

# the **OECD** **OBSERVER**

**TECHNOLOGICAL GAPS IN THE COMPUTER  
INDUSTRY OECD RECOMMENDS NEW, SOFTER  
TERMS OF AID EQUALITY AND QUALITY FOR  
MODERN EDUCATION NEEDS HOW TO SOLVE  
SPECIAL MANPOWER PROBLEMS BUS TRANS-  
PORTATION TO AID URBAN TRAFFIC-JAMS**



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# the OECD OBSERVER

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# INTERNATIONAL FINANCIAL RELATIONS IN 1968

*This article is the analysis of international financial developments in 1968 in the annual report of the Board of Management of the European Monetary Agreement just published. The Board consists of eight experts from the Treasuries and central banks of OECD countries who are responsible for supervising the operation of the EMA (1).*

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(1) The European Monetary Agreement provides a framework for monetary co-operation between governments and between central banks. Its main purposes are, first, to lay down certain basic rules concerning the foreign exchange transactions of Member countries and, second, to help them overcome temporary balance-of-payments difficulties by granting them short or medium-term credits from the European Fund.

**I**n 1968 the volume of the OECD countries' international transactions — visible trade, invisibles and capital flows — greatly increased. But, as the degree of imbalance also increased, the deficits and surpluses requiring official financing were higher than in the previous year. Little progress was made towards a sustainable adjustment of the persistent and excessive imbalance in some countries' situations.

The economic climate was dominated by the *recovery of output in several major countries*, after the slow-down in 1967, and especially by the *rapid expansion in the United States*.

*Total real output of OECD countries rose by 5.3 per cent (3.4 per cent in 1967). Total visible trade increased nearly three times more, by 13 per cent in volume (5½ per cent in 1967). This acceleration of trade in relation to output was partly due to greater economic integration (through, for example, the removal of tariff barriers within the EEC and the EFTA, and the first reductions in tariffs under the "Kennedy round" agreements). But the main reason was the excessive rate of demand expansion in the United States economy, which led to an increase of*

*\$ 6½ billion (23 per cent) in the United States' imports, more than four times the increase in real output (5 per cent). Through its direct and indirect effects, this caused a sharp rise in the exports and imports of many other countries.*

Two other major factors were: the recovery of growth in Germany (real output increased by 6.7 per cent, after showing no rise in 1967, producing an increase of \$ 2½ billion in imports, which had fallen by \$ ¾ billion in 1967); and the strong growth in the United Kingdom (real output increased by 3.7 per cent, compared with 1.6 per cent in 1967, and imports rose by \$ 1 billion).

The increase in the OECD countries' total trade was not, as in some recent years, concentrated on trade within the OECD area. The increases in trade with non-OECD countries were among the highest ever recorded: imports from them rose by \$ 4 billion (10½ per cent) and exports to them rose by \$ 4.1 billion (10 per cent). The non-OECD countries were enabled by the substantial rise in their exports to increase their imports correspondingly; their trade balance with the OECD area remained about the same as in 1967,

a deficit of about \$3½ billion. (In these figures imports as well as exports are calculated on an f.o.b. basis.)

## *Capital Flows*

The volume of capital movements also increased substantially. There were many reasons for this. It reflects, for example, important changes in recent years in practices and techniques: European investors have tended to hold a larger proportion of American securities in their portfolios, attracted by the depth and growth potential of the US market and encouraged by the reduction, since 1966, of US tax requirements for foreign investors in US securities; multinational firms have a growing share in international transactions and their operations tend to take the form of direct investments rather than exports; the financing of international trade and payments has been conducted to an increasing extent through the Euro-currency market, rather than domestic financial markets; American and other firms have had greater recourse to the international bond market (in which total issues doubled in 1968, to \$4.7 billion, American firms' issues increasing by \$1.6 billion, to \$2.2 billion, because, after the introduction in January 1968 of mandatory controls on their direct investment outflows, they financed a larger proportion of such investment by borrowing abroad); and the considerable extension of export credit facilities provided by governments has probably resulted in a larger amount of capital goods exports being sold on credit terms.

Two general factors tended to increase capital flows in 1968: the narrowing, or in some cases the reversal, of the gap between United States interest rates and those in Continental Europe and the influence of confidence factors or speculative reasons.

## *Interest Rates*

The narrowing of the interest rate gap between the United States and Continental Europe began in 1967. In that year, short-term rates in Continental Europe fell from between ¾ per cent and 1½ per cent above the US level to below that level: the rate for three-months' deposits in the US remained at about 5¾ per cent, but Continental European rates fell from 6½-7 per cent to 4-5½ per cent — except for the traditionally low Swiss rate which fell from 4½ to 4 per cent. German rates fell strongly from 7 per cent to 4 per cent. The Euro-dollar rate fell from 7 to 6½ per cent. In 1968 all these rates rose, but the new pattern continued: in particular, the United States three-months' deposit rate remained about 2 per cent above the German and Swiss rates and less than 1 per cent below the Euro-dollar rate.

Over the year 1968 commercial banks in the United

States borrowed some \$1.8 billion from their foreign branches, which obtained most of these funds through the Euro-currency market. At the end of 1968 and early in 1969 monetary restraint in the United States was considerably tightened and United States' short-term rates rose to record levels. US banks increased their borrowing from their branches in Europe by a further \$2 billion in the first two months of 1969.

In the case of long-term rates, over the two years 1967-68 the gap between Germany and the United States was reversed: yields on long-term industrial bonds in Germany fell by more than 1 per cent, from about 7¾ per cent to 6½ per cent, while yields on domestic issues in the United States rose from about 5½ per cent to about 6¾ per cent. Yields in Belgium, France and the Netherlands remained in the range 6½-7¾ per cent; while the traditionally low yield (on government bonds) in Switzerland fell slightly from 4½ to 4¼ per cent.

The yield on Euro-dollar bonds issued by American corporations remained ¾ per cent to 1 per cent above that on domestic US bonds. But the yields shown are averages for new and old issues by first grade firms; for new issues at the end of 1968 the yield on domestic US bonds was 7 to 7¼ per cent and for all but top-grade firms it was still higher (i.e. close to or higher than Euro-bond yields). Moreover, owing to the high yields on Euro-bonds, most of the American firms' borrowing in this market was in the form of dollar-denominated convertible debentures (with a yield on offering in the range of 4½ to 5 per cent) or DM-denominated straight debt issues with a yield of about 6 per cent.

## *Three Major Crises*

While confidence factors and speculation influenced capital flow throughout the year, three major crises can be discerned.

The first was caused initially by the uncertainty about exchange rates following the November 1967 devaluations. Against the background of the large deficits of the reserve currency countries in 1967 and the continuing rapid rate of expansion in these countries in the early months of 1968, confidence remained weak and doubts began to build up as to whether the Gold Pool would continue supplying gold to private buyers. There was heavy private buying of gold at the end of 1967, which was repeated early in 1968. The active members of the Gold Pool supplied about \$1½ billion of gold to meet private demand in November and December 1967, and roughly the same amount in the first months of 1968, mainly in March. On 17th March they announced their intention "no longer to supply gold to the London market or any other gold market" and stated also that "as the existing stock of monetary gold is sufficient, in view of the prospective establishment of the facility for Special Drawing Rights, they no longer feel it necessary to buy gold from the

market". Subsequently, a large number of other central banks adhered to this statement of policy, which established the so-called "two-tier system". The circuit of monetary gold holdings and transfers was henceforward insulated from the effects of private demand. The price of gold in the monetary gold circuit is the US Treasury's price of \$ 35 per fine ounce, which the United States maintains for sales to and purchases from monetary authorities. The price of gold in the private circuit is freely determined by supply and demand.

The second crisis concerned the French economy. It was caused by the strikes and riots in France in May-June 1968 which led to a large capital outflow from France. For the year as a whole the loss of monetary reserves was \$ 2.8 billion.

The third crisis came to a head in November 1968, when doubts about the strength and stability of the French economy's recovery from the earlier crisis and rumours concerning a revaluation of the D-mark set

off huge short-term capital movements into Germany from France and many other countries. Between late August and 20th November the German Federal Bank's gross sales of D-marks for foreign currency amounted to more than \$ 4 billion; but by offering favourable terms on swaps and also by providing outright forward cover back into D-marks it was able to bring its net purchases down to \$ 2.8 billion, of which \$ 2.3 billion in the first three weeks of November. This inflow was reversed in the two months after the Bonn Conference of the Group of Ten, on 20th-22nd November, and the announcement of the fiscal and monetary measures taken by France, Germany and the United Kingdom and the standby credit granted to France.

The military intervention in Czechoslovakia and the tensions in the Middle East also disturbed confidence and were part of the explanation of the capital flows to the United States and of those into Switzerland

## OECD COUNTRIES : CAPITAL MOVEMENTS IN 1967 AND 1968

Billions of US dollars

	Year	TRADE BALANCE	INVISIBLES and TRANSFERS	CURRENT BALANCE (including government transfers)	CAPITAL INFLOW OR OUTFLOW (-)					OFFICIAL SETTLEMENTS surplus or deficit (-)
					TOTAL (including unrecorded)	of which :				
						OFFICIAL LONG TERM	PRIVATE LONG TERM	SHORT TERM (and unrecorded)	BANKING FUNDS	
1	2	3	4	5	6	7	8	9		
United States	67	3.5	-1.8	1.7	-5.1	-2.4	-2.8	-0.6	0.7	-3.4
	68	0.1	-1.0	-0.9	2.5	-2.3	1.5	-0.4	3.7	1.6
United Kingdom	67	-1.7	0.7	-1.0	-0.2	-0.1	-0.2	0.5	-0.4	-1.2
	68	-1.9	0.9	-1.0	-2.0*	0.1	-0.2	-0.3	-1.0	-3.0
Belgium-Luxembourg	67	0.1	0.1	0.2	0.1	-0.1	0.2	-0.1	0.1	0.3
	68	-0.0	0.0	0.0	-0.3	-0.0	-0.1	-0.0	-0.2	-0.3
France	67	0.2	0.0	0.3	0.0	-0.1	0.2	-0.5	0.4	0.3
	68	..	..	..	(-2.8)**	..	..	..	..	(-2.8)**
Germany	67	-5.3	-2.8	2.5	-2.4	-0.4	-0.4	-0.4	-1.2	0.1
	68	5.7	-2.8	2.9	-1.1	-0.3	-2.5	0.9	0.8	1.8
Italy	67	0.1	1.6	1.7	-1.2	-0.1	-1.0	-0.3	0.2	0.5
	68	0.9	1.5	2.4	-2.4	-0.0	-1.3	-0.4	-0.7	0.0
Netherlands	67	-0.6	0.5	-0.1	0.3	-0.0	-0.1	0.3	0.1	0.2
	68	-0.3	0.4	0.1	-0.2	-0.1	-0.0	0.0	-0.1	-0.1
Canada	67	0.8	-1.3	-0.5	0.5	0.0	1.2	-0.4	-0.3	0.0
	68	1.7	-1.9	-0.2	0.4	.....	0.7	.....	-0.3	0.2
Japan	67	1.2	-1.4	-0.2	0.1	-0.2	-0.6	0.4	0.5	-0.1
	68	2.5	-1.5	1.0	-0.1	-0.2	-0.1	0.4	-0.2	0.9
Switzerland	67	-0.4	0.6	0.2	0.1	-0.0	-0.4	0.4	0.1	0.3
	68	-0.3	0.6	0.3	0.1	.....	0.6	.....	-0.5	0.4
Other O E C D	67	-4.9	3.5	-1.4	1.5	0.3	1.7	-0.1	-0.4	0.1
	68	-4.7	3.7	-1.0	1.3	.....	1.5	.....	-0.2	0.3
Total net O E C D	67	3.6	-0.3	3.3	-6.2	-3.1	-2.1	-0.8	-0.2	-2.9
	68	3.7	-0.0	3.7	(-4.8)	.....	-2.6	.....	1.2	-1.1
Deficits	67	-7.7	-7.6	-3.3	-8.8	-3.5	-5.4	-2.4	-2.2	-5.0
	68	-7.5	-7.6	-3.4	-9.1	..	..	..	-3.4	-6.3
Surpluses	67	11.4	7.3	+6.6	+2.6	+0.4	+3.3	+1.6	+2.0	+2.1
	68	11.2	7.6	+7.1	+4.3	+..	..	..	+4.6	+5.2

\* Including \$0.6 billion corresponding to exchange adjustment for settlements at the new parity of liabilities undertaken before devaluation.

\*\* As the trade account in 1968 was in balance (transactions basis) and the reserves fell by \$2.8 billion (column 9), it is assumed that the total capital outflow was of that order of magnitude. This outflow is included in column 4 only.

(which were offset by the outflow of capital from Switzerland).

## *Balances of Payments of the Major Countries*

*There were some sharp changes in the direction of trade and capital flows.*

The *trade surplus of the United States* fell to only \$ 0.1 billion. (It had been between \$ 4½ billion and \$ 6½ billion in 1960-65 and was \$ 3½ billion in 1966 and 1967). The *United States' position on capital account* swung by \$ 7½ billion, from that of the major capital exporter (\$ 5 billion outflow in 1967) to that of the major capital importer (\$ 2½ billion inflow in 1968). Official capital exports were \$ 2.3 billion (about the same as in 1967). But long-term private capital exports swung to a net inflow of \$ 1.5 billion (they had been \$ 4½ billion a year in 1964-65 and \$ 2½ billion a year in 1966-67). And there was a net inflow of \$ 3¼ billion of private short-term capital and unrecorded transactions (compared with an outflow in each year from 1960 to 1964 and an inflow of \$ 1 billion a year in 1965-67). The *net private long-term capital outflow* of \$ 2½ billion from Germany was unique in Germany's post-war history (previously there had been an inflow or an outflow of not more than \$ ½ billion).

The developments in *major countries' balance-of-payments situations* had the following salient features:

First, the *deterioration in their current account positions in recent years was on the whole aggravated or at least did not improve.*

The *United States' current account surplus*, an essential part of its balance-of-payments structure, since a large advanced economy with a very high rate of capital formation should be a major capital exporter, disappeared in 1968. This was due to the fall in the trade surplus which more than offset an improvement of \$ 0.8 billion in the invisibles balance. The current surplus had already fallen substantially in previous years (from \$ 5.7 billion in 1964 to \$ 4.1 billion in 1965, \$ 2.2 billion in 1966 and \$ 1.7 billion in 1967). In 1968 the current balance swung to a deficit of \$ 0.9 billion. The *United Kingdom's current account* showed a further deficit of \$ 1.0 billion in 1968, despite the devaluation in November 1967 and the extensive adjustment measures taken since, designed to turn that deficit into a surplus. (There had been deficits of \$ 1.1 billion in 1964 and \$ 0.3 billion in 1965, rough balance in 1966 and a deficit of \$ 1 billion in 1967). The current account surpluses of *Germany and Italy*, already large in the previous year, increased — Germany's to \$ 2.9 billion and Italy's to \$ 2.4 billion.

Second, there were *large equilibrating capital movements (mainly long-term) as well as large disequilibrating capital movements (mainly short-term).*

The new current account deficit of the *United States* of \$ 0.9 billion was more than compensated by the

new capital inflow of \$ 2½ billion described above. Consequently, there was an official reserves transactions surplus of \$ 1.6 billion (compared to a deficit of \$ 3.4 billion in 1967). *Germany's current account surplus* of \$ 2.9 billion was fully compensated by a long-term capital outflow of the same amount (of which \$ 2.5 billion was private capital, \$ 2.1 billion higher than in 1967).

*Italy's current account surplus* of \$ 2.4 billion was fully compensated by a long-term capital outflow of about \$ 1.3 billion and a short-term outflow of about \$ 1.1 billion.

