectively (the heavy metals in question being uranium and plutonium). These plants which are capable of recycling the fuel from 25 to 30 large nuclear power plants require extremely large investments; it was estimated recently that the new plant at Sellafield will have a total cost of about £1,800 million.

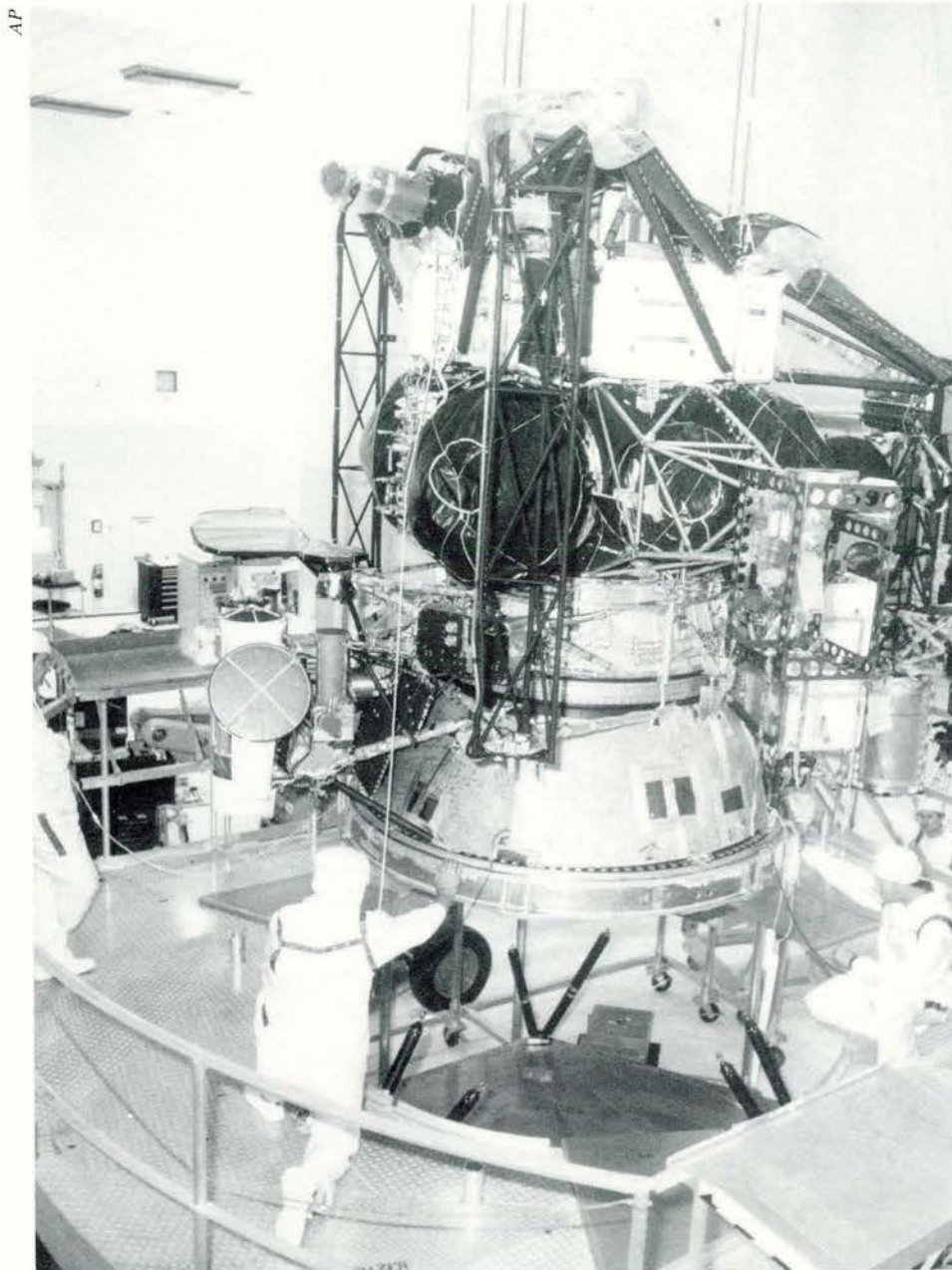
Breeder reactor technology is not yet established commercially, although France is operating the 1200 MWe Super-Phénix plant to demonstrate the technology at industrial scale, the United Kingdom has a 250 MWe reactor at Dounreay and Japan has a demonstration reactor under construction. It is generally agreed that while uranium prices remain at the low levels of today current designs of breeder reactor are too expensive to construct to allow them to compete with the light water-cooled, uranium-fuelled reactors which are the mainstay of the nuclear programmes of OECD countries. Efforts are underway to design more economical breeder reactors, and it is expected, in any case, that rising uranium prices in the next century might bring breeders back into competition.

Meanwhile, a number of countries have already had spent fuel reprocessed or are committed to doing so, for a variety of reasons. In some cases, the decision was taken in the expectation of requiring plutonium. In other cases, the decision to reprocess was taken in order to implement policy on managing radioactive wastes, taking account of the costs of storing or disposing of spent fuel or radioactive waste. In any case, stocks of plutonium are building up. Their storage entails some expense because of their physical nature and because very strict and sophisticated security procedures are implemented at plutonium stores.

Since the commercial exploitation of breeder reactors is thought to be unlikely until well into the next century (Japan's Long Term Nuclear Program, for example,



The laboratory at Dounreay allows new processes and equipment to be developed and tested for the reprocessing of irradiated fuel and its separation into plutonium, uranium and treated waste.



Plutonium-powered batteries are being used on the Galileo mission to Jupiter in October 1989.

aims at their commercial use by about 2030), there has, for a decade or more, been some experimentation with the use of plutonium to substitute for the fissile uranium isotope (^{235}U) in light-water reactors. Several electric utilities are now planning to use fuel made from a mixture of plutonium and uranium oxides (MOX fuel) and Electricité de France has already loaded this fuel in reactors at Saint-Laurent-les-Eaux and Gravelines at the start of a continuing programme for its commercial use. By the year 2000, it is expected that OECD countries will be consuming 15 tonnes of plutonium a year, mostly for MOX fuel for light-water reactors.

2. **Economics of the Nuclear Fuel Cycle**, NEA/OECD Publications, Paris, 1985; **Nuclear Spent Fuel Management: Experience and Options**, OECD Publications, Paris, 1986.

The recent NEA study included a close examination of some economic aspects of the use of plutonium following up earlier, less detailed studies.² Many variables enter into judgements on the most economical choices in relation to spent fuel: uranium prices, uranium enrichment costs, fuel fabrication costs, reprocessing costs, storage costs of spent fuel, etc. Each of these can take a range of values depending on national circumstances and the contractual positions of utilities in the markets for the various stages of the fuel cycle, such as uranium procurement, enrichment and reprocessing. It was not possible, therefore, to arrive at a comprehensive judgement on one economically correct choice.

Several countries have already paid for or are contractually committed to repro-

cessing their spent fuel and, because they then consider the plutonium as available at no extra cost, MOX fuel offers their utilities an economic saving of some 30% compared with the use of the equivalent enriched uranium fuel in reloads for existing light-water reactors.

There are therefore plans to extend the use of MOX made with this 'free' plutonium to some 40 to 45 existing light-water reactors in France, Belgium, Germany, Switzerland and Japan. To support these plans MOX fuel fabrication plants of appropriate size exist or are being constructed in Belgium, Germany, France and Japan. On the other hand, some countries such as the United States, Canada, United Kingdom and Finland have no current plans to use MOX fuel in light-water reactors. In the United States and Canada this is because of the assessment that it is not now economical to build and operate new spent-fuel reprocessing plants to support the recycling of the plutonium as fuel for this type of reactor, whilst there are as yet no reactors of this type operating in the United Kingdom.

□ □

Decisions about reprocessing and the use of plutonium are not and will not be taken purely on cost arguments. Policies on security of energy supply and radioactive waste management as well as on safety and institutional matters will be strongly influential. Current discussions on these policies reflect the fact that many people do not share the confidence of the nuclear industry that plutonium can safely be used as a fuel. Only when that confidence is felt more widely will plutonium be able to fulfill its potential as a major contributor to energy requirements in the 21st century. ■



- **Plutonium Fuel: An Assessment**, 1989
- **Nuclear Spent Fuel Management: Experience and Options**, 1986
- **The Economics of the Nuclear Fuel Cycle**, 1985.

Improving Electricity End-Use

Electricity consumption has been the fastest growing major form of energy end-use for several decades. Today electricity provides about 35% of the energy requirements of OECD countries. It is a major user of primary energy sources such as coal and oil and is in practice the only route through which nuclear, hydro and many other renewable energy sources can be used.

But in recent years there has been rising concern about how best to reconcile the increasing demand for electricity with its impact on the environment, on national economies and energy security. Nuclear power has been the central issue in several countries, while others have focused on emissions of conventional pollutants, high dependency on imported oil, the rising costs of new capacity or, most recently, the possible long-term climatic effects of greenhouse gases. Improving efficiency in the consumption of electricity (i.e., the electricity used per unit of service provided) has been advocated as one means of reducing these effects.

Mark Friedrichs
and
Erich Unterwurzacher

Concern about the energy, environmental and economic costs of the growing consumption of electricity has led to interest in improving the efficiency with which it is used. To examine the opportunities for such improvements and the policies that might accelerate them, the International Energy Agency of the OECD (IEA) has recently completed a major study.¹

Since 1973 the annual growth rates of OECD electricity requirements have been comparable to those of GDP, and have far exceeded the rates of growth in oil demand, partly as a result of government policies encouraging substitution of electricity for oil (Figure). In this period, electricity intensity—the ratio of electricity demand to GDP—remained almost constant while energy intensity as a whole declined by 23%. This indicates the growing importance to OECD economies of electricity, compared with other forms of energy.

These trends are the result of a number of different factors. Electricity is an especially versatile form of energy (it can be used to drive a wide range of motors and processes, as well as providing light and powering electronic equipment), and its prices fluctuate less than those for hydrocarbons (i.e., oil and gas). The market

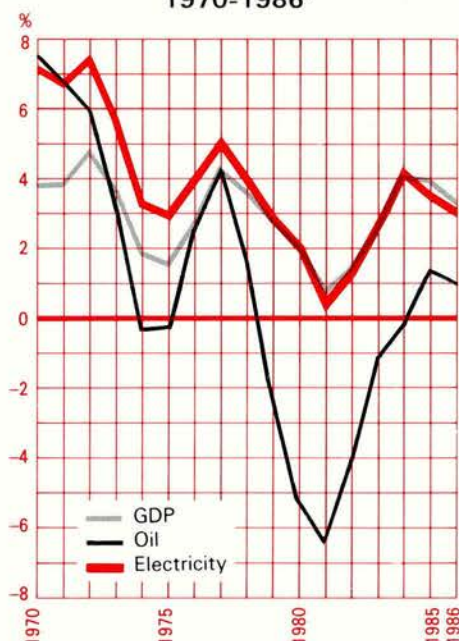
Mark Friedrichs and Erich Unterwurzacher are specialists in energy conservation in the International Energy Agency at the OECD.



Wilhelm Brugg

The heating, cooling and ventilation of commercial and residential buildings is one of the six major end-uses for electricity in the OECD countries.

Figure
ANNUAL GROWTH RATES
OF GDP, OIL AND ELECTRICITY:
1970-1986¹



1. Three years' moving average.

penetration of electrical technologies (e.g., household appliances, space heating and cooling equipment, electric arc furnaces) has therefore increased in all sectors of the economy, but particularly in households and the service sector. For many rapidly growing uses, like television and data processing, electricity is the only form of energy which can be used.

Structural changes, too—not least the expansion of the service sector—have also led to increased demand for electricity, as have growing personal income and the accompanying lifestyle changes. Changes within sectors, such as the growth in product-manufacturing (rather than materials-processing) industries, and the application of new and advanced production technologies, have also contributed to the comparatively rapid growth in electricity demand.

The assessment of probable trends in efficiency (and ultimately in demand) re-

quires the examination of specific electricity end-uses and the efficiency of the technologies involved. But because there are hundreds of different technologies and their applications differ widely among the 21 member countries of the IEA,² the study focused on six major end-uses for electricity that consume 65–71% of the total in six countries that represent a range of climatic, economic and electricity-sector characteristics (Table 1).

Of the countries studied, the United States alone represents almost 50% of IEA electricity demand, while the others range from 2.4% (Sweden) to 12.4% (Japan). Industrial motors consume by far the most electricity, followed by lighting, but all of the end-uses examined are large compared to the categories that were not examined, such as cooking or television.

Improvements in Efficiency

As a result of the combination of increasing prices for electricity in the 1970s and early '80s, improved technology and some existing government programmes, there were significant efficiency gains in all of the six categories over the past 15 years. Yet total electricity demand in these activities increased, too: more people owned electrical equipment, incomes and industrial production grew, and

more commercial and public buildings were erected.

The efficiency improvements appeared to be especially evident in refrigerators, where average use per unit often declined by 10–20% between 1973 and 1986 (which reflects an increase in efficiency of 11–25%), and in new buildings, where heat losses in new homes generally declined by 20–50% or more from the early 1970s to 1986. Lighting efficiency has probably increased by about 10% since the early 1970s, commercial space-conditioning systems for heating, cooling and ventilation probably by over 10%, and industrial motors by perhaps 5% or less. In the United States, the electricity use per unit of new water-heaters declined by 5%, and for heat pumps by 19%.

But many of the most efficient technologies available have not yet been widely adopted because for each end-use there exists a range of institutional and market barriers to improved efficiency, such as a lack of information and technical skills or split responsibilities between owners and users.

The trend towards improving efficiency in new equipment and buildings will probably continue, although the rate of change appears to be slowing. The total savings will continue to grow as the existing capital stock is replaced, yet the various barriers that remain will probably mean that

Table 1
ELECTRICITY DEMAND, 1986

	Germany	Italy	Japan	Sweden	United Kingdom	United States
Total Electricity Consumption (TWh)	354	179	595	116	250	2,275
<i>Of which (%)</i>						
Residential space heating	6.5	0.8	3.1	14.1	7.4	4.3
Residential water heating	5.3	10.2	3.0	6.2	7.5	5.4
Residential refrigeration ¹	5.2	4.7	6.5	4.4	6.4	7.4
Lighting	9.9	12.8	n.a.	10.8	15.9	18.5
Commercial/Public building heating, cooling and ventilation	9.6	3.5	1.7	7.1	6.7	13.1
Industrial motors	31.1	37.2	42.1	23.9	21.4	22.5
Electricity Intensity (TWh/GDP)	0.47	0.42	0.52	0.98	0.51	0.83

1. Refrigerators and freezers.

Sources: *Energy Statistics 1986/1987*, OECD, 1989; *OECD Economic Outlook*, June 1988.

1. **Electricity End-Use Efficiency**, IEA/OECD Publications, Paris, 1989.

2. The 24 member countries of the OECD minus Finland, France and Iceland.



The search for efficiency in electricity consumption is transforming the traditional light bulb.

a significant economic potential for even larger gains will not be realised.

It is not possible to make precise estimates of the improvements that are technically and economically feasible, nor of the effects of current market forces and government policies; but Table 2 provides relative indicators of the opportunities and trends in each of the six end-use categories examined. An efficiency improvement is assumed to be economic if the resulting savings would pay back the added cost in less than 3–5 years (the period varying with the user) or would offer a real rate of return of 20–30% or more. Of course, such efficiency improvements would not require any change in the standard of service provided to users.

The opportunities indicated in Table 2 suggest that additional savings—perhaps in the range of 10–20% per unit of service—could be made from improvements that are not likely to be realised by present efforts but that are economically viable.

Because this would require the replacement of major existing capital stock to be fully achieved, it could only be realised economically over a period of about 20 years or more. Furthermore, the numerous barriers to investments in efficiency would have to be removed or overcome and the anticipated rate of improvements substantially increased. It is not certain that workable policies by government, utilities or private firms can be developed that would fully realise these objectives. Yet if a 10% saving were able to be achieved gradually over 20 years, it might slow the expected rate of growth of electricity demand by –0.5% per year.

Policy and Programme Options for Governments

All IEA member countries have government (or utility) policies which aim, at least in part, to improve the efficiency of electricity end-use, often as part of broader conservation policies. The insulation of buildings, for example, saves both the fuels and electricity used in space-conditioning. Some of the initiatives undertaken by governments have been directed specifically at electricity although they have been much less ambitious than those aimed at the conservation of fossil fuels, in particular oil.

The basic policy tools that can be used

by governments and the utilities that produce and distribute electricity fall into five main categories:

- pricing policies
- information
- financial incentives
- standards
- research, development and demonstration (RD&D).

Prices have always been the single most potent instrument for influencing supply and demand. If appropriately set, prices provide both consumer and supplier with the best signals upon which to base their decisions, especially on investment. Prices that are too low discourage investments in more efficient equipment. And prices that are too high discourage the use of electricity to support viable economic activities.

It is often argued that the policies which result in the most accurate price signals are those which base tariffs on the time-variable costs of new electricity supply (long-run marginal costs—LRMC), including distribution and external costs, to the extent practical. But for a variety of reasons—such as the difficulty of estimating LRMC, and the possibility of excess (or insufficient) utility revenues—electricity tariffs in most IEA countries are not based on the long-run costs associated with supplying electricity but rather on the average (historical) costs experienced by

Table 2

ECONOMIC OPPORTUNITIES FOR EFFICIENCY IMPROVEMENTS

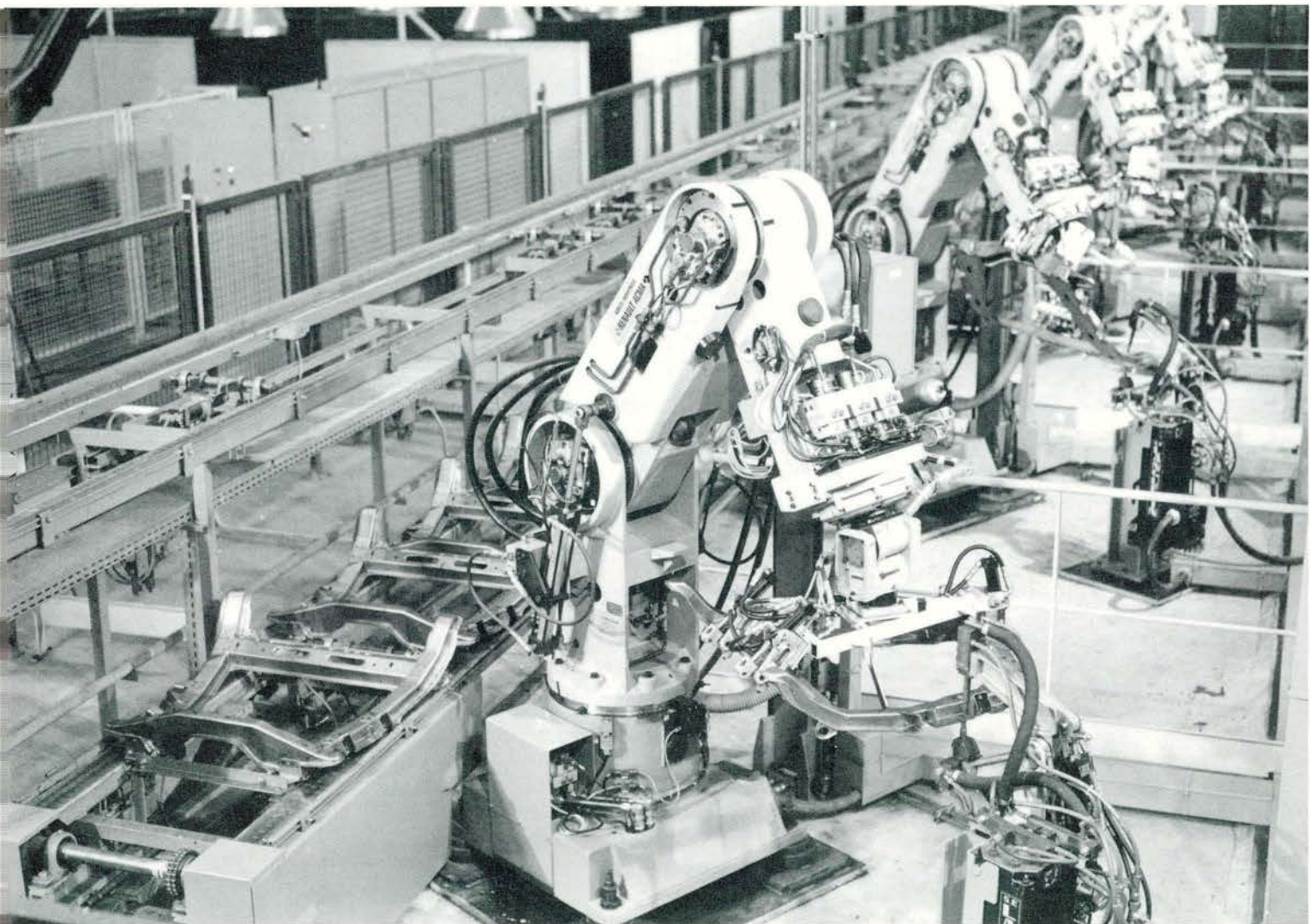
	Total Possible Savings ¹	Existing Market/Institutional Barriers	Savings not likely to be achieved ²	Time-Frame (years)
Residential Space Heating	Medium/High	Some/Many	Mixed	More than 20
Residential Water Heating	Mixed	Some/Many	Mixed	10–20
Residential Refrigeration ³	High	Many	Medium	10–20
Lighting	Very High	Many	High	10–20
Commercial Space Heating	Mixed	Some/Many	Mixed	20 or more
Industrial Motors	Low/Medium	Few/Some	Low	10–20

1. Based on a comparison of the average efficiency of existing capital stocks to the efficiency of the best available new technology. Low: 0–10% reduction per unit on average; medium: 10–30%; high: 30–50%; very high: more than 50%.

2. Reductions per unit not likely to be achieved because of current market forces and government policies.

3. Refrigerators and freezers.

Explanatory note: For lighting, 'very high' (more than 50% per unit) savings would result if the best available technology were used to replace the average lighting stock in use today over the next 10–20 years. Some of these savings would take place under existing market and policy conditions, but because of the 'many' market or institutional barriers, there would remain a 'high' (30–50%) economic potential for savings that would not be achieved.



Renault

Industrial motors are by far the biggest consumers of electricity – in Japan, for example, they account for almost a half of the demand.

utilities. In many cases such tariffs probably understate the value of electricity. Although the extent to which prices differ from long-run marginal costs has not been specifically evaluated, it certainly varies widely among IEA countries.