On the other hand, *Germany's practically balanced position on the current and long-term capital accounts combined* was pushed to an overall surplus of \$ 1.8 billion by an inflow of short-term capital (and unrecorded transactions). The *United Kingdom's current deficit* was accompanied by a short-term private capital outflow of \$ 1.1 billion. *France* has had a trade surplus (on a transactions basis) for many years: this disappeared in 1968 and the deterioration was accompanied by heavy short and long-term capital outflows.

The *overall balances in 1968*, i.e. the amounts remaining to be settled by official financing, were the *largest in the post-war period*: the sum of the overall deficits rose from \$ 5 billion in 1967 to \$ 6½ billion in 1968 and the sum of the overall surpluses from \$ 2 billion to \$ 5 billion. There was *heavy use of monetary reserves (1) and other forms of official financing*, the main features being: the use of some \$ 1½ billion of monetary gold by the Gold Pool to meet private demand, prior to 17th March 1968; the heavy monetary reserve loss of France (\$ 2.8 billion) (2) and gain of Germany (\$ 1.8 billion) and the drawing on the IMF by the United Kingdom (\$ 1.4 billion).

## *Reserves*

Many OECD countries experienced reserve losses, or only small gains in 1968. In the *calendar year 1968* the OECD countries' total monetary reserves increased by only \$ 0.8 billion. The loss of gold reserves (\$ 1.8 billion) was offset by an increase in foreign exchange reserves (\$ 2.0 billion) and IMF reserve positions rose by \$ 0.6 billion. In 1965-67 their total reserves increased by \$ 0.9 billion a year and in the ten years 1955-64 the rise was \$ 1½ billion a year.

The rest of the world's total reserves increased by as much as \$ 2 billion in 1968. In 1965-67, the rest of the world's reserves had increased by \$ ¾ billion a year and there had been hardly any rise in the ten years 1955-64.

(1) The term "monetary reserves", when used in this text, is defined as the official holdings of gold and convertible currency together with the IMF reserve position (national sources sometimes include and sometimes exclude the latter); in some of the tables the IMF reserve position is shown separately.

(2) Of which \$ 0.9 billion correspond to the reduction in France's reserve position in the IMF.

The calendar year figures for reserve movements are misleading because they include the large increases in the reserves of Switzerland and Germany due mainly to temporary inflows from the commercial banks which were reversed in January 1969. These temporary inflows resulted from the traditional end-of-year window-dressing of the commercial banks and — especially in the case of Germany — from speculative inflows of funds during the November crisis. If the reserves movements are calculated from 1st February 1968 to 31st January 1969 — thus avoiding the distorting effects of these factors — OECD countries' total reserves fell by \$0.6 billion: gold reserves fell by \$1½ billion and foreign exchange reserves and IMF reserve positions each increased by about \$½ billion.

On this basis there was an average rise of \$0.4 billion a year in OECD countries' reserves in the four years 1965-68. The additions to countries' reserves

in these four years were largely the counterpart of transactions of a temporary or exceptional nature (mainly drawings on the IMF, swap operations between central banks and purchases of "Roosa bonds", i.e. non-marketable US Treasury bonds and certificates). Purchases of "Roosa-bonds" amounted to \$2.2 billion in 1968, increasing the amount outstanding to \$3.9 billion.

Thus, in the four years 1965-68 there was *little rise of a durable nature in central reserves*. On the other hand, it must be borne in mind that during this period the *foreign exchange holdings of the commercial banks rose very substantially*.

In fact, the strong expansion of the commercial banks' holdings is, to some extent, the counterpart of the modest increases or falls, in the foreign exchange holdings of central monetary institutions. Central banks have in some cases used the technique of offering their commercial banks' swap facilities at rates which allowed a profit to be made in the Euro-dollar market, thus encouraging their commercial banks to place foreign exchange in that market. This technique was used by the German Federal bank to push out a large part of the huge short-term inflow at the time of the November foreign currency crisis. It has also been used by the Italian central bank to induce the commercial banks to increase or decrease their recourse to external sources of financing (Italian commercial banks' net foreign assets increased by \$0.7 billion in 1968).

Thus, *the commercial banks' holdings have often acted as a substitute for the central reserves, bearing the brunt of balance-of-payments fluctuations*. The total of the net inflows (increases in liabilities or falls in assets) for OECD countries' commercial banks were as high as \$4.6 billion in 1968; while the total net outflows were \$3.4 billion.

The net amount of loans outstanding in the Euro-dollar market which had increased by about \$3 billion in 1967, rose by about double that amount in 1968 (from about \$16 billion to about \$22 billion). Part of these increases is due to direct placing of dollars by central banks in this market. But the main reason is commercial bank lending. As the commercial banks often acted as intermediaries, simultaneously borrowing and lending in the Euro-currency market, they increased both their foreign liabilities and their foreign assets. For this reason and also because Euro-currency transactions, rather than local financing, have been used to an increasing extent to finance international trade and payments, the gross assets and liabilities of commercial banks have increased enormously. Data for commercial banks' foreign positions show that in 1968 the commercial banks in 14 Continental European countries and Canada and Japan increased their foreign assets by \$9 billion and their foreign liabilities by \$7 billion. United States banks' private short-term foreign assets remained unchanged at \$8.7 billion but their private short-term foreign liabilities increased by the record amount of \$3.8 billion to a total of \$19.5 billion. The increases for United Kingdom banks

### WORLD RESERVES : MAIN CHANGES IN 1955-64 (ANNUAL AVERAGE), 1965-1968 AND THE 1st QUARTER OF 1969 AND AMOUNTS OUTSTANDING AT 31st MARCH 1969

Billions of US dollars

	Change in						TOTAL 31-3-69
	10 years 1955-64 (annual average)	1965	1966	1967	1968	1st quarter 1969	
United States	-0.6	-1.2	-0.6	-0.1	0.9	0.0	15.8
United Kingdom	-0.1	0.7	0.1	-0.4	-0.3	0.0	2.5
Belgium/Luxembourg	0.1	0.1	0.0	0.2	-0.4	-0.1	2.1
France	0.4	0.6	0.4	0.3	-2.8	-0.2	4.0
Germany	0.5	-0.5	0.6	0.1	1.8	-1.7	8.2
Italy	0.3	1.0	0.1	0.6	-0.1	-0.3	5.1
Netherlands	0.1	0.1	0.0	0.2	-0.2	-0.1	2.4
Canada	0.1	0.1	-0.3	0.0	0.3	-0.0	3.0
Japan	0.1	0.1	-0.0	-0.1	0.9	0.3	3.2
Switzerland	0.1	0.1	0.1	0.2	0.4	-0.8	3.1
Other OECD	0.4	-0.1	0.2	-0.0	0.3	-0.4	6.6
Total OECD	1.5	1.1	0.6	1.0	0.8	-3.2	55.9
South Africa	0.0	-0.1	0.2	-0.1	0.7	0.2	1.7
Other developed countries	0.1	-0.5	-0.1	-0.1	0.3	0.3	2.4
Less developed countries							
• Middle East	0.1	0.4	0.2	0.4	—	0.1	3.3
• Other	-0.2	0.9	0.5	0.4	1.1	0.3	10.7
TOTAL : Rest of world	0.0	0.6	0.9	0.6	2.1	0.9	18.1
TOTAL: World (national)	1.5	1.8	1.5	1.6	2.8	-2.3	74.1
International Institutions	0.0	-0.5	0.6	-0.2	-0.1	0.1	2.0
TOTAL : (National and International)	1.5	1.3	2.1	1.4	2.7	-2.2	76.1

Source : International Financial Statistics May 1969

were also of record size. UK banks increased their private foreign assets by \$ 6.4 billion (60 per cent) to a total of \$ 16.7 billion and their private foreign liabilities by \$ 5.7 billion (45 per cent) to a total of \$ 18.3 billion.

### *\$ and £ Balances*

The counterparts of the bulk of all official and private foreign exchange holdings are the liabilities of the United States and the United Kingdom to foreign official and private holders.

In 1968, United States liquid liabilities to official holders fell by \$ 3.1 billion, but non-liquid liabilities rose by \$ 2.4 billion (reflecting a switch of part of other countries' reserves into investments with a slightly longer maturity). Thus, total liabilities (liquid and non-liquid) fell by \$ 0.7 billion. The amounts outstanding at the end of 1968 were \$ 13.6 billion (liquid) and \$ 5.1 billion (non-liquid). However, there was in 1968 a record increase, of \$ 3.8 billion, in US liabilities to private dollar holders (reflecting the increase in commercial banks' dollar holdings at the expense of central reserves; the total outstanding at the end of 1968 being \$ 20.3 billion.

The United Kingdom's sterling liabilities to official holders increased by \$ 1.4 billion, to a total of \$ 9.4 billion: while official liabilities to Western Europe and North America increased by \$ 1.8 billion, largely reflecting swap drawings, those to Overseas Sterling countries fell by \$ 0.3 billion. This fall was the net result of a fall of \$ 0.8 billion in the second quarter, due to switching into other forms of reserves, partly offset by increases later in the year. The latter were connected with the establishment of a series of three to five year agreements with members of the sterling area under which the United Kingdom has guaranteed in terms of the US dollar that part of the official sterling reserves of each country which exceeds 10 per cent of its total official reserves. In return each country has undertaken to maintain the sterling proportion of its total reserves at or above an agreed minimum percentage. At the same time arrangements (the "*Basle facility*") were made between the United Kingdom on the one hand and the Bank for International Settlements and a group of twelve countries on the other hand for a new \$ 2 billion facility under which the United Kingdom could draw in the event of the sterling balances (both official and private) of the sterling area falling below an agreed starting level. Drawings can be made during the first three years after the start of the facility; and those still outstanding are to be repaid between the sixth and tenth years. The lending countries and the BIS itself will have to provide resources only in the last resort, since drawings by the United Kingdom will first be financed as far as possible by funds obtained by the BIS from borrowing at short and medium-term in international markets and by deposits placed with the BIS by overseas sterling area central banks.

The official liabilities of the United States and the United Kingdom have increased by \$ 1.8 billion and \$ 2.2 billion, respectively, in the four years 1965-68 and have been the main source of the additions to the foreign exchange reserves of other countries. However, these two countries are taking extensive and strong measures to prevent further balance-of-payments deficits and it is generally agreed that there should not be a further substantial rise in their official liabilities. If their liabilities cease to be a major source of reserve creation and if countries continue to aim to achieve a growth of their central reserves in the long run, one way of meeting this desire would be through the facility for Special Drawing Rights in the IMF which was adopted by the Governors of the Fund in 1968 and which is now in course of ratification by IMF Member countries. Under this new facility deliberate decisions can be taken to supplement reserve assets as and when the need arises. Its use is subject to a collective judgement that there is such a need. This judgement has also to take account of two other considerations, the attainment of a better balance-of-payments equilibrium and the likelihood of a better working of the adjustment process in the future.

### *International Monetary System*

The unfavourable climate of confidence in 1968 and the fact that many of the main trading countries were experiencing losses of monetary reserves, particularly in the first half of the year, might have led to a contraction of international trade. But, as already mentioned, trade was sustained by the direct and indirect influence of strong import demand in the United States and the United Kingdom and the rapid recovery of German import demand. And the *co-operation and credit support of national and international monetary institutions* countered the disturbing effects of shifts in confidence and reserve losses.

Thus, *international monetary arrangements continued to show resilience and adaptability*, although they were put to a severe test by the very large balance-of-payments disequilibria in 1968, as in 1967. Since 1950 these arrangements have contributed to increases in the volume of international trade averaging about 4 per cent a year in the 1950's and 8 per cent a year in the 1960's, an enormous expansion of capital flows between industrial countries and a strong growth of productivity and income.

### *Adjustments of the Imbalances*

However, the *need to adjust the disequilibria* has become more and more urgent. Progress towards adjustment in 1968 was very disappointing. The United States and the United Kingdom gradually adopted a series of measures to improve their balances of payments. But important parts of these measures



came into effect only after a period of excessive expansion earlier in the year and their impact was not strong enough to obtain the needed improvement of either country's current balance of payments in 1968.

The *United States* Congress approved in June a temporary 10 per cent surcharge on income taxes and large cuts in the projected growth of government expenditure. But the effects of the resulting slowdown in Federal spending and of higher withholding taxes were to some extent compensated by a fall in the rate of saving. In fact, consumer spending actually increased in the third quarter. In the fourth quarter consumer spending was reduced but business fixed investment and the credit demand of private borrowers increased by record amounts. The growth of real GNP (6.4 per cent in the first half, 5 per cent in the third quarter and 3.9 per cent in the fourth quarter) was well above that of capacity (roughly 4 per cent), except in the fourth quarter. Prices (as measured by the price component in nominal GNP) and unit labour costs both rose by about 4 per cent. Unemployment averaged 3.7 per cent of the total labour force in the first three quarters and in the last quarter fell to 3.2 per cent, the lowest level since the Korean war.

This expansion was the main cause of the deterioration of the trade balance, though there were some special factors. Experience shows that when the United States GNP, at current prices, increases by more than about 5-6 per cent, imports accelerate sharply. In 1968, GNP at current prices increased by 9 per cent and imports rose by 23 per cent in value (24 per cent in volume). Exports rose by 9½ per cent in value (slightly less in volume) i.e. at about half the rate of increase in other major trading countries. Towards the end of the year the US authorities' policy was moving strongly towards tighter monetary restraint.

While the United States' balance calculated on the "liquidity basis" was a small surplus for the first time in ten years, this was not really a satisfactory outcome. It was the result of a deterioration of \$ 2.6 billion on current account, more than offset by the huge swing of \$ 7½ billion in the capital account. Moreover, on this basis of calculation, the increase of some \$ 2¼ billion in non-liquid liabilities to foreign central banks and governments (liabilities with an initial maturity of more than one year) is regarded as a capital inflow "above-the-line". The holders of the corresponding claims switched part of their short-term dollar claims into these investments with a longer maturity, while continuing to include them in their reserves. If the corresponding US liabilities were still regarded as "below-the-line" financing items, notwithstanding the change of maturity, the "liquidity balance" would show a deficit of \$ 2.2 billion in 1968 (and \$ 4.9 billion in 1967).

The *United Kingdom's* budget in March provided for a heavy increase in taxation; and measures were taken in January to reduce the rate of growth of public

expenditure, which is estimated to have been much less in 1968-69 (4 per cent) than in 1967-68 (7 per cent). Despite price rises due to devaluation, a pre-budget consumer boom had a powerful effect on imports early in the year; and, after a modest fall following the budget, imports rose again in the rest of the year, reflecting partly the strength of the propensity to consume but also the high rate of overall growth of the economy. Fiscal and monetary measures were taken towards the end of the year to restrain consumer demand which had increased in the autumn. Exports showed a good rate of increase, 14 per cent in volume and 23 per cent in value (1); while this was helped by special factors, it was in large part due to higher competitiveness following the devaluation. There was an increase in net invisible earnings and a slight improvement on long-term capital account. But, the outcome for the balance of payments cannot be considered satisfactory. The current deficit was as large as in the previous year and there was an outflow of \$ 1.1 billion of short-term capital. The overall deficit (including unrecorded transactions) was \$ 2.4 billion. This was increased to \$ 3.0 billion by the cost of settling at the new parity liabilities undertaken prior to the devaluation. This deficit was financed by a drawing of \$ 1.3 billion (net) on the IMF, an increase of \$ 1.4 billion in official sterling liabilities and a fall of \$ 0.3 billion in reserves.