Information activities—general campaigns, technical guidance, demonstration programmes, equipment labelling, and so on—can help improve efficiency. The obstacles include a lack of knowledge about potential savings, the cost of specific improvements, and the availability of special services for energy management,

as well as the lack of adequately trained technicians. These problems are barriers to other forms of energy conservation as well, and therefore have long been the focus of considerable activity by both governments and utilities.

It is often difficult to determine the effect of such activities precisely. Evaluations of some information programmes have indicated they can result in worthwhile savings and net economic benefits, even though their ultimate impact on demand is usually limited. Because such programmes are generally less costly than

other forms of government activity—and because they do not distort consumer decision-making or other market forces—they are supported by most IEA member countries.

A third category of policy options are financial incentives, such as rebates, tax deductions or grants for efficiency investments. These are often the most costly form of government intervention: they not only subsidise new investment but inevitably also support investments that would have been made even without the incentive. If selectively applied and well de-

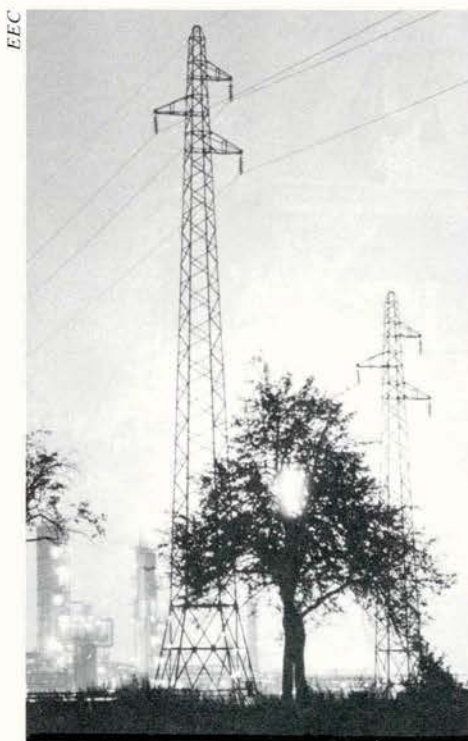
signed they can have much more impact than most information programmes and still be a cost-effective use of public monies. But the high cost and limited effects of some of the broad financial incentives that have been previously offered, as well as government budget constraints, have led many countries to scale down these activities, both in the financial resources they involve and the number of incentives offered.

Government intervention has also taken the form of mandatory or voluntary efficiency standards, which are widely applied to new residential and commercial buildings, and have also been applied by some countries to home appliances and other forms of electrical equipment. Regulations can clearly have a major effect on end-use efficiency, but they can usually only be applied where there is already considerable standardisation in construction or manufacturing, as well as similar patterns of use among consumers, as, for example, with home appliances. Even in these areas, standards can result in many uneconomic distortions in the decision-making of both suppliers and users and might result in some unintended barriers to trade, although they can be cost-effective if carefully designed to minimise market interference.

Finally, government-supported RD&D can help accelerate the development and introduction of more efficient technologies or sometimes lead to the creation of totally new ones. It can be both costly and risky, but many previous RD&D efforts have clearly resulted in significant net benefits.

Policies to improve the efficiency of electricity end-use usually involve a combination of actions in each of these areas. But in determining the main policy lines, the most appropriate mix will vary according to the economic and political circumstances of individual countries. Any strategy has potential benefits and costs which should be fully evaluated in the light of these circumstances. The implementation of the policies or programmes, once selected, might be undertaken directly by governments or by other institutions, such as utilities.

Other than electricity users themselves, utilities are the institutions that most influ-



ence (and are often most affected by) trends in end-use efficiency. Improvements can cut electricity sales, and yet there are a number of circumstances in which utilities may find it in their own interest to encourage efficiency.

What Can Utilities Do?

It is often argued that utilities see a financial advantage in reducing demand among their customers only if the costs avoided by not providing the increased demand cover both the loss in revenue and the cost to the utilities of achieving the reductions in demand. This is possible when the tariffs allowed by regulatory agencies or set by the utility are below long-run marginal costs.

For example, if it bases its tariffs on average costs and has a large amount of comparatively low-cost hydro-electric capacity, the costs of electricity produced by new capacity will probably not be covered by marginal revenues. In this case, both the utility and its customer could well find it in their interests to avoid

the new, more expensive plant fired by fossil or nuclear fuels. On the other hand, if tariffs are set at or above long-run marginal costs of supply, utilities would see little or no financial advantage.

Even if there is no direct financial motivation, there are other reasons that utilities may find it in their interests to improve end-use efficiency, such as competition with other fuel suppliers or improved customer relations. Utility pricing practices, supply and demand structures, and their resulting motivations vary widely among OECD countries. There are also many differences in the methods used to determine the rates of return or earnings of private utilities, another important factor affecting the incentives they face. Whether a utility might be finally motivated to reduce electricity demand, and to what extent, depends very much on individual circumstances.

□ □

Most of the options for improving efficiency in the consumption of electricity have already been implemented by one or more countries and have been seen to be potentially cost-effective when they are well designed and carefully targeted. But the potential for further saving remains. Increased efforts both by governments and utilities could be costly and would not eliminate the continued growth of demand for electricity. But they could make a significant contribution to furthering both environmental protection and energy security, while at the same time producing substantial economic advantages. ■



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A Century of Development

The historical dimension in development studies has been under-researched and, therefore, underestimated. The overwhelming majority of investigations of economic and social development policies have been undertaken on a cross-sectional basis, comparing different countries at the same point in time. Rarely are studies carried out to look at time-series, to consider how countries that are developed did so over several generations.

Louis Emmerij

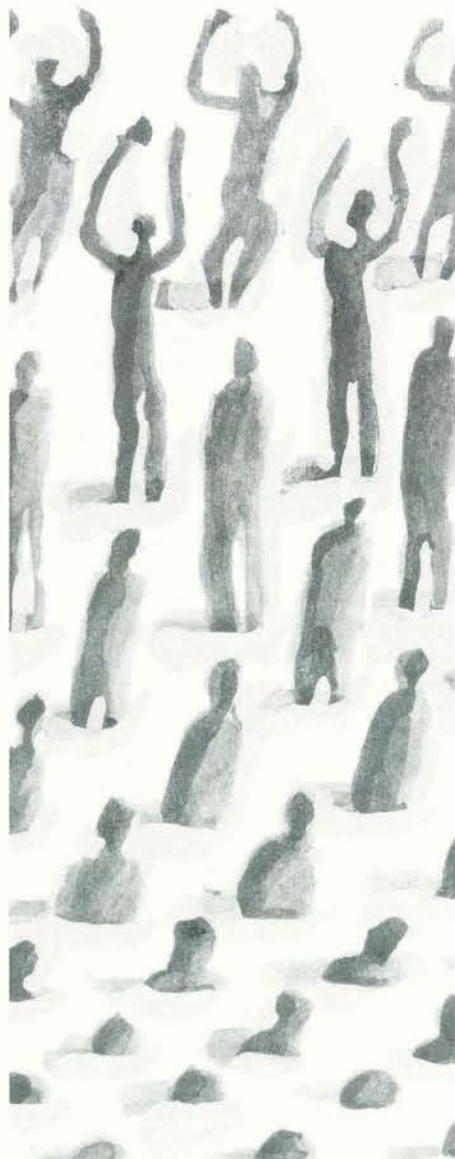
Can the conventional view of the relative economic status of the world's major regions withstand critical examination? A new publication from the OECD Development Centre¹ takes a longer perspective.

It is, therefore, not surprising that practically everyone is obsessed by the short term and has difficulties in looking ahead or even backwards five to ten years. During the 1960s full employment in the OECD countries was the norm, and the realities of the 1930s were entirely forgotten in the belief that unemployment had disappeared from the surface of the earth forever. What is true of unemployment is equally valid for inflation, debt, peace and war: there is a strange tendency to extrapolate the present forever into the future.

It is striking, for example, how pessimistic seemed the economic development prospects of Asian economies until far into the 1960s. Gunnar Myrdal's *Asian Drama*, which, as the title indicates, reflects this pessimism, dates from the end of that decade. The pessimism has now turned into optimism. This time it is Africa that is doomed until the end of our time. The future of Latin America is now considered to be sombre as well, after the much more positive assessment of the 1970s. In a recent publication, Antonio Costa, Director General of Economic and Financial Affairs at the European Commission, observed:

First, we must resist a temptation: to accept a cliché whereby two regions, Latin America and Asia—two regions so different culturally, in terms of policy and performance—lead us to conclude that in the recent past one region did everything right and the other region did

everything wrong. This is a fallacy. Of course, we know that import substitution in the Latin American continent did systematic damage. We also know that export promotion in Asia did quite some good during the 1980s. Yet, if we cast our eyes beyond the 1980s and go back to the 1960s and the 1970s, we see that the performance of these two continents was quite comparable. Growth was very strong in both regions, external trade was in balance in both regions



Louis Emmerij is President of the OECD Development Centre.

1. Angus Maddison, *The World Economy in the 20th Century*, Development Centre/OECD Publications, Paris, 1989.

Judith Ten Bosch

and capital kept flowing: bank lending in Latin America, together with foreign direct investment; while development aid poured into Asia.

Secondly, in the 1980s, things changed. First of all because the two development strategies had different

pay-offs; but also because external circumstances changed worldwide, and the changing parameters worldwide impacted the two regions differently. In a sense one region was better positioned and better prepared to take advantage of the evolving situation in the 1980s—an

evolving situation which we have to scrutinise carefully to judge whether it will last or not.²

It is therefore of more than usual interest to draw attention to a publication which studies economic growth in the 20th century, from 1900 to 1987—a perspective of almost ninety years, which is something very rare because the collection of comparable data requires an enormous amount of patient work.

A brief review cannot possibly give an exhaustive summary of the scope of Angus Maddison's study, *The World Economy in the 20th Century*; a few examples must therefore suffice. World production rose thirteen-fold between 1900 and 1987 with an average rate of growth of 3% per annum. Latin America grew fastest. This continent saw its output increase thirty-two-fold—an average growth rate of over 4% per annum. Asia, by contrast, was the slowest grower of the century with 'only' 2.7% per year. The OECD countries grew at exactly the world average—3% per year. (Africa has not been included in this quantitative historical study because of the very weak statistical base.)

A Shift in Perspectives

Now that everyone talks about the splendid performance of Asian countries and the poor performance of Latin America, it is useful to put such observations into the long-term perspective (Table 1) and to note that it is Latin America which has shown the swiftest economic growth of the century. One could identify among other things two 'objective' factors to explain this finding: first, that Latin America was not involved in the two World Wars; second, its vigorous population growth. A continent with a very low population density, as in Latin America at the beginning of the century, will benefit economically from dynamic demographic trends. That is something to be kept in mind now that everyone is complaining about high population growth in Africa.

If one looks at the economic achieve-

Table 1

THE WORLD ECONOMY IN THE 20TH CENTURY

	16 OECD Countries ¹	9 Asian Countries ¹	6 Latin American Countries ¹	USSR	32 Countries
Total					
GDP billion 'international' dollars ² at 1980 prices					
1900	601.4	313.0	30.8	101.1	1,046.4
1950	1,943.5	437.8	160.7	420.6	2,962.7
1987	7,747.0	3,303.1	996.0	1,736.6	13,782.7
Population million persons					
1900	310.0	750.0	47.0	123.0	1,230.1
1950	580.2	1,128.2	121.8	180.1	2,010.2
1987	700.7	2,405.3	316.1	282.3	3,706.9
Average					
Per capita GDP 'international' dollars ² at 1980 prices					
1900	1,940	417	655	822	851
1950	3,350	388	1,320	2,336	1,474
1987	11,055	1,373	3,151	6,152	3,718
Rate of Growth of GDP annual average compound rate (%)					
1900-50	2.4	0.7	3.4	2.9	2.1
1950-87	3.8	5.6	5.1	3.9	4.2
1900-87	3.0	2.7	4.1	3.3	3.0
Rate of Growth of Population annual average compound rate (%)					
1900-50	1.3	0.8	1.9	0.8	1.0
1950-87	0.5	2.1	2.6	1.2	1.7
1900-87	0.9	1.3	2.2	1.0	1.3
Rate of Growth of Per Capita GDP annual average compound rate (%)					
1900-50	1.1	-0.1	1.4	2.1	1.1
1950-87	3.3	3.5	2.4	2.7	2.5
1900-87	2.0	1.4	1.8	2.3	1.7

1. See Table 2.

2. Mean rate of dollar measured against a basket of currencies.

Source: Angus Maddison, *op. cit.*

2. In Louis Emmerij (ed.), *One World or Several?*, Development Centre/OECD Publications, Paris, 1989, p. 91.

ments before and after 1950, it becomes plain that economic growth experienced a clear acceleration during the second half of the century. World output grew at 2% per year until 1950 and at 4% since then. This time it is Asia which leads, with a rate

Table 2
**INDIVIDUAL COUNTRY
PERFORMANCE, 1900–1987**
annual average
compound growth rates (%)

	GDP	Population	GDP per capita
Australia	3.1	1.7	1.4
Austria	2.2	0.3	1.9
Belgium	2.1	0.4	1.6
Canada	4.1	1.8	2.3
Denmark	2.8	0.8	2.0
Finland	3.3	0.7	2.6
France	2.4	0.4	2.1
Germany	2.8	0.7	2.2
Italy	2.8	0.6	2.2
Japan	4.3	1.2	3.1
Netherlands	2.9	1.2	1.7
Norway	3.4	0.7	2.6
Sweden	2.8	0.6	2.3
Switzerland	2.8	0.8	2.0
United Kingdom	1.8	0.4	1.4
United States	3.2	1.3	1.8
OECD Average	2.9	0.9	2.1
Bangladesh	1.6	1.5	0.1
China	2.9	1.1	1.7
India	2.1	1.4	0.6
Indonesia	2.7	1.7	1.0
Pakistan	2.8	1.9	0.9
Philippines	3.3	2.4	0.9
South Korea	4.2	1.8	2.3
Taiwan	5.1	2.2	2.8
Thailand	3.8	2.3	1.5
Asian Average	3.2	1.8	1.3
Argentina	3.3	2.2	1.1
Brazil	4.8	2.4	2.4
Chile	3.1	1.7	1.5
Colombia	4.2	2.3	1.8
Mexico	3.7	2.1	1.6
Peru	3.5	2.0	1.5
Latin American Average	3.8	2.2	1.7
Developing Country Average	3.4	1.9	1.4
USSR	3.3	1.0	2.3

Source: Angus Maddison, *op. cit.*



Judith Ten Bosch

of economic growth of not less than 5.6% per year, eight times faster than the 0.7% it achieved between 1900 and 1950. This acceleration since 1950 is much less obvious in Latin America and, indeed, in the Soviet Union.

Considering, instead, income per capita (Table 2), it is interesting to observe that in absolute terms income per head of the population has increased everywhere since 1900 but that disparities between countries have become more pronounced. During the past ninety years per capita income in Asia increased three-fold, in Latin America five-fold and in the OECD countries six-fold. Everyone was better off but the industrialised world more than the rest.

Within OECD countries there is a clear income convergence. The richest countries in 1900 (Australia, the United Kingdom, the United States, the Netherlands and Belgium) have been the slowest growers, whereas the poorest countries in 1900 (Japan, Finland and Norway) have grown fastest. In this way differences in income per capita were reduced from 4:1 to 1.5:1. An opposite trend can be observed in Latin America and Asia. There, income disparities increased from 3.7:1 (Argentina, the richest country in 1900

against Bangladesh) to 13:1 (this time Taiwan as opposed to the same country, Bangladesh).

The champions of the century in terms of GDP growth are Brazil and Taiwan, countries which since 1900 have known an average annual rate of growth of 5%. In terms of per capita income the champion is Japan, with 3.1% per year and Taiwan with 2.8%. In both cases Bangladesh comes in last.

In view of the difficulties which the world economy has known since the middle of the 1970s and especially since 1980, it is clear that the period 1950–1973 now appears as a 'golden age', during which a new international economic order took shape based on the liberalisation of international trade, the stimulation of economic growth, the introduction of development co-operation, and all this backed up by the creation of strong international organisations. That Latin America performed relatively less well during this period may find a partial explanation in the extent to which its economic policies were more inward-orientated.

□ □

The conclusion is clear: matters can change for better or for worse; no tendency will continue indefinitely into the future; good and bad policies do make a difference. And one should keep an eye on the long trend so as to learn lessons for the future, so as not to despair when things do not go well—and so as not to rest on one's laurels when the economy is booming. ■



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Competition in Banking

Günther Bröker

OECD governments have generally come to accept that competition makes financial markets more efficient and that there is no conflict between ensuring adequate regulation and promoting efficiency. Nonetheless, as a recent OECD report points out,¹ some banking activities are still sheltered from the bracing wind of competition.

The banking failures of the 1920s and '30s underlined the importance of the stability and soundness of national financial systems and of maintaining public confidence in financial institutions. To ensure stability and soundness, the authorities resorted at that time to strict control of interest rates and the compartmentalisation of institutions, sectors and markets in order to curb competitive pressures on profits and capital.

These protective regulatory regimes remained virtually intact until the 1950s, when attitudes began to change. National authorities came to the view that the highly diversified, complex and rapidly changing financial requirements of modern economies could no longer be met by over-protected and over-regulated financial systems, especially in an increasingly international environment. That set in train the long process of deregulation and liberalisation which started in the 1960s and accelerated through the 1970s and into the 1980s.

The first major development was the relaxation of interest-rate controls in favour of market forces, opening the way for more price competition. Yet not all OECD countries have ended all controls over all interest rates: some restrictions on bank deposit rates are still in place because some governments fear that excessive interest-rate competition amongst banks might put undue pressure on interest rate margins and bank profits whereas the increased risks in banking

today call for higher profitability and capital ratios.

The authorities have had less scope for stimulating competition in the fees and commissions charged for financial services, since these are not usually subject to direct regulation. What governments could do, though, was dismantle all sorts of cartel agreements in the financial services industry. Some countries outlawed agreements amongst banks, and a number of stock exchanges in OECD countries introduced freely negotiable commission rates on orders to buy and sell securities, for which minimum rates were traditionally fixed by stock exchange members.

Deregulation also entailed the removal of quantitative restrictions, such as credit ceilings, which were often required to maintain artificially low interest rates. Such ceilings not only impede the operation of market forces and distort resource allocation, but they also limit the competitiveness of banks since they prevent dynamic institutions from expanding their market shares and protect less efficient ones.

In a bid to boost the general competitiveness of financial systems, governments

have fostered the trend towards diversification and decompartmentalisation. Specialised savings institutions have been allowed to develop into full-scale retail banks, and post office systems have become increasingly integrated into the banking system. Commercial banks have diversified into new spheres of activity and the dividing line between them and securities firms has become blurred.

Simultaneously, the conditions governing the entry of market newcomers have been liberalised, both those governing existing institutions moving into new activities from which they were excluded before and those governing the establishment of new firms, local and foreign.

The market for financial services has thus become increasingly competitive over the past two or three decades under the impact of this deregulation and growing internationalisation. Securing further improvements in the operating efficiency of financial systems requires yet more competition—in price, in products and services, and between different national centres. Most OECD countries agree on the economic benefits of competition, but their attitudes diverge when it comes to the degree of competition that should be permitted in practice.

In retail banking, it is difficult to strike a balance between the two extremes: destructive competition in the quest for market share, and insufficient competition leading to higher costs of financial services. Unbridled competition for retail customers could undermine the financial

1. **Competition in Banking**, OECD Publications, Paris, 1989.

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would be to make all financial institutions subject to the same uniform legal framework so they would all operate under identical conditions.

The original policy of separating banking and securities-related activities was motivated by two concerns. First, it was argued that universal banking would give rise to unmanageable conflicts of interest, since no institution could expect to be equally competitive in all services, and that this transformation of the banking landscape would endanger the stability and soundness of the system, as well as make it harder to protect investors from malpractice.

Second, it was feared that allowing financial institutions to offer a complete range of products and services would result in a concentration of power that would be unacceptable, both politically and economically. Whether or not the authorities opt for the mandatory separation of activities, investors and consumers have to be protected from abuses that may arise as a result of conflicts of interest. That may call for regulations which require institutions to make a full disclosure of all aspects of their business or for the establishment of detailed codes of conduct and rules of practice. Sometimes it may be sufficient to rely purely on competition and market forces to guide consumers in the selection of agents and steer them away from inefficient institutions.

Competitive Equality?

The authorities generally aim at ensuring equality of competitive opportunity for all providers of financial services—a 'level playing field': regulation should thus have a neutral impact on all institutions doing the same or similar kinds of business. That basically requires historically different regulatory frameworks applying to competing groups of financial institutions to be harmonised or amalgamated. To that end, a number of countries have phased out the preferential treatment accorded to certain categories of institutions, such as savings banks and public sector credit institutions, and have generally also eliminated differences of treatment between domestic

soundness of banks and thus threaten public confidence in the stability of the financial system as a whole.

But in many countries there is at present only moderate price competition in retail banking, so that banks generally have control over the margins they earn in this area. The spreads they charge on retail foreign exchange transactions, for instance, seem excessive by wholesale banking standards. 'Universal' banks are thus able to use profits from retail banking to cross-subsidise activities in more competitive markets, such as corporate finan-

cial services or international financial operations.

Diversification is turning financial institutions into universal banks in those countries where no mandatory separation is still imposed between traditional banking and securities-related activities. (Japan and the United States are now the only two OECD countries where institutions are banned by law from engaging in both commercial banking and all securities-related activities.) But views differ as to whether the process of integration should be carried to its regulatory extreme, which

Table

THE INTERNATIONALISATION OF BANKING

	1960	1970	1980	1985
Number of Foreign Banks in OECD Countries				
Host countries				
United States, Canada	..	79	153	291
Europe	141	410	927	1,187
Japan, Australia, New Zealand	40	44	90	127
Number of Foreign Affiliates of Banks from OECD Countries				
Home countries				
United States	131	532	787	916
Europe	34	122	453	666
Japan	37	67	213	346

.. = not available.

Source: National submissions to OECD.

and foreign institutions.

Self-regulation plays a major role in the financial sectors of many countries, although it is generally administered by professional associations representing the interests of their members against the authorities or other professional organisations and groups. While these 'clubs' generally make a major contribution to the development of markets and their technological infrastructure, and have thereby helped improve the efficiency of financial systems, they provide a threat to the effective working of market forces: they tend to be closed to new entrants, and they have often used their monopoly position to fix fees and commissions.

These 'clubs' can help to promote efficiency, soundness in business practices, and investor protection, but effective competition policy requires them to be scrutinised and their restrictive, anti-competitive practices curbed.