The fact that the deterioration of the current balances of the United States and the United Kingdom has been largely the result of inflationary pressures in the last few years, makes the adjustment process more difficult. It increases the extent and force of the adjustment measures needed and the length of the period during which they will have to be maintained in order to slow down the cost and price increases. As the latter have gained considerable momentum and have come to be taken for granted by the public, they are likely to react slowly to the reduction of demand pressures.

Both moderation in the growth of public expenditure and a high degree of monetary restraint will be needed. The latter will tend to pull in short and long-term capital from the rest of the world on a scale which could raise problems for certain financial markets. Already in 1968 the short-term inflows into the United States rose to \$ 3 billion, while long-term private capital swung to an inflow of \$ 1½ billion. The main elements in this swing are higher issues of securities abroad by US firms (\$ 2.2 billion in 1968) and higher foreign purchases of existing US securities (\$ 1.9 billion in 1968). A part of these inflows will most probably continue, but a part is not sustainable. The United States authorities have indicated their desire to readjust the components of the US balance of payments in keeping with a creditor position.

On the other hand, the relatively small cost and price increases and considerable margin of unused

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(1) In the trade accounts, in terms of sterling.

resources in Germany (prior to the second half of 1968) and in Italy have led to very substantial current surpluses in these two countries.

*Germany's* current surplus increased by \$0.5 billion to the record level of \$2.9 billion in 1968. This was almost entirely due to the trade balance. It took place despite a rapid upswing stimulated by fiscal and monetary policies, which brought the economy close to full resource utilisation by the end of 1968. This upswing was from a rather low starting point. Germany was the only major industrial country, other than the United Kingdom, in which the recessionary tendencies in 1966-67 had led to a sharp fall in industrial production (by 5 per cent in the second half of 1966 and 7 per cent in the first half of 1967, at annual rates compared with the preceding half-year); the fall for 1967 as a whole was 2 per cent and in that year there was hardly any rise in real GNP. For this reason and because the rate of saving was high, prices rose very little in the two years 1967-68. The price component in the nominal rise in GNP was 0.6 per cent in 1967 and 2.1 per cent in 1968; and consumer prices, after allowing for indirect tax increases, rose over the two years by less than 1 per cent per annum, while export prices declined slightly. As already mentioned, the whole of the current surplus was compensated by a long-term capital outflow, mainly private capital. But, due to the exceptional factors mentioned earlier, there was an enormous inflow of short-term capital (and unrecorded transactions). Part of this inflow was reversed in the last weeks of 1968, the net increase in reserves over the year 1968 being \$1.8 billion; but a further outflow in the first months of 1969 fully reversed this increase. Germany introduced in November 1968 a temporary 4 per cent tax rebate for imports and 4 per cent additional tax charge on exports and also took measures to encourage a reversal of the inflow of short-term capital.

*Italy's* current surplus increased, by \$0.7 billion, to \$2.4 billion. Real GNP increased at a lower rate than in 1967 ( $5\frac{1}{2}$  per cent in 1968, 6 per cent in 1967). Economic activity was sustained mainly by foreign demand. Internal demand slackened, with the growth of consumption and investment declining. Stimulative measures were taken by the government, and the Treasury deficit increased substantially. This deficit was financed partly by recourse to the Central Bank and, for this reason, but also through the policy followed by the authorities, long-term interest rates were kept at a relatively low level. Private capital exports increased by \$0.4 billion to \$1.7 billion. Commercial banks, taking advantage of the swap facilities provided by the authorities, increased their net foreign assets by \$0.7 billion in 1968 (whereas in 1967 they had reduced them by \$0.2 billion). Consequently, the current balance was fully covered by capital outflows and there was no increase in reserves. Italy's current surplus has averaged \$2 billion a year since 1965. The aim of the authorities is to achieve a faster rate of expansion and thus gradually absorb

this surplus, by speeding up the implementation of public investment programmes, which will stimulate private investment, and by such steps as increasing pensions in order to encourage higher consumers' expenditure.

Thus, in 1968 the current surpluses of Germany and Italy were compensated by capital outflows which had reached a very high level; and it is likely to be difficult to use this means on the same scale to compensate future surpluses. Moreover, while in the case of Germany an increase in long-term capital exports is to be welcomed, it is inappropriate that Italy should remain a large net exporter of long-term capital, given its heavy needs of capital (particularly for the investments required in its underdeveloped regions). However, to the extent that the current surpluses of Germany and Italy are reduced, by measures such as those mentioned in the above, there will be less need for high capital outflows.

A difficult adjustment problem also faces *France*, where the substantial wage increases and credit expansion in 1968 have made it necessary to apply a programme of fiscal and monetary restraint designed to moderate significantly any further rise in costs and prices, improve the trade balance and prevent further capital outflows.

To achieve a more effective adjustment process in future, it will be necessary for the deficit countries to bring inflationary pressures under control at an earlier stage and ensure a more even and sustainable rate of growth, which would imply a slow-down from the high rates of 1968. At the same time the surplus countries, without endangering price stability, will have to maintain fuller use of their resources and ensure that a higher proportion of internal demand is met by imports.

At the start of 1969, France, the United States and the United Kingdom were all applying policies or measures designed to restrain internal demand. Their object is to bring the growth of internal demand below the rate of increase of capacity, thereby slowing down demand for imports and making internal resources available for the increase of exports. These countries account for a very large proportion of world trade and a weaker trend in their imports will, directly and indirectly, have a general dampening effect. Consequently, the surplus countries will need simultaneously to take steps to maintain internal demand in order to compensate the effects of a fall in demand for their exports. They should also try to ensure — without jeopardising price stability — that their internal demand increases faster than output, so as to make room for increases in the deficit countries' exports.

Otherwise, the adjustment action by the deficit countries would have to become more severe and the adjustment would take place at a lower level of output and trade than would have been possible with more effective and co-ordinated policies. Without such policies there would also be a greater danger of resort to direct controls and protectionist policies.

# EQUALITY, QUANTITY AND QUALITY IN EDUCATION

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In the last decade or so the European economies have provided the basis for a period of educational affluence. Growth in a quantitative sense, in terms of finance and enrolments, has been achieved. But there are disturbing signs that the social objectives of this expansion, in terms of equality of educational opportunities, are not being met. There has, of course, been some "redistribution" of educational opportunities. Table 1 shows that in several important OECD countries the disparities between social classes in gaining access to higher education have narrowed. In *absolute terms*, the number of students of working class family background increased threefold in Germany and fourfold in Italy and France from the mid-1950's to the mid-1960's. But in *relative terms* the situation is different: the number of students of upper class (category A) background increased by 6 per 1,000 men in the working population in Germany, 47 in France and 20 in Italy; whereas the equivalent working class figures (category E) are 1, 3 and 1 respectively.

Table 2 bears out this general trend. The "opportunity gap" between the social classes is narrowing slowly but at a pace which would probably arise in any case because of the diminishing reserves of ability in those social classes which already participate fully in higher education.

It is debatable whether the expansion of education is not taking the form of a highly intensive development of the abilities of the upper social groups, with declining effectiveness in social terms because the privileged youth of the middle classes is ruled by the same iron law of the normal (in the statistical sense) distribution of abilities, and because the intensive educational "farming" of abilities is self-defeating because it cannot generate the motivations on which

the development of individual abilities is dependent. On the other hand, the "reserves" of ability in the lower social groups lay untapped, apparently unable to develop in the alien soil of the educational systems as they now exist. The problem of "poverty" in education is emerging as a major political issue at the

## 1. NUMBER OF STUDENTS BY SOCIO-ECONOMIC CATEGORIES PER 1 000 ACTIVE MALES OF THE SAME CATEGORIES

Countries	Year	Socio-economic categories varying from country to country. In broad terms:					Total
		Professional and Managerial	Middle class clerical and Sales workers	Farmers Self employed	Other Self employed workers	Manual and Service workers	
		A	B	C	D	E	
Germany	1952-53	44.3	10.9		13.3	0.5	7.1
	1958-59	43.9	15.2		18.5	0.9	9.6
	1964-65	50.2	23.0		28.7	1.4	14.1
France	1959-60	91.4	25.2	4.3	23.3	1.1	13.8
	1964-65	138.4	38.8	9.9	38.4	4.4	24.7
Italy (1)	1953-54	17.5	10.6		2.2	0.4	2.2
	1960-61	23.1	12.4		3.6	0.6	3.1
	1964-65	37.1	15.3		5.3	1.1	4.6
Japan	1961	149.9	29.2	10.5	—	4.8	24.6
Sweden	1962-63	77.0	52.6	10.1	34.4	5.5	21.4
United States (2)	1957-58	76.0	39.0	52.1	—	22.3	41.4

(1) First year students

(2) Number of bachelors compared with male population aged 40-45

Source: OECD analysis of data in published documents, being prepared for publication as part of the OECD Educational Growth Review.

## 2. COMPARATIVE CHANCES FOR ADOLESCENTS FROM DIFFERENT SOCIO-ECONOMIC BACKGROUND TO HAVE A UNIVERSITY EDUCATION (Category E = 1)

Countries	Year	Socio-Economic Categories				
		A	B	C	D	E
Germany	1952-53	88	22	26	1	1
	1958-59	49	17	21	1	1
	1964-65	36	16	21	1	1
France	1959-60	83	23	4	21	1
	1964-65	31	9	2	9	1
Italy	1953-54	44	27	5	1	1
	1960-61	38	21	6	1	1
	1964-65	34	14	5	1	1
Japan	1961	31	6	2	1	1
Sweden	1960-61	14	10	2	6	1
United States	1958	3.5	2	2	—	1
England and Wales	1961-62	8	4	—	—	1

*These figures have been calculated by dividing data for categories A, B, C, D of table 1 by those of category E.*

same moment that society may be beginning to react against educational affluence as a result of student unrest.

Quality and equality — the heart and soul of modern, open, self-renewing societies appear to be in conflict. What is going wrong?

### *What is Ability?*

For 50 years and more education has been viewed as one of the spearheads of equality of opportunity. With growing force it has become accepted that education is a key factor in the development of the individual and his mobility in society. In the extreme form, the view sees educational disparities as replacing the ownership of capital as the root of inequality. The consequence has been that society has behaved as if the educational system could be expanded and improved to the point of utopia in which all innate abilities would be developed, and individuals would find their right place in a "meritocracy" based on ability.

The path to this state of social justice based on education has been seen as a *continuous and lengthening* process including pre-primary, primary, secondary and higher education. In Europe, following the same path as the United States, the aim of "higher education for all" will no doubt succeed the phase of "comprehensive secondary education" which has been the main preoccupation of the last ten years. In other words, something like 15 - 20 years of continuous presence in educational systems, as the best way of developing the highest abilities of the individual, comes to be the basic idea behind the educational structures of European countries.

On reflection this appears to be a rather monolithic and narrow idea of how the individual may



*Primary education: pupils in this Yugoslav school*

develop his personal capacities and skills. It is authoritarian in the single path of development it provides for the child, and in particular for the young adult. It is somewhat arrogant in its presumption of a monopoly for education as the only social institution which can help the individual to develop her or his ability. It is an exaggeration which should perhaps be challenged.

In order to do so it is necessary to go back to first principles and ask what is the concept of ability on the basis of which social institutions can today reasonably build the framework for the full development of the individual. One implicit assumption of much contemporary educational activity is that ability is genetic, largely derivative from "intelligence", and normally distributed throughout the population. Equality of educational opportunity is thus based on the provision of equal educational facilities so that the achievement of individuals will reflect the distribution of innate abilities. The higher the innate ability, the higher (and longer) will the individual proceed up the educational ladder. The higher the rung on the ladder that is reached, the more abstract becomes the



\*number 1200 and attend classes in three shifts.

curriculum and the more is success related to “intelligence”.

This view of ability rests on increasingly weak foundations. One thing stands out above all — that the development of ability cannot be divorced from *motivation*. However much one may subscribe to inherited, randomly-distributed intelligence as a truth which goes more or less without saying, ability in any socially meaningful sense is a function of interest in, will for, or necessity of achieving certain kinds of performance by the individual. In this sense ability is a continuously evolving characteristic of the individual, whether child, adolescent or adult.

Democracy in education would in this view mean a structure which enables the individual not only to prepare for his role in society, but also to have access to education *after* she or he has been able to test her or his talents in society. What happens today is the opposite: education stops more or less at the very point when society recognises the right of the individual to act as a socially responsible person.

The next weakness in the traditional view resides in the monopoly of “intelligence” as the over-

ridingly important ability. There can be little doubt that, if we were to change our view on this point, the conclusion as to who does or does not have ability would undergo a metamorphosis.

Thus, in a sense, the failure of educational growth lies in the lack of clarity in making explicit the purposes it is supposed to serve. For it is quite apparent that the educational expansion of the last ten years was meant to provide society with skills and performances of many different kinds, involving many different kinds of ability. Yet rarely are these complex, flexible concepts of ability translated into what happens in the schools. The curriculum, methods of teaching and examinations remain dominated by an out-dated view of ability.

The third weakness lies in the uniformity of educational provision. It seems highly likely, if not perfectly obvious, that different children and young adults will respond best to different educational procedures. If this simple truth could be taken seriously, equality of educational opportunity would consist in providing the “right” educational procedure for each individual child, whereas today in general we insist on giving them the *same* treatment in the name of equality. Of course, such “individualised” instruction might be costly and perhaps hard to organise, but its value has long been recognised in some of the more renowned (and expensive) forms of education for privileged social groups.

We are led to the conclusion that the relative failure of educational growth in the last ten years to achieve its social objectives lies on the one hand in the failure of the educational system to change in response to new concepts of ability and, in particular, to adjust the educational process itself to these new concepts; and, on the other hand, in the very narrow prevailing view of the relationship between education and society, that is to say, as one in which the individual is worked on (like a manufactured product) by a *continuous* series of educational processes until he is handed over to society at the end of the production line. In the next ten years it seems likely that the re-entry of the adult into the educational system at various stages of his life will grow in importance, and this will lead to a re-examination of the relationship of education to the social system.

## *Education and the Social System*

Nothing less than a radical change in the relationships between the individual, the educational system and society will suffice to resolve the dilemma in which the “education society” now finds itself. On the one hand, it is compelled willy-nilly towards more education; on the other hand, it begins to recoil from the explosive implications of the student power which results from placing an increasingly large proportion of every generation of young adults in institutions of higher education.

The basic flaw lies not in expanding facilities for higher education but in *compelling* young adults to enter higher education when their motivations would in all likelihood lead them to more active social roles. It is a fact in most OECD countries today that the

young adult who fails to enter higher education *immediately* on leaving secondary school embarks on a path of personal development which *excludes* the highest social, professional and economic opportunities. Few people return to higher education after they have tested themselves in society, to the extent that they are aware of their own abilities and have a personal view of how they wish to change or to fit into society, that is to say when they are motivated in terms of their own abilities.

This is an argument for the freedom of the young adult to choose, without exposing himself to the penalty of limited social and economic opportunities, if he is drawn more towards doing than to learning at the age of 16-18. It is a plea for a "second option" in higher education through the occupational system, in which those wishing to pursue their studies would have no greater or lesser opportunities than those doing so immediately after school. It was done after the 1939-45 World War — why not now?

The arguments in favour of a radical transformation of the educational structure of higher education in this direction are many. First, in terms of equality of opportunities it is surely the essential principle of democracy that the young citizen should be enabled to strive for his own progress when he knows what he wants. Second, a wider age-structure in the universities would bring different forms of social experience into the student body — and thereby strengthen the links between universities and society, without yielding to the temptation, which is aroused in the present conditions, to distort the role of the universities as institutions.