Concentration and Efficiency

Fears of excessive concentration in finance and banking have been allayed by experience, because deregulation has generally increased the number of groups of players that are competing, domestically or internationally, for the same business. In addition, the existence of large and financially strong institutions has proved to be a driving force in financial

innovation and technological progress, and large banks have considerably improved their performance and standards of service in many peripheral activities.

Side by side with the larger institutions, smaller firms have shown they can carve out profitable niche markets, by specialising in particular products or catering for specific groups of customers, notably in the securities markets. In international markets in particular, size is seen as a vital asset when it comes to catering for the demands of multinational corporations.

Yet competition and market forces alone cannot remove all the efficiency problems in the financial sector—co-operation is sometimes a better approach, and it has proved its value in four activities in particular:

- the development of the technological infrastructure
- the organisation and management of markets
- large projects and common product development
- the bringing together of 'producers' and 'distributors' of financial products and services.

Co-operation also has a role to play in 'levelling the playing field' for international competition, especially when it comes to market access and the harmonisation of capital ratio regulations. There is general agreement that the entry of foreign banks into national markets should be governed by the principle of national treatment, en-

suring international equality of competitive opportunity.

□ □

Further reform of financial systems calls above all for a global, integrated approach towards regulation and supervision, which was underlined by the stock-market crash of October 1987. In the past, financial reform tended to be oriented in a piecemeal fashion, towards particular problems whereas the different parts of the financial system are now recognised to form an interdependent whole.

The systemic risks in activities involving securities are now considered to be similar to those inherent in the operation of the banking system, so that a broad 'run' on the securities markets could be as disastrous for public confidence in the stability of the financial system as a 'run' on the banks. Prudential regulation of the securities business should therefore be fully integrated with that of the banking system, and future reforms should be designed more under a global approach than was often the case in the past.



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Trade in Services with Developing Countries

Kenneth Heydon

It is widely acknowledged that liberalisation of trade in goods can contribute to increased economic welfare of the world's trading nations, developed and developing. But can this analysis be applied to trade in services?

A recent OECD report¹ concludes that what is true for goods is also likely to be true for services: developing countries (LDCs) could indeed benefit from liberalisation, provided that due account is taken of the adjustment strains likely to be entailed in the transition to more open markets.

The nature and extent of benefit will clearly differ from country to country and the considerations applying to a least developed country are unlikely to apply to a newly industrialising economy. Nevertheless, the sectoral experience briefly reviewed here suggests that there are underlying principles with general application over a wide range of countries.

It is common practice in many countries, developed and developing, to foster the indigenous service sector and to curtail competition from external suppliers. In pursuing such a policy many LDCs have sought to avoid a perceived vulnerability in being over-dependent on foreign firms. Underlying those strategic considerations are two general concerns: in macro-economic terms, to minimise the cost of imports, which can threaten the balance of payments position; and in micro-economic terms, to protect the market position of indigenous providers of services.

Though these underlying concerns may be well-founded, the protective measures which they prompt are often counter-productive. Developing countries, whatever their circumstances, stand to gain significant benefits from the multilateral process of trade liberalisation now underway in the Uruguay Round. These benefits will arise in part from increased export opportunities as other countries' barriers are lowered, and in part from development gains as



reductions in domestic protection improve the efficiency of resource allocation and encourage the transfer of service skills from overseas.

Banking and Financial Services

Although it is generally agreed that developed countries have a comparative advantage in the supply of financial services, the internationalisation of banking has not been a one-way street. Indian and Brazilian banks in particular have deve-

loped branch networks in industrialised as well as developing countries, and offshore centres in the developing world account for a large proportion of euromarket business. Liberalisation of banking and financial services will offer export opportunities for some developing countries.

In general, regulations governing the establishment and operation of foreign institutions are more restrictive in developing than in developed countries, whereas prudential and supervisory regulations are usually less strict. In addition to the two general concerns—macro- and micro-economic—LDC controls on banking and financial services are a response to characteristics specific to this sector and its role in fostering economic development and sound domestic monetary policy. Many LDCs consider banking and financial services part of the basic infrastructure of a nation state, and thus a sector over which they may justifiably exercise political control. ►

1. *Trade in Services and Developing Countries*, OECD Publications, Paris, 1989. (It is proposed to share information on OECD work in trade in services with interested non-OECD countries participating in the Uruguay Round. For this purpose a meeting is being arranged in Geneva this autumn.)

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Alamy

Yet the protective environment which these underlying concerns have engendered has led to reduced efficiency in the banking and financial services of many LDCs. In most the range of financial services on offer is quite limited. Foreign banks can be instrumental in filling such gaps and in facilitating the adaptation of advanced financial sector skills to local conditions.

In many developing countries the transition to a more liberal environment in banking and financial services will call for careful attention to the adjustment process:

- in stabilising the macro-economic framework should there be financial distress in the domestic banking sector
- in the sequencing of deregulation, given a risk that liberalisation of the financial sector—if carried out before liberalisation of the current account—may, through induced capital inflow, cause a rapid and destabilising appreciation of the real exchange rate.

These considerations do not argue against liberalisation, but they do call for a process which is gradual and progressive.

The Insurance Industry

While some developing country insurers have established foreign subsidiaries in industrialised countries, and regional bodies, such as the Arab Reinsurance and Insurance Group, have been created to develop members' international activities, for most developing countries export opportunities in the insurance sector are at present limited. Many LDC firms are under-capitalised, they lack the global diversification of foreign-based insurance companies, and they do not generate sufficient income to enable them to cover liabilities.

Insurance plays a crucial role in the economies of developing countries not only for offsetting risks in production and transport and thus facilitating the flow of

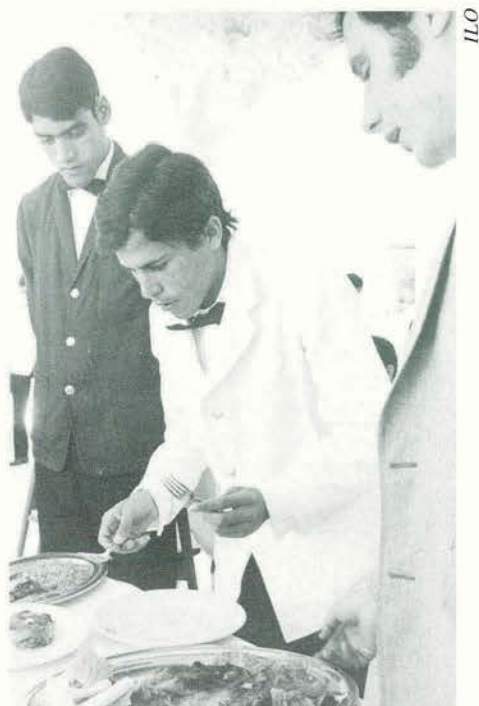
goods and services but also for promoting and channelling savings and for encouraging the use of new technologies and materials. Moreover, LDCs are arguably more exposed to risk than industrialised countries, whether because of natural circumstances or because of the scale of industrial projects relative to GNP. But insurance services are often more expensive and less efficient in LDCs than in developed countries: premium rates are higher and the payment of indemnities is both less prompt and less generous.

Restrictions on cross-border insurance operations and on the establishment of foreign insurers are widespread in LDCs. One particular market where many developing countries impose restrictions is on the inherently international business of cargo insurance, which results in high additional costs for domestic consumers. It is estimated that compulsory local insurance doubles the transport and insurance costs of some 50% of LDC imports.

One of the main reasons given for promoting an indigenous insurance industry is the cost to the balance of payments of importing insurance services. But reduced reliance on foreign-based direct insurance is likely to lead to increased dependence on international reinsurance, because of the inability of local insurers to retain the increased business. In such circumstances any gains through reduced foreign exchange outlays on direct insurance are likely to be significantly eroded. While dependence on international reinsurance will remain so long as underlying economic disabilities persist, one potential benefit of the expansion of trade might be to help LDCs establish an appropriate balance between domestic and foreign-based insurers such that the degree of retention of business were increased.

Liberalisation would not only help reduce costs but would also engender the transfer of skills. In Kenya and Nigeria, for instance, the American International Group (AIG) has put its motor vehicle insurance underwriting entirely in the hands of local enterprises, enabling local staff to acquire valuable on-the-job experience.

As with banking, the process of adjustment to a more liberal environment does not necessarily put prudential control at



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Tomas Sennett/ World Bank

risk. A distinction might thus be drawn between the prudential requirement (applied on a basis that does not discriminate between local and foreign-based insurers) that a proportion of premiums be retained in the country where risks are covered and any additional requirement for the retention of profits—those funds not required to cover claims would be liberalised.

Tourism and Travel

Taking advantage of relatively low labour costs, strategic location on international travel paths and attractive physical or cultural resources, some developing countries are becoming major players in tourism: Mexico, Singapore, Thailand and India were amongst the top 20 income-earners from tourism in 1985. At the same time, the heavy capital requirements and sophisticated electronic information networks required to compete in the international travel business will be beyond the capacity of many LDCs.

Liberalising trade in tourism services would provide an opportunity for increased exports from developing countries, either through individual travellers (in view of the large number of countries that impose restrictions on the amount of currency their citizens may purchase for travel abroad) or through tourism enterprises (in view of barriers against the establishment of tourist promotion offices).

Moreover, a more liberal trade environment would help foster the transfer of tourism skills and related technology into the LDCs that face basic resource or infrastructural disabilities. Various constraints are currently imposed by many

developing countries on foreign-based travel operators, raising their costs and reducing their efficiency and profitability. The result is to limit the degree of activity in the whole travel-and-tourism sector, which may have a ripple effect on other parts of the economy. For the local tourism industry within LDCs, it is not a shortage of financial resources that is their main handicap (few African airlines, for example, have been hampered by an inability to raise external loan finance), but a lack of expertise. It is therefore important that they have access to the communications and organisational skills of foreign operators.

For most developing countries the principal adjustment burden associated with an expansion of activity in tourism will be the strain on the balance of payments resulting from expenditure incurred by their nationals travelling overseas (tourism imports). Although most LDCs have a surplus on their tourism trade, many are concerned by the total outlays that their citizens make on tourism. Easing restrictions on foreign currency allowances for foreign travel may thus be likened to reducing import quotas and, accordingly, has to be undertaken gradually, taking due account of the country's balance of payments situation.

Adjustment strains can also be associated with increased exports. These are related essentially to the impact of tourist flows on cultural integrity and the environment—'externalities', where the market does not reflect and balance the full costs and benefits of activities undertaken. The requirement will again be for a progressive approach to liberalisation in which opportunities are encouraged for co-operative arrangements between host countries and international tourism enterprises.

Construction and Engineering

A number of developing countries have proved to be highly competitive exporters of construction and engineering services, essentially because of their large pools of low-cost skilled and semi-skilled labour, their mastery of 'mature' technology, and the close relations they may have with

other LDC host countries. In 1987, 33 of the top 250 international contractors were based in developing countries—11 in South Korea, four in Singapore and three in India.

Labour costs are a key element in this situation. South Korea, faced with rising domestic wages, has seen its share of international construction work fall from 11.2% in 1982 to 2.8% in 1987. The other side of this coin, of course, is that opportunities are opening up for other LDCs: Korean companies are increasingly using site workers from other low-cost developing countries, such as the Philippines, Thailand, Indonesia and Pakistan. An important consideration if these opportunities are to be fully realised will be the way in which the services framework being discussed in the Uruguay Round deals with the question of the temporary re-location of service providers and essential personnel.

Construction and engineering activities are often regarded as the basis of economic development, since there are major 'backward' linkages with labour-intensive industries such as cement and steel manufacturing and 'forward' linkages with most other productive sectors. In these circumstances, developing countries may be tempted to pursue policies of support for infant industries—to realise comparative advantage more quickly than might otherwise be the case. And, indeed, experience in the LDCs suggests that import substitution policies can serve to stimulate local technological effort. The danger is that local engineering service firms are denied ready exposure to imported technology and the demonstration that a more liberal, export-oriented environment can bring substantial economic benefits. ▶



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In the last two decades advanced technology firms have increasingly acknowledged the net gains (for them) of technology transfer, as a condition for securing business. A principal constraint on technology transfer in construction and engineering services is thus likely to be the capacity of the host country to absorb the imported technology. A major challenge in the transition to a more liberal environment will thus be to help foster a co-operative approach between domestic and foreign companies, ensuring the optimum use of local inputs and capacities while drawing on foreign skills and technology not otherwise available to the developing country in question.

Information, Computer and Communications Services

The merging of computer and communications technologies has produced an area of service activity that is not only important in its own right, but also a vital element in the conduct of all other service and manufacturing activities. A number of developing countries are realising export potential within the information economy as advances in micro-electronics reduce costs of entry and opportunities open up for labour-intensive activities in areas such as data input, data processing and software development. But there are limits to the scope for LDC exports. Costs of entry will be lowered if all that is required is simply to plug into the network, but this will not be the case if an independent net-

work is required or if basic telecommunications infrastructure is seriously deficient. Similarly, opportunities arising from labour intensity will be qualified where a high degree of skill and capital intensity is also required.

Partly in response to perceived disabilities, many countries (developed and developing alike) have introduced some form of official 'informatics policy'. These can entail protectionist measures, whether by restricting market access and trans-border data flows, limiting the right of establishment, or by imposing discriminatory taxation. Such policies are likely to impose high costs and be a major disincentive to trade. Opening up the market could bring benefits to both producers and users, and any efficiency gains would again have a ripple effect through the whole economy.

A principal benefit of a more outward-oriented approach, in this as in other sectors, is likely to be the transfer of skills associated with foreign-based service providers. Experience suggests, for example, that the risks of technological changes overtaking the competitive strengths of the LDCs in software production can be reduced through the creation of joint ventures and associated technology transfer.

If LDCs are to open up their markets, their interests will have to be taken fully into account and attempts made to allay their concerns in three particular areas:

- possible changes in the institutional environment (for example, by any diversion of traffic from Intelsat's global satellite system and consequently reduced benefits from its tariff structure which tends

to favour thin, predominantly LDC, traffic regions)

- the perception of LDC vulnerability associated with, for example, access to data questions and the risks entailed in storage overseas of nationally important data bases
- the fact that while certain forms of services trade may assist the development process, a purely trade-oriented approach would not address the underlying problems faced by developing countries with inadequate communications infrastructure.

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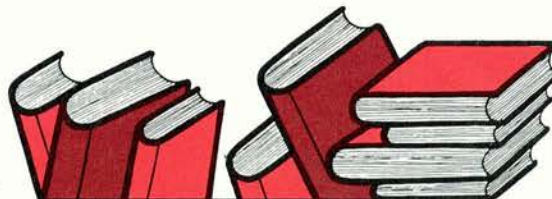
It might be concluded that, whatever their circumstances, developing countries can expect to derive benefits—whether through export opportunities or efficiency gains—from a multilateral process of liberalisation of trade in services which:

- is rules-based and provides a viable alternative to market opening in response to bilateral pressure from trading partners
- draws a distinction between liberalisation and deregulation, thus enabling LDCs to retain or even strengthen the regulations required to protect consumer interests or ensure sound prudential control
- facilitates service transactions involving establishment or physical presence and the skills transfer which this frequently entails
- is progressively applied, enabling LDCs to adjust gradually to a more liberal environment.



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THE PATH TO FULL EMPLOYMENT STRUCTURAL ADJUSTMENT FOR AN ACTIVE SOCIETY

The *Employment Outlook*¹ appears at a time when employment growth over the past year in the OECD area outside the United States as a whole has been at its strongest since 1973. This progress, which includes almost six million additional people in work in 1988, has helped fulfil the aspirations of many citizens of OECD countries to become economically and socially active.

Nevertheless, complacency is not warranted. Unemployment remains high—7½% of the labour force in the OECD area as a whole—and a substantial proportion of job-seekers has been looking for work for over a year. Furthermore, even the relatively rapid growth in employment over the last two years has not brought the OECD as a whole anywhere near to full employment.

When reviewing the trends in employment and the prospects for the future, it is important to reflect on the types of policies and societal choices which facilitate a continuing brisk growth of employment. Current strong employment growth provides both the opportunity and a particular requirement to re-activate the long-term unemployed. The opportunity arises because the current growth in employment comes at a time of increasing reports of skill shortages by employers. Sufficient versatility has to be achieved in those working or seeking work to meet these skill shortages.

This is not to suggest that the demand for experienced, skilled labour can generally be met directly from the ranks of the long-term jobless. Rather, the opportunity both for further reductions in un-

employment, and for meeting tomorrow's skill requirements, lies in mastering a more extensive and complex chain of relationships. This involves an expansion of training activity and re-organisation of working practices, thereby generating the skills required and consequentially creating vacancies in entry-level positions. These are the vacancies which the existing unemployed are most able to fill, the more so if employment services and employers together provide the necessary initial support.

Such a strategy is required now in many countries to maintain recent employment growth. Current inflationary pressures are leading to a tightening of monetary policies in most OECD countries, and if structural constraints remain unchanged, there would be risks of a reduction of the growth rate of output and

of employment. Adaptive and flexible labour markets are crucial to overcoming such constraints. The environment in which change occurs is shaped importantly by governments, but employers (including, of course, public-sector employers) and unions have a particular responsibility for this aspect of structural adjustment.

There are other important reasons for expanding employment opportunities. Demographic developments—already occurring in Japan, and soon to affect Europe—will by 2020 increase appreciably the ratio of aged people to those of 'working age'. Unless retirement occurs later or the aged become wealthier, ensuring an adequate income for those who have retired could require an in-

1. *OECD Employment Outlook*, OECD Publications, Paris, 1989.

creasing flow of support from the economically active. But even in those societies in which extensive transfers and consequently high tax rates are accepted, there is a perception that tax levels cannot readily be raised further. If the degree of support is not to be reduced, any extra burden on the transfer payments system will require a broadening of the tax base. There is thus both a clear interest, private and public, in achieving a broadening of participation in employment.

The Limits to Post-war Socio-economic Performance

When full employment was adopted as a policy goal in the early post-war period, its meaning seemed self-evident: all those who wished to find employment at prevailing wage rates were to be able to do so. By offering all 'bread-winners' the opportunity to support their families, full employment ensured that mass poverty was largely eliminated. Full employment, and the economic growth associated with it, also formed the context in which the main programmes of social protection were developed and in turn much expanded. Health, education, and old-age pension schemes were progressively extended to cover entire populations, their structure being largely, although not entirely, based on the traditional family and the close links of its single (usually male) earner with regular employment. Welfare payments supported those who were unable to work or were not part of a settled family.

Throughout the 1950s and '60s, and indeed into the early 1970s, full employment, steady economic growth and the development of social programmes proved mutually reinforcing, and in social and labour-market terms achieved considerable success. The health status of populations improved, the proportion of children proceeding to higher education increased significantly, and poverty in old age was largely eliminated.

J. Maillard/ILO



Demographic developments will by 2020 increase appreciably the ratio of aged people to those of 'working age'.

Further, the systems of both unemployment compensation and general welfare support which were in place by the early 1970s were to prove very important in the latter part of that decade, as well as in the 1980s, in softening the social impact of high unemployment.

This environment of relatively steady growth in per capita incomes led many OECD societies to aspire to offer all individuals the chance to escape dependency on others. But over the last decade or so several developments have weakened some of the underpinnings of what had been a strong, but simple, and in some areas inflexible, structure of full employment, social protection and economic growth. The initial reaction in many countries as unemployment rose was to offer income support in place of access to earned income, the hope being that the economic downturn would prove temporary, and that full employment would therefore soon be re-attained. It was hoped that this support would prevent a lapse into dependence on the part of those displaced from their jobs. But in a number of countries full employment proved very difficult to regain, and the entitlement to support thus proved to have offered only a false independence. In many countries, inflation pressures appeared to require higher rates of unemployment to keep them in check. And there appeared also to have been a growth in structural unemployment: the number of unfilled vacancies rose in relation to the number of unemployed.

Thus policy-makers in many countries had to come to live for a period with rates of unemployment which nonetheless they regarded as unacceptable for the longer term. And perhaps even more importantly, unemployment has proved to be concentrated in particular groups (young people, older workers, the long-term unemployed), and in particular localities. The weak links of these groups with employment-based entitlements and benefits has meant that they, together with others often outside the labour market—such as lone parents or

discouraged workers—have experienced a form of 'new poverty' in which they have become isolated both economically and socially.

Accompanying these changes have been others in family structures and, indeed, in employment itself, changes which have tended to weaken the previously rather direct links between employment and social protection. In some cases they have had positive results: the growing number of two-earner families with fewer children has of itself tended to strengthen the links of households with the labour market. Only a small minority of the unemployed are now husbands in families in which no-one else is employed. And where both earners have continued in full employment, households have become relatively better off. On the other hand, the search for independence has also led to larger numbers of single-person (and thereby more vulnerable) households, and the diversity of employment patterns—part-time, intermittent, temporary—has not been matched by a corresponding diversity in entitlements to social protection.

Early Responses to the Setback to Full Employment

As it became recognised that unemployment was proving longer-lived than had been hoped, two main avenues of policy reaction were followed. One was to seek to ration the supply of labour more in line with the limited 'stock' of jobs which were considered to be available. In other words, policy sought to achieve a lower unemployment rate by reducing the number of people who sought to find employment—by reducing or even reversing immigration flows, by encouraging earlier retirement, and (in some contexts) by discouraging women from entering the labour market. Sometimes, longer schooling was seen as a way of deferring youth unemployment, but not as a means of increasing the

overall employability of young people—it being thought that, because there were not enough jobs, there was nothing that the schools could do to increase aggregate employment. A policy situated between the two was to seek to redistribute employment through work-sharing arrangements.

Such approaches have come to be seen as a dead end. First, they have not generally been effective. The countries with the lowest unemployment rates are not those with the lowest participation rates, but rather those with the highest. Similarly, unemployment has fallen in many countries which have continued to accept substantial numbers of immigrants, while it has stalled, at a high level, in a number of countries with strong restrictions. Second, such policies run counter to social trends: women, in particular, are no longer willing to withdraw from the labour market whenever the supply of jobs appears to decline. And it is increasingly apparent that in most countries, over the longer term, demographic trends are going to make a continuing decline in the age of retirement inconsistent with the maintenance of adequate incomes for those who have retired.