It may be counter-argued that the intellectual development of the individual is such that higher education will only succeed if followed between the ages of, say, 18 and 25. There may be something in this argument for certain disciplines like theoretical physics, mathematics or symbolic logic, for all of which abstract, formal tools of analysis are necessary. But even if this is so, it is certainly not so for the vast majority of disciplines taught in institutions of higher education. Indeed, in many fields the possibility of fruitful academic study may be definitely enhanced by greater maturity and wider social experience.

The real terrain of argument is the socio-economic feasibility of such a radical departure in educational structure. Is there not an unresolvable conflict between the income needs of the adult with family responsibilities, and the possibilities of financing such a reform? Could career patterns be adjusted in such a way that a more flexible relationship between occupational experience and the educational system would be viable for the individual and for society? What would be the effect on the labour market of school leaving at, say 16-18, followed by access to higher education between the ages of 22-30 and even later?

The answers to these questions are not known, and indeed the questions are not even being asked in any serious manner. At a time when many countries are beginning to explore the extension of the educational system to the pre-primary level, with a view to equalising educational opportunities, it is surely necessary to take a broader view of the conditions under which



*Higher education : Japanese girl*

the disturbing failures in the process of educational growth can be overcome.

### *The Economics of Quality - the next 10 years*

We have argued above that the relative failure of educational growth in the last decade is due to a too-narrow conception of the educational structure, which unduly restricts the paths open to the individual in using the educational system to develop his potential abilities.

The second weakness lies in the curriculum and in the methods of teaching. Looking back, the great expansion of education in the last 10 years takes on all the appearances of a vast growth of investment in plant which is largely obsolete. Of course, the analogy to capital investment in industry is misleading because the concept of new "plant" in education is meaningless, unless viewed in relation to the changes in social attitudes and skills which are at the centre of educational change.



students receive their diplomas.

Nonetheless, it now looks as though it were extraordinarily difficult to incorporate in the old machinery of education new concepts of developing abilities through new learning processes. Many partial and sporadic changes in curriculum and teaching methods to achieve this are frustrated by the stranglehold of the old ideas. Brave experiments are isolated in individual "pilot" schools, or still-born in the laboratories of educational research and development.

What can be done to generate a genuine process of educational innovation in which the new ideas can be explored systematically and generalised rapidly when proved? No one understands the process of educational innovation well enough to give an answer, but we can draw some comfort from the fact that in the past education has shown itself to be most responsive to change when its fundamental principles and philosophy are challenged. Nothing less than a questioning of the fundamentals seems likely to energise movement on a broad front today. And that is why basic educational research is most likely to be rewarding, even if it only leads us to ask new questions.

For example, it may be argued that the most strik-

ing change in the nature of society today is its inability to transmit any body of knowledge to the younger generation as *given* truth. Religion, politics, national ethics, and cultural values are all in the melting pot. Even specialised bodies of knowledge, such as medicine and engineering, can no longer be taught on the assumption that the teacher knows all and the student little, for the rate of obsolescence of specialised knowledge is accelerating all the time. Indeed, knowledge is changing so fast that the basic assumption of education as the process of transmitting a given body of knowledge to the rising generation is to some extent challenged.

What new concept are we to put into its place? Certain things seem reasonably clear. There will be a trend towards curricula based on the principle of stating questions, organising knowledge and methods of attacking problems as opposed to the assimilation of specific bodies of knowledge. The corollary of such a trend in curricula will be more flexible methods allowing the individual to develop and adjust his own style and pace of learning, and to generate his own information from the vast resources *outside* the school.

New technologies of education are likely to play an important role in this search for more flexible and individualised methods of learning. Both the above trends, in curricula and method, could hardly flourish in schools or universities based on authoritarian relationships. They will necessitate new forms of school and university organisation based on a higher degree of participation by the students themselves. These are some of the great qualitative changes in education which must be systematically explored in the coming decade.

Is it possible to demonstrate the same confidence today about society's ability to provide the resources to meet these new needs as one did when on the threshold of the quantitative expansion of education a decade ago? The answer must surely be less optimistic for two reasons.

The first is that both economic growth and the growth of educational spending as a proportion of national income are likely to be lower in the 1970's than in the 1960's. The 1960's will probably turn out to have been a period of educational affluence in Europe, followed by a levelling out of educational income.

In the second place, the educational growth of the 1960's has greatly increased the number of alternatives for expanding and improving educational systems. Are we to invest in a general system of pre-primary education which would take vast resources in some countries, or in developing a "second option" in higher education as argued here? Are the new technologies of education economic, and do they achieve the declared educational objectives — or do they represent a need for considerable additional expenditures to raise the quality of education for particular social groups?

It is to questions such as these that educational research, and in particular the economics of education, should now turn if it is to throw light on how to overcome the disturbing failure of educational growth to provide the equality of opportunity that was its main objective.



## OECD'S DEVELOPMENT ASSISTANCE COMMITTEE RECOMMENDS NEW, SOFTER TERMS OF AID

**O**ECD's Development Assistance Committee, with the agreement of all 16 Member countries (1) has recommended that Member governments ease the financial terms on which they give official development assistance.

Countries which accord at least 70 per cent of this aid in the form of grants are considered as having achieved the desired degree of "softness" in their aid programmes. For the others there are two alternatives: the first is that 85 per cent of all official development assistance commitments be provided in such a way that *each* commitment meets certain standards. Three combinations of loan terms (maturity, interest rate and grace period) which qualify under this provision can serve as examples (2):

- 30 years maturity, 8 years grace period and 2.5 per cent interest;
- 38 years maturity, 10 years grace period and 3 per cent interest;
- 25 years maturity, 7 years grace period and 2 per cent interest.

These terms are as soft as those recommended by the UNCTAD II Conference in New Delhi (30 years maturity, 8 years grace period and 2.5 per cent interest), and softer than the standard set for terms by the DAC in 1965: loans which just met the 1965 minimum standards carried what came to be known as "DAC average terms" — a maturity of 25 years, a

grace period of 7 years and an interest rate of 3 per cent.

While most donors will seek to comply with the first alternative, a second one is provided for the sake of flexibility in the case of a few DAC Members with relatively large shares of grants in their aid programmes. This target applies to a country's official development assistance commitments as a whole rather than to each commitment: if a country eases terms in such a way that 85 per cent of these commitments meet sufficiently stringent standards on average, it will be considered to have complied.

Examples of combinations that would qualify under this alternative are:

- 52 per cent grants and 33 per cent loans at 30 years maturity, 8 years grace period and 2 1/2 per cent interest;
- 57 per cent grants and 28 per cent loans at 25 years

(1) Australia, Austria, Belgium, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Portugal, Sweden, Switzerland, the United Kingdom and the United States.

(2) All three examples are calculated to have a "concessional" element of 61 per cent or more using a 10 per cent discount rate. Standards could also be expressed using other discount rates without greatly affecting the various alternative targets or the comparisons made with other targets.



maturity, 7 years grace period and 3 per cent interest;

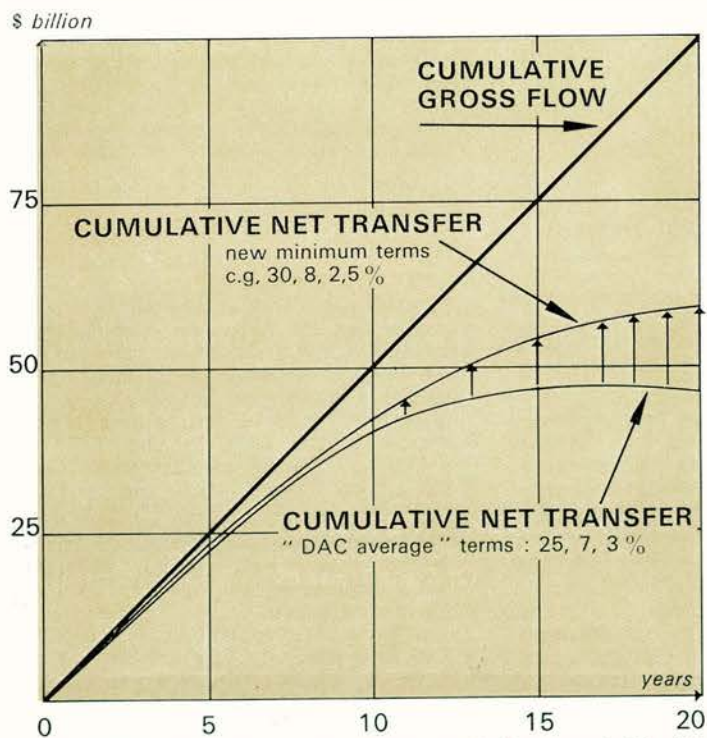
- 65 per cent grants and 20 per cent loans at 20 years maturity, 5 years grace period and 4 1/2 per cent interest.

An innovation in the new Recommendation is the DAC's expressed intention not only to assess the terms of official development assistance programmes but also to ensure that at least a minimum *volume* be provided on soft terms. Thus programmes which are very soft but very small relative to the gross national product of the particular donor country would not qualify.

In addition to encouraging many DAC Members to improve their terms it is hoped that the new Recommendation will help to reassure those DAC Members who are already providing aid on softer terms that better harmonisation is in the offing.

## THE LONGER-RUN IMPACT OF NEW MINIMUM TERMS \* COMPARED WITH SO-CALLED "DAC AVERAGE" TERMS

The effect of continued lending (constant at \$ 5 billion per year) on gross flow and on net transfer by 5-year period



(\* the alternative illustrated here is one of those provided in paragraph 9A of the new Recommendation). Net transfer of resources equals gross lending less repayments of principal and interest.

The above graph illustrates the difference between the newly recommended terms and the previous objectives. In a hypothetical example, if \$ 5 billion of new loans were provided to developing countries each year at the new minimum recommended terms, the debt service repayments over a period of 20 years would decline by more than \$ 11 billion (20 per cent) from the sum that would have been due if an equal amount were loaned at the previous "DAC average terms".

## Paradoxical Trends

It is significant that a number of DAC Members who formerly provided loans at harder terms have, since the 1965 Recommendation was adopted, been able to shift at least part of their lending to the softer terms called for at that time. Based on 1967 performance eight countries (Australia, Belgium, Denmark, France, the Netherlands, Norway, Switzerland and Sweden) were in full compliance with those standards, and three more — the United States, the United Kingdom and Canada — were close to qualifying.

Despite the progress made by various countries, however, DAC Members as a group showed some deterioration in the average terms of official assistance comparing 1967 with 1964 : for example grants dropped from 60 per cent of total official commitments to 55 per cent, weighted average maturity periods declined from 28 to 23 years and weighted average interest rates rose from 3.1 to 3.8 per cent. Paradoxically, therefore, average overall performance appears less favourable while the policies of the majority of individual countries have improved. This is largely the result of the changing structure of official commitments : the volume of aid provided by countries with relatively harder terms (Italy, Japan and Germany) increased, while that of relatively "soft" donors (the US, France and the UK) remained steady or declined; grants declined as a portion of total aid; and official export credits grew, relative to other types of commitment (1).

This trend is viewed by the DAC Chairman in his Annual Report, recently published (2), as "disturbing in view of the grave debt situations facing a number of developing countries". Between 1962 and 1967 outstanding debt grew at an average rate of 10 per cent a year and service payments by 12 per cent a year, significantly faster than the export earnings of the less-developed countries as a group. In Asia and Africa debt obligations more than doubled during that period.

It is hoped that the 1969 recommendation will help to offset this unfavourable trend for the developing countries by encouraging DAC Members to provide more liberal terms in their future aid programmes. Since the adoption of the new Recommendation, Germany, third largest donor among the DAC countries, has announced its intention to extend development loans at the more favourable terms now recommended and has already announced a major loan at the new, softer terms to Indonesia.

(1) Unlike the 1965 Recommendation which applied to all official assistance the objectives of the new Recommendation apply to official development assistance which is intended to be concessional in character. They do not apply to export credits which are of a different nature. Borderline cases are being examined with a view to defining such credits with more precision. Moreover, the new Recommendation stresses the importance of further careful study of export credits and their relationship to development considerations and the indebtedness problem facing less developed countries.

(2) Development Assistance Efforts and Policies - 1968 Review.

## DAC Recommendation on financial Terms and Conditions

*The following is the text of the new DAC Recommendation on Financial Terms and Conditions*

### Introduction

1. The DAC has reviewed the terms targets established in the 1965 Recommendation on Financial Terms and Conditions. Review of these objectives in 1968 is called for in the 1965 Recommendation itself and is referred to in the Agreed Texts on financing emerging from UNCTAD II with the "hope that it will result in further liberalisation of terms". The DAC notes that, although the average terms for Members as a group have shown little overall change over the past three years, the 1965 Recommendation has been followed by considerable softening of terms in the case of many Members. DAC Members now re-affirm their intention to carry out the provisions of the 1965 Recommendation and, in particular, to attain the degree of softness in lending terms represented by the 1965 Recommendation. In addition, the DAC has decided to strengthen the purpose of the Recommendation and to soften terms further.

2. The Development Assistance Committee wishes to emphasise that, while the importance of financial terms appropriate to the needs of developing countries is fully recognised, equal attention must also be given to the provision of an adequate and sustained volume of resource transfers from developed to developing countries, the ultimate aim being to secure the greatest benefits of such transfers for developing countries. The recommendation on terms, must, therefore, be seen together with the international objectives for the flow of financial resources (as agreed in the UNCTAD one per cent target).

3. DAC Members are aware of the difficult economic and financial problems, including that of debt service, faced by many developing countries. They recognise the need for further softening of aid flows in many cases. However, in determining appropriate terms policies, many factors have to be taken into account.

4. It is recognised that debt servicing difficulties of developing countries are not only or even primarily due to insufficiently soft terms on official aid. They often reflect more general difficulties arising from pressures on overall resources and foreign exchange and require comprehensive corrective action in a number of fields in addition to that of aid terms. These complex relationships including the need for appropriate policies on the part of developing countries are reflected in Section A of the 1965 Recommendation.

5. The economic situation, the acuteness and nature of the external debt problem, and thus the appropriateness of softer aid, differ greatly from country to country. Members, therefore will give special attention to the provisions of paragraphs 2 and 6 of the 1965 Recommendation direct-

ed toward the need to "relate the terms of aid on a case-by-case basis to the circumstances of each less-developed country or group of countries", to "establish criteria for determining appropriate financial terms" and to "make concerted efforts to harmonise terms in particular cases as far as possible". Members have already recognised (paragraph 4 of the 1965 Recommendation) that for some countries very concessional assistance is required until their capacity for self-support improves.

6. The objectives of the Recommendation apply to official development assistance, which is intended to be concessional in character. In addition, however, export credits have become of increasing importance as a source of finance and have contributed to the indebtedness problem of a number of developing countries. DAC Members, therefore, agree to review more fully, in consultation with other interested Committees of the OECD, the differences in their basic approaches to export credits, whether official or officially guaranteed, and their relationship to aid and development considerations. Further, in the course of its regular reviews, the DAC and its Working Party on Financial Aspects of Development Assistance will keep itself informed as to the incidence of export credit transactions, their geographic distribution, especially with respect to those developing countries with severe external debt situations, and their impact on the overall indebtedness of developing countries.

### Objectives for Financial Terms

7. The provisions for quantitative terms objectives contained in the 1965 Recommendation (Section C. "General Softening of Financial Terms") will now read as follows :

8. Recognising the special financial effort required in providing grants, it is reaffirmed that countries extending a very large (70 per cent or more) share of their total official development assistance in the form of grants or grant-like contributions are considered to meet the terms objectives of the DAC.

9. It is now recommended that other Members (not falling under the provision of paragraph 8) should use their best efforts, through appropriate institutional, budgetary and policy arrangements, to fulfil either of the following terms objectives :

A. to provide at least 85 per cent of their official development assistance commitments so that each transaction has a minimum concessional element of 61 per cent (1).

or

B. to ensure that 85 per cent of their official development assistance commitments contain an average concessional element of at least 85 per cent.

10. The objective of alternative A is to ensure that **each** qualifying commitment

achieves a minimum degree of concessionality. Examples of loans with the required concessional element are :

● 30 years maturity, 8 years grace period and 2.5 per cent interest

● 38 years maturity, 10 years grace period and 3 per cent interest

● 25 years maturity, 7 years grace period and 2 per cent interest, etc.

The objective of alternative B is to ensure that a large part of the programme as a **whole** contains a mixture of commitments which together reach a minimum concessional element. Examples of programmes with the required concessional element are :

● 52 per cent grants and 33 per cent loans at 30 years maturity, 8 years grace period, 2 ½ per cent interest

● 57 per cent grants and 28 per cent loans at 25 years maturity, 7 years grace period, 3 per cent interest

● 65 per cent grants and 20 per cent loans at 20 years maturity, 5 years grace period, 4 ½ per cent interest, etc.

11. A donor country's terms policy cannot be assessed fully without reference to the volume of official aid it provides. It has been agreed accordingly that in judging compliance with aid targets account will be taken of both the terms and volume of aid. On the question of terms, countries whose volume at qualifying terms (as defined in paragraph 9 above) is significantly below the DAC average as a percentage of GNP will not be considered as having met the terms target (2).

12. Members are urged to use their best efforts to reach the new objectives of the Recommendation, the important factor being the rate at which they improve their performance.

13. It is noted that several Members are still far from the standards of the original 1965 Recommendation, in most cases reflecting their domestic financial and structural difficulties together with a lower per capita income. These Members are urged, while keeping the new objectives in mind, to concentrate their efforts on first meeting the original objectives.

14. The achievements of individual Member countries in implementing the agreed upon objectives, as revised, will be regularly appraised as part of the Annual Aid Review (cf. paragraph 20 of 1965 Recommendation). Due account will be taken of relevant factors affecting aid-giving capacity and the composition of the resources provided. In addition, the Working Party on Financial Aspects of Development Assistance will keep progress under this recommendation under regular review and will make, after three years experience, a comprehensive report to the DAC.

(1) "Concessional element" is defined, for the purpose of this Recommendation, as the face value of a financial commitment less the discounted present value of the required amortisation plus interest payments (using a 10 per cent discount rate).

(2) In statistical presentations of terms performance, official aid volumes would be shown.

# DISCUSSING CURRENT MANPOWER PROBLEMS WITH TRADE UNIONS AND MANAGEMENT

*Several times a year OECD's Manpower and Social Affairs Directorate holds a seminar on problems of current concern*

*for representatives of trade unions, management, or the two together. Government officials and academic research workers also participate in some of these discussions.*

*In the course of these meetings OECD's experts in the manpower field both circulate ideas that have originated in the Manpower Committee and sound out the groups represented for their views on subjects of*

*interest to the Committee. During the past year the discussions focussed on the subjects treated in the following*

*articles : manpower policy and economic restraint, trade unions*

*and the problems of women workers, education and training for the metal worker of 1980 and the obsolescence of*

*present wage systems. In the year to come the problems to be treated include: the continuation of training and education during working life, new patterns in collective bargaining, personnel planning*

*methods, and the employment problems of young people.*

*The articles here give some of the highlights from the papers and discussions rather than comprehensive coverage. In line with the mutually informative nature of these seminars, explicit conclusions and recommendations are not normally formulated ; for each seminar an integrated summary in one volume is being prepared, with a view to publication (1).*

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(1) In the series entitled "International Seminars". The published volumes will be announced in the Organisation's Catalogue of Publications. Individual papers can be obtained on request from the OECD Manpower and Social Affairs Directorate.

# MANPOWER POLICY AND ECONOMIC RESTRAINT

*Beginning in 1966, after a period of increasing labour shortage, governmental measures to prevent inflation and balance-of-payments disequilibria resulted in slackened growth and increased unemployment for most European countries. What lessons does this experience hold for the architects of manpower policy in future? This was the central topic of the international conference on "Employment Fluctuations and Manpower Policies", held in London last February. OECD's Manpower and Social Affairs Directorate had invited participants from all Member countries representing labour, management, governments and academic research.*

**T**HE recession connected with policies to contain inflation and/or improve balance of payments roughly doubled unemployment in a number of Western European economies between 1965 and 1967 or 1968. Even the new figures, usually around 2 or 3 per cent of the labour force, might have appeared small in comparison with those of earlier recessions or depressions. But these statistics only tell part of the story: in most countries the *reduction in employment* was much bigger. In the extreme case, Germany in 1967 compared to 1966, this reduction was as much as four times the registered increase of unemployment.

Concentration of public and governmental attention on the most easily measurable and rapidly available unemployment statistics seems sometimes to have led to an underrating of the seriousness of the downturn. This mistake should not be repeated, warned Jacques Delors, Head of the Social Affairs Department of the Commissariat Général au Plan of France, who presented a general survey of European developments (1). In individual terms those who drop out of the labour force not only fail to make their productive contribution to the economy but also may experience poverty, deterioration of skills, and general discouragement. As the group that is squeezed out consists to a large extent of those so-called marginal workers — the unskilled and poorly educated, older or handicapped workers, those in declining regions — a period of unemployment may make them really unemployable.

This awkward side-effect of governments' efforts to master inflationary pressures by a policy of general economic restraint, was commented upon in the opening speech by Gösta Rehn, OECD's Director for Manpower and Social Affairs: the squeeze, as it had been

conducted with the means available, had not affected only points of inflationary overstrain. It often hit more severely where it did not contribute very much to containing inflation but where it had adverse social and human consequences. The positive effects of economic stabilisation had therefore been bought at much greater social and economic costs than would have been necessary if had been possible to conduct the squeeze more selectively (2).

Once the damage had been done, it was important to draw lessons for the future, and many governments have done so, at least to some extent. In the effort to come back to full employment, governments are trying to resist the demand for an exaggerated reflation of an overall character. Selective programmes were and are being applied to an increasing extent: measures to expand employment just where the workers are, to help people find and move to places where the demand for labour is again increasing, to provide training and retraining for the occupations which can offer more income and employment security in the future, to mobilise those who are on the fringe of the labour market for gainful employment.

If countries should again get into a situation where a renewed retreat to a lower level of total demand were necessary, more parallel timing of overall and selective actions would be hoped for as a result of the 1966-68 experience. As an integrated part of any anti-inflationary action, decisions should be taken to allocate

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(1) *The American experience, described by Professor Albert Rees of Princeton, is not included in the scope of this article.*

(2) *This point was made by the Manpower and Social Affairs Committee in its "Report on the Implementation of The Recommendation on Active Manpower Policy", (Spring 1968).*

administrative and financial resources to counteract useless and negative side-effects of the general restraint: workers in sectors, occupations and regions likely to be particularly hard hit would thus immediately be helped to move into jobs where they could alleviate shortages and contribute best to economic progress. This would mean fighting inflation in a more positive way than by an economic squeeze alone. To the extent that this desirable solution were not possible, a broad set of other programmes for keeping people in gainful employment should be ready for implementation *the moment the need appears* and not with a long and costly lag.

## Selectivity and Rapid Action

However well developed employment forecasting may become, there are bound to be surprises; therefore governments must be able to take rapid action in the event of such unforeseen disturbances when and wherever they appear. The problems of a policy for "selective rapid action", its possibilities and difficulties, was a *leitmotiv* of the conference.

Rudolf Meidner, Head of the new Institute for Labour Market Studies in Sweden, presented more fully the basic theory about "the role of an active manpower policy in contributing to a solution of the dilemma between inflation and unemployment".

The short-term effects of inflationary levels of demand could appear as very positive, Mr. Meidner noted. Many potential members of the labour force were able to find meaningful employment during peak periods of economic activity and, for this and other reasons, the temptation can be great to try to live with an inflationary level of monetary demand for goods and services and to counteract its results on wages and prices with various versions of "incomes policies". Both experience and theoretical analysis, including considerations of income distribution, showed such efforts to be both futile and less desirable in his view. The only tenable line would be to keep the economy in a non-inflationary sort of balance and to apply selective manpower policies in such a way that the loss of welfare, which anti-inflationary measures tend to inflict on vulnerable groups, would be prevented or compensated. Recent experience has demonstrated that a really satisfactory solution on these lines would be a "gigantic task", but it ought to be tried.

## Compensatory Employment and Other Techniques

One important form of rapid action is the creation of temporary jobs for unemployed workers who cannot

immediately find suitable vacancies in the ordinary labour market. The techniques of gearing such jobs to local needs and creating them with the necessary speed was discussed by Thomas Lachs of the Economic Department of the Austrian Trade Union Confederation. The administrative difficulties involved in proper timing of "classical public works" has discouraged some countries from using them as a major weapon, and optimism was mixed with pessimism with respect to the possibilities for eliminating these obstacles. It should not be too difficult to speed up the flow of projects through the pipeline between planning and termination, according to the optimistic view. But, noted a pessimist, "the pipeline can burst" if preparations for expansion of generally desirable public investments are made long in advance; the temptation to start off with these investments at too early a date — over-heating a boom — may be politically irresistible.

The likelihood of obtaining the intended effects on employment would be enhanced, Mr. Lachs observed, referring to a recent OECD study (3) if additional instruments for creation of supplementary work — government procurement orders and the expansion of public services — were more widely used; they have the advantage over heavy construction that they demand neither as great physical strength on the part of the workers, nor as high expenditure in relation to their immediate employment effects; nor are they as likely to have an impact, perhaps inflationary in nature, outside the specific areas of unemployment.

*Income maintenance* for workers during periods of unemployment is usually discussed in terms of its role in levelling fluctuations in consumer demand and of social justice, since it is recognised that changes in the economy which are necessary for economic progress should not involve great sacrifices for a minority. A paper by G.L. Reid of the University of Glasgow (UK) invited the conference to discuss this problem from another point of view: income maintenance as a means of promoting smooth adaptability in the labour market. Some speakers expressed the fear that a generous system of income maintenance is likely to undermine the willingness of the unemployed to take up work again. Others stressed the importance of systems which promote acceptance of technical and structural change in the economy even if this means that some persons lose their employment for a period of time. The importance of the new system of redundancy payments in the UK in easing the process of "shake-out and redeployment" was noted, but on the other hand the rationality of redundancy payments was challenged as compared to unemployment insurance and ample access to more positive forms of adjustment assistance such as retraining. Differing views were expressed concerning the possibilities of utilising "sabbaticals" as an instrument

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(3) "Compensatory Employment Programmes: an international comparison of their role in economic stabilisation and growth", (published in the "Developing Job Opportunities" series) by Jay Howenstine, OECD, May 1968.

for adjustment of labour supply to variations in demand.

The employment problems of "special groups" under varying market conditions were reviewed by Dr. Rolf Weber of the Federal Union of German Employers' Associations, measures to promote *geographical mobility* by Mr. Mario Milano of the Italian General Confederation of Industry, and *adjustment of the employment service to changing conditions* by Mr. Reidar Danielsen, Director of the Norwegian Labour Market Board. Some of the main points that emerged from the discussion of these subjects were :

- Social legislation and insurance systems should counteract the tendency to let the least adaptable groups bear the greatest responsibility for adjustment in the labour market and to suffer the greatest insecurity in employment.

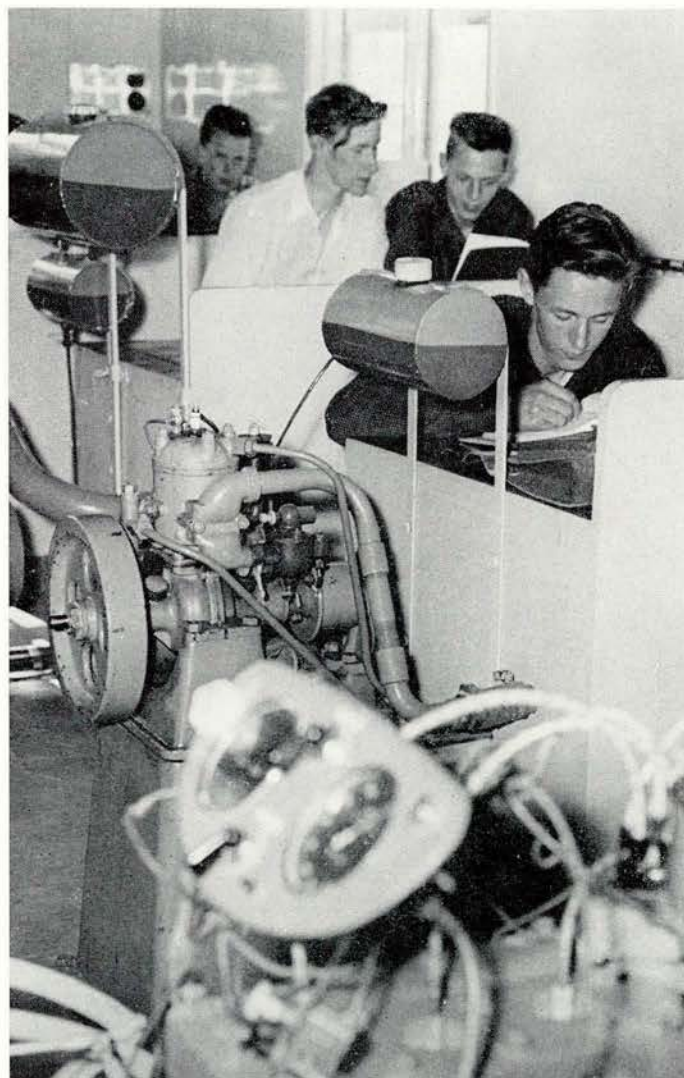
- Attitudes varied on the question of financial support for geographical mobility when employment opportunities differ greatly between regions. There are obvious cases where a speedup of mobility out of a declining area can be the only sound solution, but in other situations careless promotion of geographical mobility from labour surplus areas may worsen the situation for those remaining in these areas ; such measures should be consciously selective and should be combined with steps to encourage the return of experienced workers.

- In order to reorient employment service officers to the requirements of an active manpower policy and to ensure their close contact with industry, it would be advisable to deviate from the usual pattern of job permanence in the civil service so that the service could exchange personnel with private firms insofar as possible. This greater flexibility would require more adequate financial compensation.

## Country Experience

Although the conference programme was designed to invite discussion on specific issues, the national policy lines of individual countries were often evoked, at least in the case of countries where particularly interesting developments had taken place. Papers concerning Germany, the UK, and Sweden were submitted to the conference by W. Steinjan, Derek Robinson, and Rolf Sohlman, respectively.

The marked recession in *Germany* was largely due to the unexpectedly strong impact of fiscal-monetary restraint, and thus the policy for stimulation followed a similar pattern, relying mainly on general policy measures. But important elements of what might be called manpower policy were also used. The contingency budget, aside from its role as an expansionary fiscal policy tool, was used selectively, at least to some extent, to meet the differing needs of local labour market situations. In other fields of manpower policy, too, Germany increased its efforts, e. g. promoting



*During periods of economic restraint, training and retraining can be stepped up to offset a decline in the employment level.*

occupational and geographical adjustment in order to solve the structural problems of the coal and steel industries, which appeared more acute because of the recession. Recent experience may also have speeded the elaboration of a new draft "employment promotion law" now before the Parliament. Similar legislation was recently passed in *Austria* (see OECD OBSERVER, April 1969).