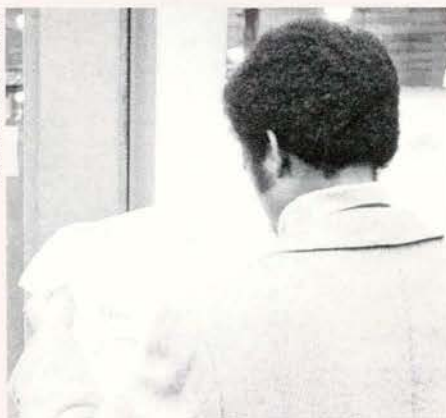
A second policy approach was to create special jobs targeted at groups—either through direct public-sector job creation or through the subsidisation of jobs in the private sector. Initially, such efforts were generally directed either at the reduction of unemployment through the creation of jobs (in the public sector) for the unemployed, or through the subsidisation of employers in the private sector to hire unemployed people. Such policies sought to 'cheat the Phillips curve' by confining such direct employment creation to those least likely to be in demand by employers in the open labour market. Such policies were thus the counterpart—on the demand side—of 'supply control' policies.

This approach, too, progressively became recognised as not very satisfactory, particularly with 'special' job creation in the public sector. To the extent that such

policies improved the employment prospects of those 'officially' unemployed, they encouraged people not in employment to classify themselves as unemployed, and hence did not succeed in 'confining' the labour market. Much effort often was put into ensuring that the 'special' jobs were additional to—and hence in general separate from—normal recruitment. But in turn this often meant these jobs did not represent a particularly satisfactory path into the normal labour market. Direct employment creation thus did not necessarily enhance the employment prospects of participants, and neither did it substantially reduce long-term unemployment. To the limited extent that it may have done so, this was often achieved by re-allocating jobs away from other entrants into the labour market, many of whom thereby entered the pool of unemployment in place of those who escaped through participation in special programmes—the phenomenon of 'churning'. In recent years, a number of countries—among them Australia, Canada, New Zealand, the United Kingdom and Sweden (for youth)—have for this reason significantly reduced their expenditure on direct job creation, while at the same time increasing expenditure on opportunities for training the labour force.

Proposals to reduce unemployment through reductions in working time straddled these two approaches. Working-time reductions which are imposed without a concomitant slowing in the rate of increase of hourly earnings increase labour costs, and hence are unlikely to increase the number of jobs available. Even if hourly labour costs do not rise, a reduction of working time is unlikely to translate into the equivalent number of full-time positions, since it is relatively easy for firms to adjust through increases in overtime working. If extra jobs are to result from working-time reductions, many of them would almost certainly have to be 'non-standard', and many of those who take them would be new entrants into the labour force. Some recently negotiated agreements on re-

Alain Nogues/Syigma



duction of working time, such as those in the German metal industry, have recognised this in part, by the agreed linking of reduction in standard working hours to increased flexibility in workplace procedures.

The Trend towards More 'Active' Societies

In response to these policy questions, the last five years or so have seen a new, and in a number of ways more sophisticated, policy approach in a number of OECD countries. This approach welcomes—rather than resists—the entry of new groups into the labour market. It recognises the demand for participation in economic and social life which is increasingly voiced by most groups in the population, and does not seek to resist the expression of this demand through a growth in aggregate participation in the labour force. Instead, the underlying goal is to enhance the effective productivity of the population as a whole by drawing on talents previously unused, harnessing them in a more effective and comprehensive division of labour. Such structural reforms have the same potential for increasing productivity as do improvements in the productivity of technical equipment. If they are implemented in a manner which is responsive to technological and market developments, and are combined with other reforms which

reduce structurally induced inefficiencies, output and productivity can improve and inflation can be contained, leading to higher employment and real income: the micro-economic impact of a more productive population becomes validated at the macro-economic level.

This implies that the statistical distinction between those currently in the labour force and those who would like to be is increasingly a poor guide for policy-making. Hence, the goal becomes both to welcome into active life all those who wish to take part, and to enable them to do so. The aim thus is not to 'define away' unemployment, by assigning those seeking work to some other status, but rather to recognise that realisation of the full human potential of the population involves the employment not only of the unemployed, but of all those who wish to participate—whether working full-time, part-time, or in casual employment.

Obstacles to participation in economic life clearly have to be broken down if this goal is to be attained. One avenue being pursued is the removal of institutional impediments to other 'non-standard' forms of participation in the labour force, such as part-time work, week-end work, self-employment and home work, either through the removal of regulatory constraints (as in the United States and the United Kingdom) or through the renegotiation of collectively bargained constraints. A policy choice has to be made here: the removal of such impediments may lead to some activities being performed in these ways rather than in 'regular' full-time jobs. The 'permanent' job as an entitlement to a secure income in return for performing the same unchanging tasks is increasingly inappropriate in societies which seek to mobilise their full talents in response to evolving technologies and markets.

This point does not mean that the quantity of regular full-time employment has been declining or will do so; a more productive economy calls forth new demands for labour, and some of this is full-time. The process is turbulent—of the stock of jobs at any point in time, at least

one in ten was created over the past year, and at least one in ten will disappear during the forthcoming year. This means that adequate training and other mobility-enhancing facilities will in general be necessary if some of those displaced from full-time jobs are not to be permanently sidelined from the mainstream of employment. To avoid this, it becomes necessary, perhaps increasingly so, to develop avenues of mobility between

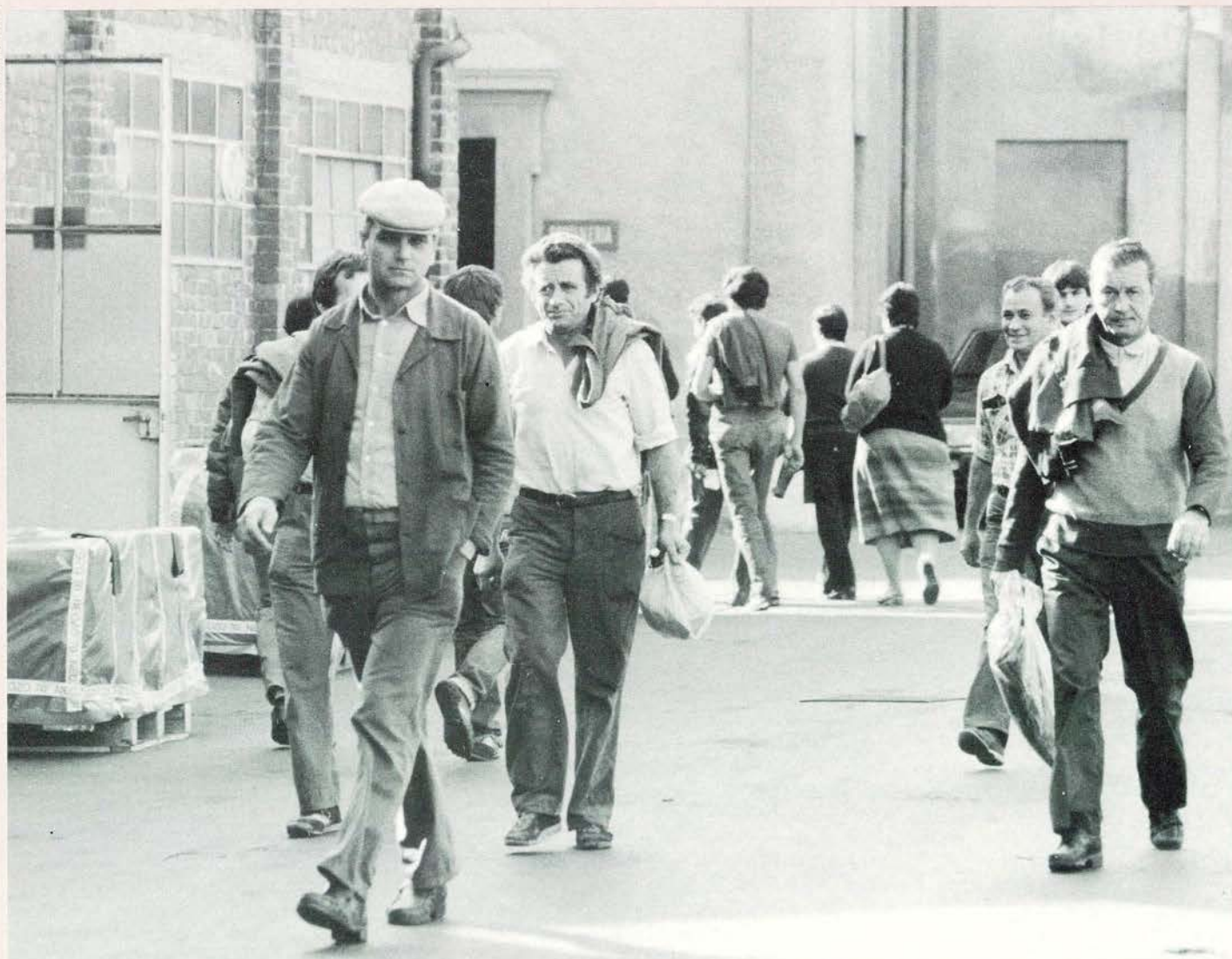
'non-standard' forms of participation and full-time regular jobs.

Increasingly, and helpfully, market mechanisms are generating such avenues—for example, temporary employment agencies in the United Kingdom have been finding it necessary to offer training facilities and employment continuity to attract able recruits and to offer employers the expertise they require. Just as much adaptability is likely to be

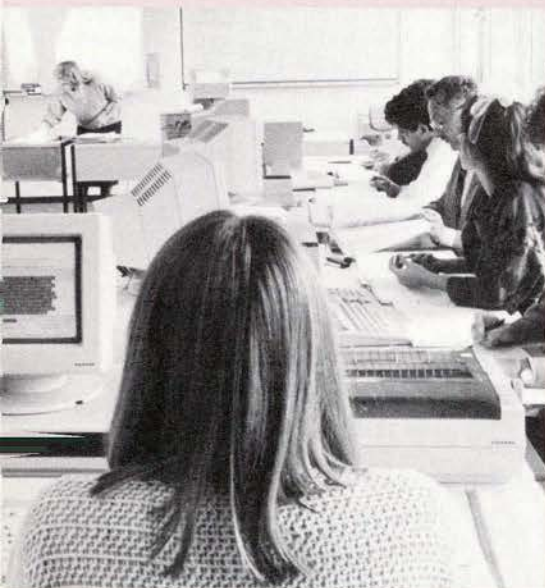
called for on the part of those who continue to be employed full-time. They will continually be challenged to upgrade their qualifications, and will often find their working lives change even if they remain employed with the same enterprise.

In the fight against chronic unemployment, this new policy strand is refocusing attention. Income-support payments to the unemployed are generally

J. Maillard/ILO



By offering all 'bread-winners' the opportunity to support their families, full employment ensured that mass poverty was largely eliminated.



Temporary employment agencies have been finding it necessary to offer training facilities and employment continuity to attract able recruits and to offer employers the expertise they require.

even less than minimum wages in full-time work, particularly for those for whom earnings-related insurance benefits have expired. Providing training opportunities which occupy the unemployed full-time can require considerable additional expenditure—not only for direct wage costs but also for the ancillary costs of providing structured training—even if that training includes participation in productive work.