The *United Kingdom* has developed an increasingly forceful system for stimulation of employment in "development areas". Since 1967 this programme has included a direct "regional employment premium" which represents a radical departure from the earlier and internationally more usual investment subsidy. There is logic, it was noted, to the idea of supporting employment rather than labour-saving machinery when and where the problem to be solved is one of unemployment.

Some British delegates stressed the complicated nature of eliminating regional employment differences. The existence of a relatively high level of unemployment

in an area does not necessarily mean that this area is less exposed than others to the risk that a general increase in demand will lead to inflation rather than to increased employment and production. Shortages of "key workers" with adequate skills can be as great in these areas as anywhere else, and a real reduction in unemployment might better be promoted by encouraging an influx of such workers, by internal mobility between sub-areas, or by adult training schemes than by general support for expansion of employment or promotion of outward mobility.

Among the recent British innovations, the workings of the Industrial Training Act of 1964 also evoked particular interest. It was observed that this law, which provides a compulsory clearing system for financing vocational training costs in each industrial branch, would, in the long run, work as a forceful stimulus to the development of industrial skills in the British economy. It could not, however — at least not yet or in its present form — function as an instrument to encourage speedy adjustment of general or sectoral imbalances in the economy. Some of the discussion centered on the question of whether such increased flexibility could best be provided by changes in this law and its implementation or by development of the Government Training Centres which are now of limited quantitative importance.

The paper on *Sweden* described the "rapid action aspect of Swedish manpower policy". In Sweden the adult retraining scheme was deliberately used as an instrument for rapidly influencing the labour market imbalance. The emergence of unemployment in 1966 and 1967 — and forecasts of more — gave impetus to a sharply accelerated expansion of existing programmes, and the number of trainees in government-sponsored courses was raised from 21,000 in March 1966 to 27,000 in the same month of 1967 and to 35,000 in 1968 — a total which represents nearly 1 per cent of the labour force. Thus these courses were used as a sort of public works for the unemployed, both better and cheaper than those of the usual type.

H. Hakanson, former Head of the Adult Retraining Division of the Swedish Labour Market Board, whose paper was the main presentation of training issues, emphasised that a fall in employment provides an opportunity to upgrade the skills of the work force, in particular for shortage sectors which usually exist even when employment is low, at the same time preparing for a period of greater expansion when demand for labour is rising again. Adult training programmes should be at the direct disposal of the manpower authorities, so that the latter can make decisions at the shortest possible notice about appropriate variations in scope of enrolment and about occupations taught. It is, he suggested, well worth accepting the costs entailed in under-utilisation of the system at certain times in order to leave room for rapid expansion at the right moment.

To combine in this way the training system's ordinary task of improving the supply of skills in the eco-

nomy with the short-term task of alleviating unemployment was somewhat foreign to the thinking of delegates from some other countries. Some were afraid that workers would not want to go into training if there did not seem to be an ample number of openings waiting at the end of the courses; this hesitation in periods of slack had been a feature of the Swedish experience, during the early stages before the whole idea of retraining as a natural reaction to unemployment had taken hold in that country. Others feared that the necessary improvisation would endanger quality and reduce the status of training and the trained. The Swedish delegates, whose adult training system had been scrutinised recently by an OECD expert team, felt that this was a factor of very limited importance, and that there were great advantages to "getting two chickens out of one egg".

Even more important in quantitative terms than the adult training system in Sweden was the rapid implementation of selective employment creation in areas and sectors where unemployment had increased or redundancies were foreseen: relief works (i. e. public works on which the employment service may place unemployed workers); sheltered employment (in public undertakings or subsidised private firms); release of "investment reserve funds" (money put aside by companies with a tax allowance during the boom, for use in periods decided upon by the government); and building programmes in areas of unemployment.

The total number of persons for whom employment or training opportunities were specifically created in this way rose from 1.1 per cent in March 1966 to 1.6 per cent in the same month of 1967 and to 2.6 per cent (100,000 persons) in 1968.

The Swedish representatives stressed the fact that, despite these efforts, it had been impossible entirely to neutralise the factors creating higher unemployment. The Government had therefore drawn the conclusion that the capacity for such selective adjustment measures should be further reinforced.

With the "rapid actions" actually brought to bear at local and sectoral levels, the Government had, however, been able to maintain an overall anti-inflationary policy against strong demands for relaxation by means of general fiscal-monetary measures. The fight between the "general relaxation" line and the "selectivity" line had cut across traditional political constellations, but when the latter approach had shown its results, there was a very marked swing (as shown by Gallup polls) towards greater confidence in the Government's capacity to solve the unemployment problem.

Now that another international upswing seems to be underway, a considerable number of people could be released from their temporary employment or from the training courses, thus providing an important anti-inflationary — and expansionist — factor in the economy.

The Swedish views did not elicit much discussion. One should mention, however, the observations of an employers' representative that the unemployment prob-

lem tends to be exaggerated unless one takes into account the fact that the unemployment registers are partly filled by "unemployables" (who should be regarded as pensioners for reason of age or other incapacity); that most of those who become unemployed get new jobs in a relatively short time without much help from governmental measures. Speakers from the trade unions on the other hand maintained that many of those who lose their jobs during an economic slowdown were not previously unemployable and that there was a need for increased attention to the problems of those who were difficult to place once they had lost their jobs.

Discussing the "rapid action" theme, delegates from various countries expressed pessimism about the chances of getting the consent of parliaments to necessary financial freedom of manœuver. It was observed, however, that the recent OECD experts' report on Fiscal Policy for Stabilisation recommended that all Member countries seriously reconsider their budgetary rules, not only from the specific point of view of manpower policy, but as a general precondition for sound economic development.

The need for financial as well as administrative flexibility was a central point in the final discussion on "the problem of coordination" introduced in a paper by Sir Denis Barnes, Permanent Under-Secretary of the Department of Employment and Productivity in the UK. It is, of course, not possible to elaborate any general prescription for coordination involving different ministries, central and local government agencies, labour and management organisations and

other bodies. This depends on national conditions and traditions, but it was noted as a general observation that the realisation of high ambitions for levels of employment, growth and stability is changing the character of ministries of labour; from their role as agencies for helping the unemployed and administering other social welfare programmes, they are becoming one of the economic policy ministries. It is in this capacity that they have to co-operate with the other ministries responsible for employment and economic growth, without losing sight of the social welfare aspects. It is significant that the Ministry of Labour of the UK has become the Department of Employment and Productivity.

It was also noted that one important part of co-ordination is that between long-and short-term goals. Observations that "rapid action" against short-term disturbances could not be the only task for manpower policy gave Mr. Rehn an opportunity in his summing-up to underline the attitude of the organisers of the conference: the fact that we have concentrated upon the rapid action aspect on this particular occasion does not mean that we believe this to be the only important aspect. In fact, there is no antagonism between long-and short-term policies and programmes. What is needed is permanent machinery for non-permanent activities. If governments maintain a high degree of preparedness to meet unforeseen changes of limited scope before these have grown into more serious imbalances, they will have greater possibilities to solve the problems in such a way as to support and not disturb their long-term plans and the long-term trends of their economies.

# TRADE UNIONS AND THE PROBLEMS OF WOMEN WORKERS

*The increase in the number of women, and particularly married women, in the labour force over the last fifteen years has posed a whole new complex of problems for the trade unions. In OECD countries at the present time between 24 and 42 per cent of all non-agricultural workers - and hence of potential trade union members - are women, and in the growing service sector they account for as much as 60 to 70 per cent of total employment. Yet relatively few women are trade union members, and the unions, for the most part, have not fully taken into account the importance of the female labour force in formulating their policies. At the request of OECD's Trade Union Advisory Committee the Manpower and Social Affairs Directorate invited 40 trade unionists from 6 European countries (Austria, Denmark, France, Ireland, Italy and Norway) to discuss these issues with sociologists, economists, educators and representatives of international trade union federations. In part their dis-*



*discussion was based on conclusions drawn by OECD's Manpower and Social Affairs Committee on measures to be taken for workers with family responsibilities and on a survey of existing measures (1).*

(1) "Women Workers: Working Hours and Services" by Viola Klein (1965). Some of the problems discussed are also covered in a publication entitled "Part-Time Employment, its extent and its problems" by Jean Hallaire (1968).

**T**HE principle of equal pay for equal work advocated by many trade unions has made considerable progress; it is incorporated into the constitutions or legislation of a number of countries and into the European Economic Community's Treaty of Rome, and there has probably been a narrowing of actual differentials in pay between men and women, particularly in the public service, though precise figures are rarely available.

Despite this advance, however, trade union delegates to OECD's seminar on the employment of women pointed out that women's earnings are still considerably lower than men's (French sociologist Evelyne Sullerot estimates them as being on average 60-70 per cent of men's salaries) not only because of discriminatory rates but also because women are heavily concentrated in traditional "women's" work at the low end of job evaluation scales and in relatively low-paid industries and services.

To a great extent women are still considered as "a reliable safety margin for the always difficult fore-

casts of the labour market" to be encouraged in times of short labour supply and otherwise disregarded, and the right to work is not generally considered as a female prerogative: "The underemployment of women does not frighten our societies in the same way as the underemployment of men" Mrs. Sullerot observes.

The reasons for this failure to integrate women into economic life are complex but seem to be intimately related to society's attitudes about the proper role of a woman (which is often confused with that of a mother with small children, though in most countries only a relatively small proportion of female employees fall into this category). A number of trade union speakers pointed to the distance between these conceptions and the actual demographic and technological facts of life (e. g. longer life span, smaller families, which are concentrated during the early stages of a couple's married life, allowing the woman to take up work again sooner, more of a child's education outside the home). Ways of life have changed more rapidly than traditional conceptions, and in some areas where the employment of women is most widely denounced, the highest proportions of working women are to be found.

Whatever the profound causes, the inequities between men and women are deeply rooted in the educational system. Nancy Sear of the London School of Economics described the situation in the United Kingdom where in 1965-66 only 37,000 young women were studying for a first degree in university as against 98,300 young men. (In other OECD countries the ratio is more favourable, but in only a few countries do the numbers approach equality.) In occupational training the situation is even more unbalanced: again in the UK only 5,400 girls were serving as apprentices in skilled trades at the last official count as against 271,650 boys, and the girls are heavily concentrated in textiles and clothing where employment is on the decline.

Except for a few occupations like computer programming only a token number of girls are being trained for the scientific and other technical occupations which have among the highest pay scales and greatest potential for the future: 110 girls were being trained as scientists and technologists for industry at the time of the British survey (9,630 men), 350 as draughtsmen (17,450 men), and at university level only 144 girls were in engineering studies as against almost 9,000 men. The same is true on the whole for the growth industries: in engineering and electrical manufacture for instance, there were only 220 girl trainees and in chemicals and allied industries none at all.



*A high proportion of women workers are employed in traditional industries such as textiles and clothing.*

*(continued on page 26)*

The situation in other countries is similar. In Austria, for example, 57 per cent of the boys leaving school received vocational training as against 33 per cent of the girls. Edith Krebs of the Austrian Chamber of Labour noted that "as a general rule the girls are taught the trades which are traditionally 'suitable for women', often against their will and without regard to the few job openings available. Consequently many abandon the occupation for which they were trained and take jobs in some other branch of industry as semi-skilled workers". Training courses fail to correspond to job opportunities in France as well: more than 85 per cent of the girls learning an industrial trade prepare for couture but, being unable to find jobs in that field, work in other branches such as electronics where their skills are valued but, because they do not have the appropriate certificate, they are classified as semi, rather than fully skilled workers.

Providing more equal training opportunities is the key to the central problem of equal employment opportunities for women but will not be sufficient in itself, for the needs of the economy often go against the girl's own (or her parents') conception of what a woman's work should be. Hence the overriding importance of professional counselling in the schools and for women who wish to resume employment after having raised a family. "Traditional attitudes die hard, and a strong lead from the top, backed by administrative action, is needed to speed up the rate of change", says Miss Seear, citing as an example of such action a circular sent in October 1967 by the French Minister for National Education to all heads of schools. This note points out that there is a need for girls to switch to new types of technical employment and for technical and professional training opportunities to be made available to both boys and girls without discrimination.

## A New Approach

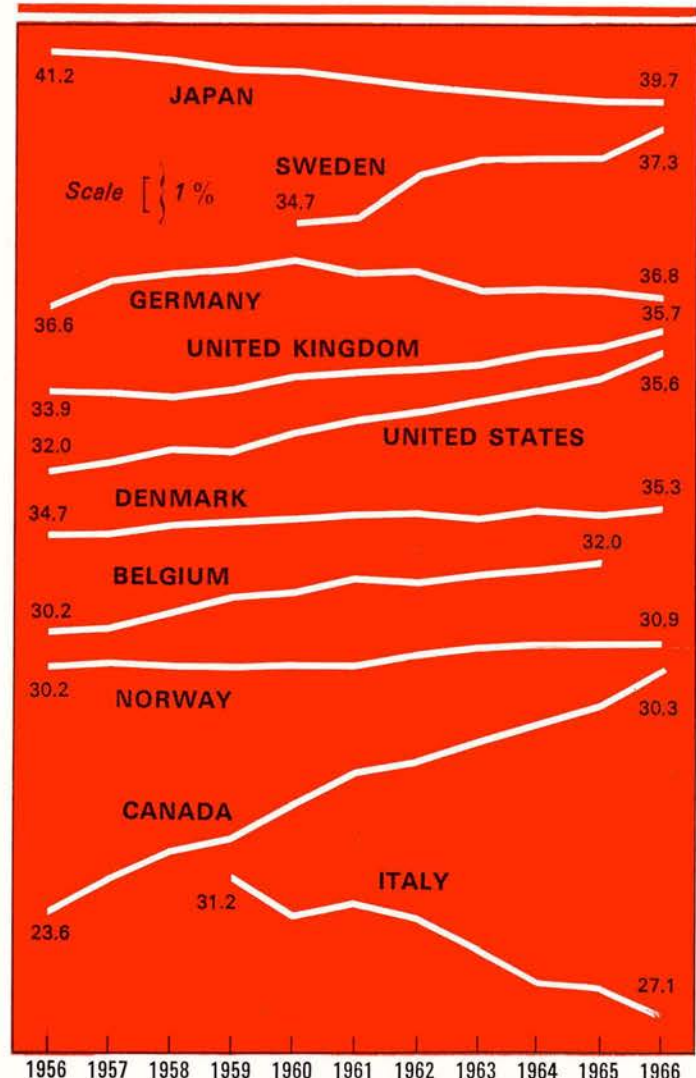
If women workers are to have higher paid, more responsible jobs, the old trade union objective of obtaining special protective measures through collective bargaining or legislation must give way to a new approach. Much of existing legislation on health, safety, hours of work, etc. is technologically out-of-date, and such special provisions can work to the detriment of women in achieving equal treatment. Rather the emphasis should be on eliminating health and safety hazards and improving other working conditions for all workers, men as well as women.

The fact remains that if a woman is to continue in employment, she is likely to require maternity leave, and this involves extra costs for the employer under existing arrangements. The consensus of opinion of the trade union representatives was that child bearing must be considered as a parental and social function and hence that the extra costs should be borne not by the employer but by the community as a whole. Such

an approach would reduce employers' resistance to hiring women. (Formerly many firms solved the problem of maternity costs by writing a clause into a woman's employment contract to the effect that she would be dismissed in the event that she married, but these "celibacy clauses" have been invalidated by legislation or by the courts in most countries.) In Italy a law passed in 1963 provides for the social security system to take over the costs of maternity care and provides an allowance to tide a woman through the period during which she is absent from work. The consensus of opinion at the seminar was that it would be desirable for other countries to adopt similar legislation.

Other obstacles encountered by women in finding or keeping a job were discussed, in particular the lack of adequate "social infrastructure" — crèches and nursery schools, family helpers, after-school or vacation activities for children — and the lack of coordination between the hours of banking, government administration and other services with hours of work. These

WOMEN AS PERCENTAGE OF CIVILIAN EMPLOYMENT



Source: Labour Force Statistics 1956-1966 OECD, 1968

problems too are matters of social policy which must be overcome by the community as a whole. Several speakers suggested the formation of councils representing trade unions, employers, consumer groups and the Ministry of Labour to solve the problem of working out compatible schedules in order to avoid clashes and eventual waste of time.

There was some debate on the matter of providing child care for the very young, one of the trade union delegates pointing out that the cost of creating crèches is very high and that it might be better to give the mother of very young children a sufficiently high indemnity so that she can choose whether or not to stay at home.

There was also considerable divergence of views between the trade union representatives on the matter of whether or not part-time work should be encouraged for women (and men) who are unable to carry out full-time work because of other responsibilities. French trade unions take the position that the existence of part-time work has a tendency to cause deterioration in the wages and employment conditions of full-timers and hence should not be encouraged. The delegates from other countries on the whole favoured part-time work and advocated protection of all workers by guaranteeing part-timers social security, wages and other benefits

on the same basis as full-time workers. In Norway a special commission is looking into the question of what form such a guarantee might take.

## Types of Action

“ The time has passed when the trade unions could be content to write a few claims of principle into their programme and adopt some pious resolution on equal pay ”, concluded Simone Troisgros and Marcelle Dehareng on behalf of the World Confederation of Labour and the International Confederation of Free Trade Unions. The role of women as permanent members of the work force must be recognised and the obstacles to their full employment removed, in part through collective bargaining but in other ways as well. Since attitudes towards the employment of women are so important in determining their opportunities, the unions have an educational role to play, providing information on the demographic and cultural evolution that has taken place, on new types of job opportunities and training possibilities. But since many of the obstacles to the employment of women can only be solved by the community as a whole, the trade unions will also have to act as a pressure group in bringing about the political changes that are required.

# EDUCATION AND TRAINING FOR THE METAL WORKER OF 1980

*In an effort to pin down to a specific industrial context what are often rather general discussions about the impact of automation on employment, a seminar was held on the future of the metal working industry. Both the technological possibilities and the economic outlook were taken into account in attempting to assess what skills will be needed by workers in this broad industrial sector a decade hence and how they can be acquired.*

**N**EW technology, already in use in such advanced industries as aeronautics and space travel, may prefigure the kind of techniques that will replace conventional metal working methods by 1980. Some examples cited by contributors to OECD's seminar are :

- electron-beam welding in which the pieces to be joined are melted with a sharply focussed beam of high-energy electrons. Some 450 such tools are already in operation in the US, and the technique is being used experimentally by the automobile industry ;

- laser-beam welding ;
- magnetic metal-forming which uses jolts of magnetic pressure to form metal without creating heat.
- electrical discharge machining which uses electric sparks to vaporise the metal along the tool's path and which can maintain very close tolerances ;
- electrochemical machining which “ pulls out ” pieces of metal from the main work piece.

*(continued on page 28)*



*An electromagnetic hammer corrects distortions in metal surfaces through magnetism — one of many space techniques that could change the job profile of the metal worker of the future.*

Even more important in terms of their impact on metal working jobs will be numerically controlled machine tools, which Vernon Jirikowic, Research Director of the US International Association of Machinists and Aerospace Workers, characterised as “the most significant new development in manufacturing technology since Henry Ford introduced the concept of the moving assembly line.” This type of machine which “can understand measurements” is capable, he said, of performing most of the functions now carried out by the operator of conventional machine tools, and in the US it is estimated that sales have already reached 285 million or 15.2 per cent of the total machine tool market. The potential of these tools is not limited to individual operations: self-contained machining centres — a single machine tool, or a family of them, capable of performing all the machining operations required to complete a given part — are becoming increasingly important; at last count 114 such centres were in operation, and they are expected to increase in number.

In the more distant future the concept of numerical control will be widely extended, predicted Professor W. Simon of the Technical University of Berlin, noting that already there are numerically controlled testing machines, wiring machines and drawing tables on the market, and differing types of functions may be linked. “It is no longer a question of replacing a few obsolete machines with more modern ones but in many cases of the need to reorganise the firm completely so as to permit the integrated data processing of management, construction, job preparation, production and sales.”

The final conceivable stage in this development — complete manufacturing control through a central process computer — is still a remote contingency and could probably only be used in special cases, in the opinion of Professor Simon, but there are many intermediate stages which provide the opportunity for radical change both in production methods and organisational forms by 1980.

Other technological possibilities were touched upon by speakers at the seminar, notably the replacement of metal in many uses by plastics. F. Koenigsberger, Professor of Machine Tool Engineering at the University of Manchester in the UK, noted that a plastic gear-box housing for motor cars has already been successfully produced and used in an experimental vehicle: an experimental “all plastic” car in which metal is not even used for structural load-bearing parts, such as body posts and understructures, was described to the seminar.

## **The Implications for Training**

The difficulty of translating these technological glimpses into the future into particular job descriptions quickly became evident to the conference.

Not only are the technological forecasts subject to uncertainty, but job content depends very much on management or joint trade-union/management decision. Deliberate job enlargement or the setting up of higher job qualifications than may be necessary for immediate

performance so as to help upgrade the workers' overall capacities are very much within the realm of possibility.

But, from the point of view of training, the very difficulty of projecting future jobs leads to the important conclusion that present narrowly oriented apprenticeship systems which train young people in specific limited occupations are out of date in a rapidly changing technological society. Industrial training must be broadly conceived in order to meet the continuous need for changing skills, and training must become an integral part of every employee's working life. "The most important thing to achieve by 1980 in the retraining of industrial workers", noted W. Douglas Seymour of the University of Birmingham, UK, "is the abolition of the idea of retraining altogether. We should have become so accustomed to training in industry that we do not think in terms of training and retraining but of training and more training."

The conference heard detailed descriptions of new training systems — the three-step programme in Germany and the modular system in the United Kingdom, both of which involve a breakaway from traditional concepts of apprenticeship and provide broadly based training in engineering practices as a foundation for

subsequent free choice of more specialised study immediately or after a period of work experience. The module system, which is being applied by the engineering training board set up in 1964 by the Industrial Training Act allows for different learning rates depending on the person's capacities rather than arbitrary time scales for the achievement of standards and also provides a means of bridging job boundaries in order to form multi-skilled craftsmen.

But training in the strict sense was not the only concern of the trade union representatives attending the conference who constantly turned to questions of general education in the schools and the need for a broad educational base for technical skills. "While trade unions have in the main concentrated their bargaining power on seeking general improvements in pay and conditions of work", noted Joseph Moon, Principal Training Officer of the Engineering Industry Training Board, in summing up the conference, "they have possibly undervalued the changes which they could bring about by placing greater emphasis on education and training and their continuation into adult life. The idea of negotiating conditions for vocational training and education is one which is worthy of much deeper investigation".

## ARE PRESENT WAGE SYSTEMS OBSOLETE ?

*Changing technology has put a strain on traditional methods of wage determination. As a result of this and other factors, many enterprises are questioning the old systems and trying to find new, more appropriate ones. At the request of its Business and Industry Advisory Committee, OECD's Manpower and Social Affairs Directorate held a management seminar to discuss present methods of wage calculation in Europe and America and possible new approaches.*

**A** large proportion of the blue collar workers in Europe are paid according to some wage formula which is an outgrowth of simple piece-rate systems. Over the years these systems have evolved and become much more sophisticated. Most of them, for example, provide for a basic minimum below which earnings cannot fall and rates which are established in conjunction with detailed studies of work content and organisation ; nevertheless they retain the basic characteristic of an incentive system : earnings are a direct function of the amount of work done by a single worker or group of workers.

In the United States, incentive pay was common during World War II, but in the 1950's there was a "crisis" in incentive systems and today, with the exception of certain industries — clothing, hosiery, shoes, selling, logging and also parts of the steel industry — hourly, weekly or monthly pay is the rule.

The difficulties now being experienced with incentives by some European firms indicated to a number of the participants in OECD's seminar that Europe may be in the throes of a similar crisis and that new forms of wage payment will replace the old methods.

*(continued on page 30)*

## The Underlying Assumptions

Some of the basic assumptions underlying incentive systems have been called into question by technological developments; not only has the control of work pace been taken over by the machine; in the most automated jobs, workers have been removed altogether from the physical process of production and made into machine minders, maintenance men, or technicians. Hence management objectives in designing a wage scheme, originally focussed on the limited task of encouraging physical output, have shifted: in particular there is growing concern with encouraging workers to accept technological change and to learn new skills and techniques.

A change which could affect incentive systems may also be taking place in worker motivation. Louis Tiedge, Director of Industrial Relations of the Bendix Corporation in the US, noted that "in many respects, the average production worker of today is not as easily motivated by inducements of monetary rewards as his counterpart of a decade ago. Unquestionably, many of the features of our present-day prosperity such as high basic rates, a broad range of fringe benefits and the availability of overtime have lessened the individual's desire to achieve greater income through increased effort. Our young people are not only more highly educated but are also the product of an affluent society. The more ambitious look to education not effort as the key to self improvement."

From the point of view of the economy as a whole, methods of wage payment must be judged in the light of governments' commitment to the idea of distributing increases in productivity in a way that is both equitable and non inflationary. There is evidence that payment by-results systems may conflict with both of these goals. The difficulties are perhaps best illustrated by the experience of one Swedish company, cited in a recent OECD study (1), which, because of frequent changes in production technique, has to renegotiate some 4,000 rates each month. Participants in the seminar noted that, because of union opposition or a desire to get round official controls or because it is the path of least resistance, there is often a tendency for management to allow earnings to increase when new machinery or forms of work organisation raise workers' productivity. In some cases cited, control over the wage structure has been lost altogether. The resulting "wage drift" may create anomalies (unskilled workers earning more than skilled workers or even in some cases more than supervisors) or inflationary pressures as other workers press for similar increases. In any case the gains in productivity tend to be passed on to workers in irrational fashion, possibly without any advantage accruing to consumers in the form of reduced prices. For this reason incentive systems have been of interest to those concerned with incomes policies: a 1968 report of

the British National Board for Prices and Incomes found that drift amounted to as much as 4 to 8 per cent a year in some firms with wage incentive systems, more than the average growth of national productivity. In others, however, where the system was under firm control by management or joint agreement with the union, the rise was limited to 1 or 2 per cent.

## Wage Systems for the Future

Participants in the conference differed as to the likely future direction of wage payments; some noted that individual or group incentive systems would probably be maintained by many companies because it was the traditional way of doing things and might continue to prove satisfactory where the level of technology was not too advanced or the change too rapid. Moreover, incentive systems might be further refined to reward factors other than physical output — attentiveness, ability to take responsibility, and even perhaps willingness to accept technological change. But, noted Emile Boursier, General Secretary of the National Association of Metal and Mining Industries of France, the most striking advantage generally cited in connection with systems of incentive pay (productivity gains of as much as 20 to 25 per cent) may be more associated with the detailed study of the work involved and consequent rationalisation than with the incentives themselves. The same advantages could, therefore, be obtained with a system of stable weekly or monthly earnings if it included job evaluation and promotion for merit.

Representatives of the Philips Company of the Netherlands described current modifications in that firm's wage structure, the eventual aim of which is to eliminate the traditional distinction in treatment and status between white and blue collar workers. One element in this transition is putting the latter on a salaried basis through a step-by-step changeover from fluctuating incentive rates. In the United Kingdom, a survey conducted by the Industrial Society in 1966 showed that 11 of the 180 firms sampled intend progressively to give "staff status" to all employees. Since, with automation, the traditional differences between blue and white collar work are tending to disappear, a number of delegates felt that these examples would become generalised. Some favoured carrying this type of integration even further through use of profit-sharing and other plant or company-wide bonuses, formerly applied mainly to members of management. Such schemes would be intended to encourage employees to identify their own objectives with those of the enterprise rather than pursue the narrow production orientation that has been promoted by wage structures in the past.

(1) Wage Drift, Fringe Benefits and Manpower Distribution, by Derek Robinson, OECD, 1968.

# TECHNOLOGICAL GAPS IN THE COMPUTER INDUSTRY

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*Not only are computers widely used in virtually every industry, including the growing service sector; they are intimately linked to the decision-making process and hence to management, whether of private companies, government agencies, education or the armed forces. The role of the computer as the "nervous system" of advanced technological societies has been explored in an OECD study of computer manufacturing and utilisation in North America, Europe and Japan. A brief report on the study, one of a series on technological gaps recommended for publication by the Third Ministerial Meeting on Science, will be published shortly. It was prepared by a group of experts (1) and national rapporteurs (2) under the chairmanship of Mr. F.J.M.Laver (UK), submitted to national authorities and revised in the light of their comments.*

*The following article is written by Nicolas Jéquier, Secretary of the expert group and consultant to OECD's Science Directorate. The views expressed are solely those of the author and not necessarily those of the OECD.*

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*(2) Austria : Dr. H. Raimann, Rechenzentrum Graz, Graz; Canada : Mr. R.F. Linden, Department of Industry, Ottawa; Denmark : Mr. N.I. Bech, Regnecentralen AG, Copenhagen; France : Mr. P. Audoin, Délégation à l'Informatique, Paris; Germany : Mr. H. Wessling, Zentralverband der Elektrotechnischen Industrie, Frankfurt; Italy : Prof. L. Dadda, Politecnico di Milano, Milan; Japan : Mr. S. Totani, Mr. K. Wakasone, Ministry of International Trade and Industry, Tokyo; Sweden : Mr. G. Lindstroem, Saab AB, Linköping; United Kingdom : Mr. D.V. Davey, Ministry of Technology, London; United States : Mr. S.A. Pettingill, Business and Defense Services Administration, Department of Commerce, Washington.*

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## Measuring the Gaps

The existence of marked technological gaps is one of the few incontestable characteristics of the computer industry. All the available evidence points to a clear-cut lead of the United States over other OECD Member countries. American companies and their foreign subsidiaries account for approximately 95 per cent of the Western world's production of computers (1). The chart on page 32 summarises the situation.

Production is not the only way of measuring the gaps. One can use other indicators such as the pattern of international licensing agreements, innovative performance, foreign trade or foreign investment. These yardsticks all confirm the above picture.

Several European and Japanese firms have acquired manufacturing licences from American companies. These agreements reflect the leadership of American technology, the importance of which comes out even more forcefully if one reflects upon the fact that in 1967 there were no more than two companies making a broad range of computers outside the United States without the help of an American manufacturing licence: the first is ICT in

the United Kingdom (the name of this firm has been changed to ICL after a merger with English Electric) and the second is Fujitsu in Japan. No European or Japanese firm is in a position to grant a licence to the United States. There has however been a recent development which clearly indicates that all gaps are relative: by 1968, two companies outside the US had granted manufacturing licences to Eastern Europe (Bull-General Electric to Czechoslovakia and Fujitsu to Bulgaria). In a sense, Western Europe and Japan are in the same position of technological leadership vis-à-vis these countries as is the United States vis-à-vis the rest of the world.