There have recently been a number of initiatives which have sought to escape from the constraints which these additional expenditure requirements can imply, and to move to a more sophisticated analysis of the net overall benefits from active labour-market programmes. Many income-support schemes which are conditional on job search by recipients proved unable to be adequately controlled during the (long) periods during which vacancies were considerably outnumbered by job-seekers. Thus, making income-support recipients eligible for continued support if they undertake activities to improve their readiness for the

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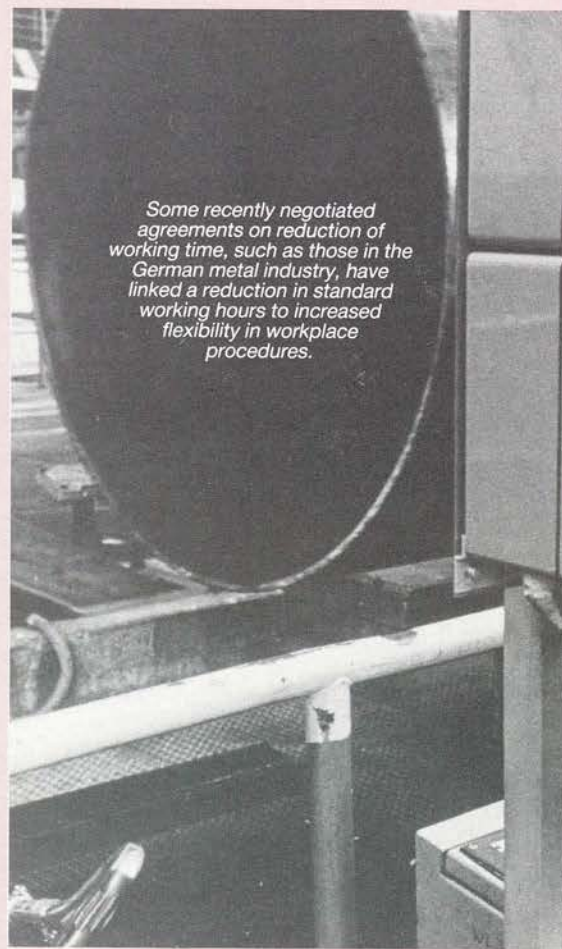
labour market can actually lead to a reduction in the total cost of the support—even if the 'active' programmes are more expensive per participant than is passive support. The successful integration of those not in employment into the labour market will always involve some displacement of those already in employment. Yet, unless displacement is near total, the social rate of return from reintegration should quickly repay the investment implied by the difference between the cost of income support and that of more active measures.

A number of countries have recently introduced initiatives which reflect such thinking. In those countries in which unemployment benefits were previously available to teenagers on the same basis as to adults—for example, Australia, New Zealand, Sweden and the United Kingdom—income support for teenagers is now conditional on participation in some form of training and/or part-time employment. Unemployment benefit systems for adults are being revised to emphasise active measures in Sweden, Australia and Canada. The recent welfare reform in the United States has attempted to eliminate those features of the income-support system which discouraged participation in the labour force by lone parents. And France's new minimum income scheme (*revenu minimum d'insertion*) is designed to link in with measures for reintegration into society.

Such approaches are requiring a diversion of resources from merely maintaining the incomes of those who are unemployed, disabled or lone parents to finding ways in which they can participate in economic life. In such reform programmes, the goal is to find other guided forms of training and employment which will preserve income-security entitlements while encouraging actual participation in the labour force. If this involves an extension of part-time employment, it is generally not in the context of 'sharing out' existing full-time posts, but rather of using the resources currently devoted to passive income maintenance to create additional em-

ployment opportunities which would be structured so as to reintegrate participants into working life.

Thus it would be a fundamental mistake to identify the role of policy purely in terms of 'programmes' entitling particular classes of individuals to particular forms of income support or other assistance. Such measures have an important place, but will be effective only if they operate in the context of an entrepreneurial and innovative community climate. Community initiatives which foster such a climate—the focus, for example, of the OECD's Initiatives for Local Employment Creation (ILE) programme—are therefore essential complements to such targeted measures. Schemes which encourage



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the unemployed to create their own business or become independent workers, which now exist in one form or another in most OECD countries, combine the benefits of both approaches, being both targeted on the unemployed and aimed at replacing dependency by enterprise.

The Education System and the Labour Market

Educational structures have also been influenced by these trends. As participation in the labour market has increased in variety and extent, it has become progressively clearer that there is no contradiction between the broad social and

cultural objectives of education and training for labour-force participation. Fears that training for the world of work might require that classrooms be turned into extensions of factories have been calmed by the growing realisation that methods of work organisation which incorporate continual learning are also more productive. Humane and co-operative schooling methods seem to be the best preparation for adult life both in the workplace and outside it.

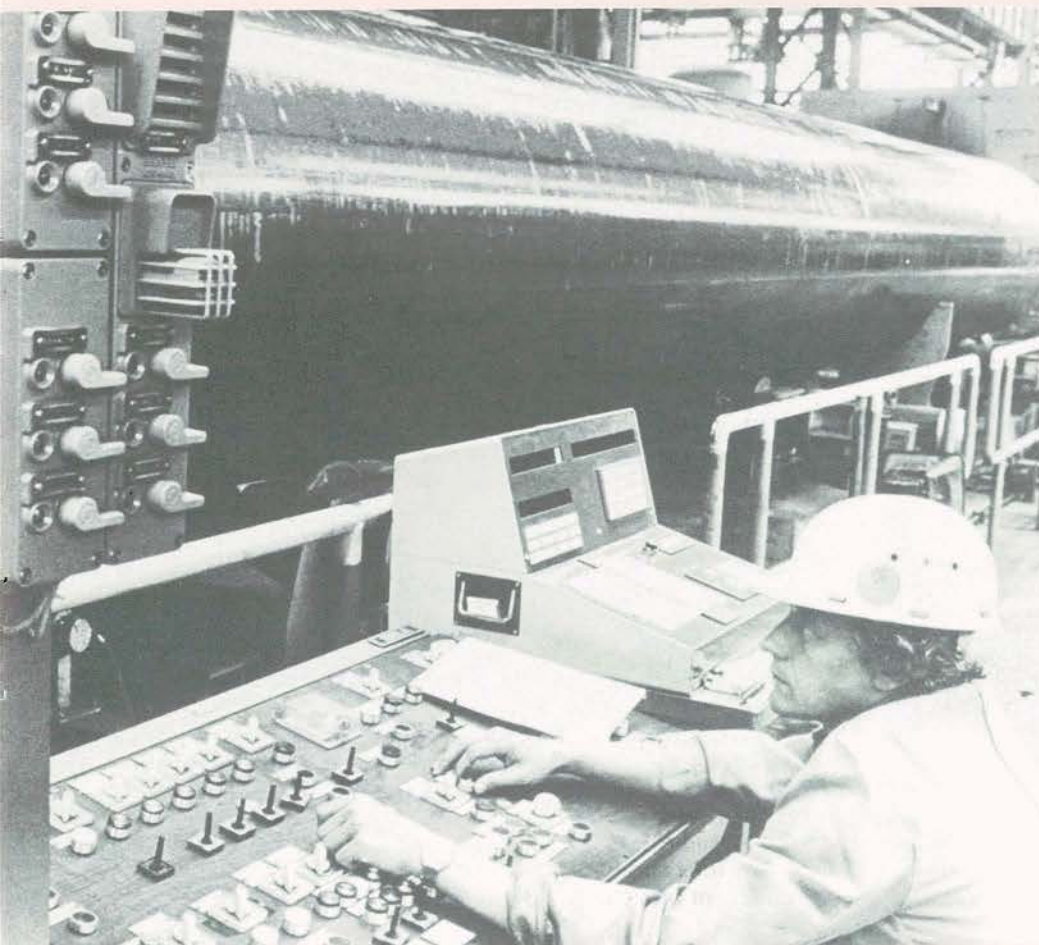
The recent general revival of interest in the links between the education system and labour market outcomes reflects those concerns. It has become apparent that if all citizens are to be adequately prepared for active life, educational ar-

rangements must cater for the requirements of all, and not only the most talented. These concerns underlie the 'quality of education' debate about the basic skill attainments of schoolchildren which have emerged in most countries in recent years. But there is a danger that laying down standards without also instituting measures which enable the disadvantaged to achieve them might identify the talented more efficiently but not improve overall attainment. The tragic result could easily be the persistence of a pool of unemployed young people simultaneously with high demand for young entrants to the labour market whom the system has identified as talented.

Many of the cultural and intellectual achievements of all societies have been accomplished by elites, and there is an understandable tendency for education systems to orient themselves to the selection of those best fitted to preserving and developing those accomplishments. The challenge for educational curricula and structures is to find mechanisms by which such achievements can be enhanced by a process other than one of exclusion.

Towards a More Active Society

Although the attention of economists and economic policy-makers has been directed mainly to the enlargement of opportunities for increased participation in labour-market activity, there are also other ways in which people can participate actively in society. In particular, those who have retired—often before the age of 65—frequently have little wish to re-enter the labour market, but equally are unwilling to withdraw completely from community life. In all communities there is a spirit of generosity and co-operation which is institutionalised in welfare systems, but which is also evident in voluntary co-operation and mutual assistance. Further education and community-service organisations which cater for



Mannesmann



Bossu/Sygma

The tendency for women to enter declining industries may suggest that barriers to entry for women should be re-examined if they are to participate fully in careers in expanding areas.

these desires clearly add to the range of choices available in the community, and can complement and enhance participation in the formal labour market.

The role of public policy through social provisions then becomes one of removing obstacles to individual activity (such as unduly restrictive age retirement rules) and of ensuring that individuals have the skills to make such activities personally and/or economically rewarding. Policies which do so include the removal of incentives to early retirement, the revision of tax structures and child-allocation provisions to remove any discouragement of participation by married women, and the broadening of child-care provisions.

Many of the analytical topics addressed here point to ways in which specific groups of the citizenry can be enabled to be more active. The discussion of educational attainment shows starkly that those with only a basic education are increasingly less likely to establish themselves in modern labour markets—hence

the importance of an education system which ensures widespread competence. Regional labour markets are as susceptible as are national ones to isolating the immobile or the less educated from opportunities. The co-existence of regions of high unemployment with other regions in which labour and housing markets are over-heated suggests that rigidities in relative wage structures and in housing markets can be as harmful in inhibiting opportunities for participation within countries as are inappropriate relative aggregate wage levels and trade barriers between countries. Compensation to the injured, however generous, is a poor substitute for adequate measures for the prevention of occupational accidents, and can directly inhibit reintegration if compensation is conditional on inactivity. Measures which encourage the re-entry of retired or injured workers (as is the case with the recent invalidity pension reforms in Sweden) are thus an important complement to accident prevention.

The examination of the characteristics of growing and declining industries points to further issues. The strong relationship between educational attainment and relative growth by industry indicates the importance of the educational infrastructure in enabling employment expansion. The tendency for women to enter declining industries, by contrast, may suggest that barriers to entry for women should be re-examined if they are to participate fully in careers in expanding areas. And the importance of temporary employment in growing industries suggests that this form of labour market flexibility makes a significant contribution to the enhancement of overall employment growth.

□ □

There is clearly a type of 'full employment' which OECD countries have rejected, and which also is being abandoned elsewhere. It pretended to offer guaranteed employment to all, maintaining jobs even when they had ceased to respond to technological requirements or consumer preferences. This type of policy has proved fundamentally inconsistent with economic progress.

The alternative to this policy is not to confine economic activity to a narrowing number of increasingly productive employees, and making the resultant unemployment tolerable through income transfers from the active to the inactive. Rather, it is to base policy on the recognition that it is workers and their talents, and not just physical hardware or the accumulated software of organisational arrangements, which constitute the driving force of societies. A more productive population—one which develops in new ways its inherent talents and the potential which schooling has provided—can help to improve the real resources available, in the process adding to the volume of output which can be derived from existing physical capital. The resulting higher real incomes can lead in a virtuous circle: to higher incomes, higher employment and faster social progress. ■