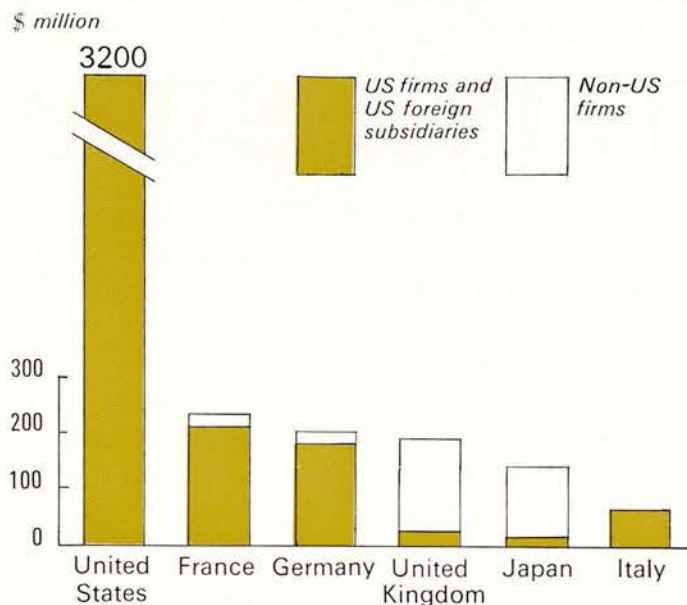
A list of the most important inventions and innovations is another useful indicator. The history of the industry or, more broadly, of computer technology, starts around 1936, when some of the most important theoretical works were published. This incubation period or "pre-industrial stage" lasted until around 1951, the year in which the first computers were commercialised; the industry is thus less than twenty years old. During this first period, important technological contributions were made by three coun-

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*(1) The present study addresses itself only to digital computers; analog and hybrid computers have been left out on account of their relatively minor importance (probably less than 5 per cent of the whole computer industry).*

# 1. THE WORLD COMPUTER INDUSTRY IN 1966

Estimated shipments by US and non US firms  
in the main computer producing countries



Source: National replies to checklist, OECD estimates.

tries: the United Kingdom, Germany and the United States. The British mathematician A.M. Turing, for instance, was among the first to expound a general theory of computing; Germany's Konrad Zuse developed the world's first electronic computer, the Z 3, in 1941; J.P. Eckert and J.W. Mauchley of the University of Pennsylvania developed ENIAC, America's first and the world's second electronic computer in 1946.

The second period — roughly the 1950's — is marked by the disappearance of Germany from the small group of technologically leading countries. And in the third period, i.e. after 1960, the leadership of the United States is established. This late period can conveniently be described as that of solid-state technology: whereas the computers of the 1950's used vacuum tubes, those of the 1960's used transistors, and later integrated circuits.

The only countries for which reasonably good data on international trade in computers are the United States and Japan. The first of these two countries had a trade surplus of \$ 284 million in 1966, and the second a deficit of \$ 39 million. The trade figures for other countries, when available, are difficult to interpret owing to the highly international character of the industry. In France, Germany or Italy for instance, most of the computers exported are made by subsidiaries of American companies.

Foreign investment is in a way the normal extension of a company's operations: success on the national market can lead to export, and later to manufacturing in some

## THE MAIN INVENTIONS AND INNOVATIONS IN THE COMPUTER INDUSTRY

(A = theoretical advance, B = first application, C = first commercial application)

Description	Type, country and year	Responsible firm or individual	Remarks
1. General theory of computers	A. France 1936	L. Couffignal	Unknown outside France No publications. Totally unknown  Relatively important influence
	Germany 1936	K. Zuse	
	United Kingdom 1937	A.M. Turing	
2. First electronic computer	B. Germany 1941	K. Zuse	Z3 computer. Unknown outside Germany ENIAC. Important work was also done by G. Stibitz at Bell Telephone (1940), H. Aiken and IBM at Harvard (1944) and V. Bush at MIT (late 1930's and early 1940's) UNIVAC I
	United States 1946	J.P. Eckert and J.W. Mauchley	
	C. United States 1951	Remington Rand	
3. Internally stored program	A. United Kingdom 1937	A.M. Turing	Z3 Computer  MADM } Close scientific, inter- EDSAC } change between the UNIVAC I } United States and the United Kingdom
	United States 1946	J. von Neumann (Univ. of Pennsylvania)	
	B. Germany 1941	K. Zuse	
	United Kingdom 1948	Univ. of Manchester	
	United Kingdom 1949	Univ. of Cambridge	
	C. United States 1951	Remington Rand	
4. Subroutine concept	A. United Kingdom 1937	A.M. Turing	
	United States 1946	J. von Neumann	



5. Read-only memory	A.			The read-only memory has been used in automatic telephone exchanges
	B.	United States 1946	J.P. Eckert and J.W. Mauchley	ENIAC computer. Limited storage
		United Kingdom 1949	University of Cambridge	EDSAC II computer. Storage of the entire control information
	C.	Several countries	Most manufacturers	
6. Associative memory concept	A.	United States 1946	V. Bush	ATLAS { The full possibilities of 360-67 { associative memories have not yet been exploited
	B.	United Kingdom 1952	Ferranti	
	C.	United States 1965	IBM	
7. Microprogramming	A.	United Kingdom 1948	University of Manchester	{ Close interchange
	B.	United States 1948	University of Cambridge IBM (J. Backus), U.S. Navy (G. Hopper)	
8. First compiler (A2)	B.	United States 1951	U.S. Navy (G. Hopper)	In the late 40's, Grace Hopper worked in the U.K. UNIVAC I : first computer to have a compiler
	C.	United States 1951	Remington Rand	
9. FORTRAN language	B.	United States 1953	IBM Users Association (SHARE)	First FORTRAN compiler written by J. Backus of IBM
	C.	United States 1954	and IBM IBM	
10. High speed drum printer	C.	France 1954	Bull	First application of the "on the fly" principle for printing
11. Ferrite core memory	A.	United States 1955	MIT (Lincoln Laboratory)	Important work was also done at Harvard UNIVAC 1103A, IBM 704 and 705
	B.			
	C.	United States 1956	Remington Rand, then IBM	
12. Transistorized computers	A.	United States 1947	Bell Telephone	Discovery of the transistor effect in 1947 Leprechaun computer
	B.	United States 1956	Bell Telephone	
	C.	United States 1958	Philco, IBM, GE	Philco 2000, IBM 7090, GE ERMA System
		United Kingdom 1959	Elliott	Elliott 803 ER56 computer. (S.E.L. is a subsidiary of the American ITT)
		Germany 1959	S.E.L.	
13. ALGOL language	B.	Several countries 1958	ACM (USA) and GAMM (Germany)	ALGOL was jointly developed by American and European specialists convened in Zurich, Switzerland. The first ALGOL compiler was written by Dijkstra of the Netherlands. ALGOL was subsequently adopted by most manufacturers, and is presently more widely used in Europe than in the US
	C.	All countries after 1958	Several manufacturers	
14. Multiprogramming	C.	United States 1960	Honeywell	H800 computer } No interchange Orion I computer } independent developments
		United Kingdom 1962	Ferranti	
15. COBOL language	B.	United States 1960	US Department of Defence	
	C.	Several countries after 1960	Most manufacturers	
16. Family of compatible computers	B.	United States 1955	US Army	FIELDATA plan IBM 360 series. CDC 3000 and 6000 series, Honeywell H 200 series, RCA Spectra 70 series
	C.	United States 1963 1964	IBM, Honeywell, RCA, GE, CDC	
17. Time-sharing	B.	United States 1964	MIT, Dartmouth College, GE	Civilian application (Project MAC)
	C.	United States 1966	GE, then several large US manufacturers (IBM, CDC, etc.)	

Sources : US reply to check-list. *Chronology of computing in Africa, Asia, Europe and Latin America* by J. Connolly, New York 1968. *Discussions and correspondence with experts.* OECD. *Visits to companies.*

of the larger foreign markets. In the computer industry, the only firms to manufacture abroad are American; they can therefore be considered as more competitive internationally than their foreign counterparts. The number of US firms with large-scale manufacturing facilities abroad is however surprisingly small: the only two are IBM and General Electric. Other US companies are expanding in this field (notably Honeywell, Control Data and Burroughs), but their impact has not yet been significant. This situation is largely due to the fact that the computer industry is still very young and far from maturity, either technologically or economically. The strong international position of a firm like IBM does not result from early maturation but rather from the fact that IBM, which was originally an office equipment manufacturer, already had several subsidiaries abroad long before the computer industry existed; these subsidiaries were converted quite early on into computer companies. Younger firms obviously could not do the same thing.

Production figures and the four indicators used here clearly show that the computer industry is dominated by the United States. The first manifestation of the gaps can be traced back to the late 1950's, which suggests that the fundamental causes are concomitant with the birth of the industry. Country-by-country analyses all show a deterioration of the position of European companies vis-à-vis their American competitors in the 1960's. As for Japan, it looks as if the trend is evolving in the opposite direction. This situation must of course be put into perspective: markets have been expanding at an explosive rate (sustained annual growth rates of 30 - 40 per cent are not uncommon), and the failure of European companies is first and foremost a manifestation of a certain inability to keep up with this rapid tempo.

## The Information Revolution

Concern over technological gaps in this industry is to a large extent a political problem, for computers are the key to the information revolution. The role of computers is somewhat similar to that of the steam engine, which paved the way for the industrial revolution by making large quantities of cheap power available in any geographic location. The computer is doing the same thing for another intangible commodity, namely information.

The value of information is directly proportional to one's ability to process it. With its high speeds and its rapidly falling cost of operation, the computer is opening up vast possibilities by creating entirely new uses for information, not only in all the management functions, be it in industry, government or the armed forces, but also throughout society. Availability of more data is not just a quantitative phenomenon, but a qualitative one as well. Among the entirely new dimensions of information one can mention satellite tracking, missile guidance and computer-aided instruction, tasks which are made possible by the fact that the information can be processed almost instantly, and then fed back into the system.

The impact of the computer on society is difficult to assess, for we are only at the very beginning of a major revolution. One of the main effects could well be an increasing individualisation of industrial society (and not the contrary, as is generally believed); because information is becoming increasingly inexpensive and easy to

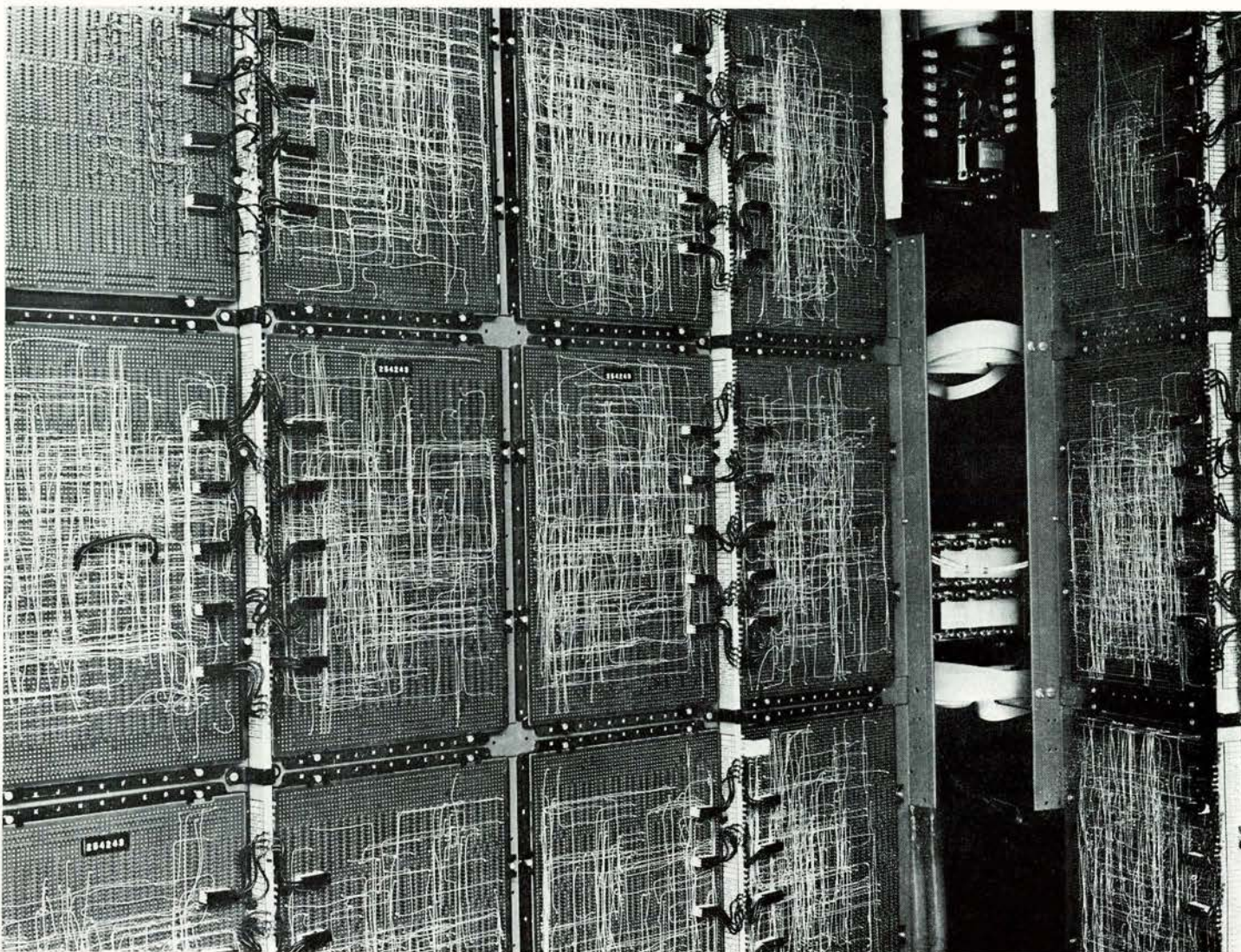
handle, it is theoretically possible to cater to the needs of the individual, not only at the production level with tailor-made mass-produced goods, but also at the administrative and cultural level. This is true not only of the relations between the citizen and the state, but between the citizens and other social institutions such as the educational system. The computer is also making large-scale decentralisation economically and administratively feasible. There are of course some risks that the computer, if misused, could serve to force individuals into a common mould and centralise all administrative powers. Technological advances always tend to be ambivalent, but this particular one does offer the possibility of alleviating some of the ills brought about by the industrial revolution.

## The Causes of the Gaps

The emergence of the gaps in this industry and an evaluation of the prospects for the future cannot be discussed without a reference to what the computer really is. Basically it can be described as an information system, the two main components of which are a certain number of pieces of equipment (the hardware) and large numbers of instructions (the software) which allow the computer to perform the required tasks. Hardware can in turn be divided into two groups, the central processing unit, or computer proper, and the peripheral units (card readers, magnetic tape readers, printers, TV sets, etc.) through which the operator communicates with the computer. Marketing of such a system requires vast quantities of supporting services such as systems analysis, maintenance and training programmes.

The main technological evolution over the last 15 years has been the decreasing importance of the computer in the cost of the whole system. In the early Fifties, the user of the computer wrote a good part of the software himself, and the supporting services offered by the manufacturer were minimal. The growth of business applications, pioneered by IBM, contributed to putting much more emphasis upon software and services: customers being generally less sophisticated than the early users of computers, it was necessary to offer them much more than a mere machine. The diminishing importance of the computer proper is also the result of the tremendous advances in electronic component technology: semiconductor components are much more reliable and efficient than vacuum tubes, and their cost has been falling by a yearly average of 30 per cent. This has reflected upon the price of the central processor, which is composed essentially of such components. Another important development has been the increasing importance of software: most of the new applications are achieved through new types of software, and this is one of the factors accounting for the emergence of a specialised software industry, distinct from the manufacturing of hardware.

Technological gaps are the manifestation of certain deep-rooted differences which go far beyond simple industrial performance; one could in effect consider them as a sort of syndrome. For this reason, their causes are rather difficult to pinpoint and even more difficult to evaluate. In the computer industry two of the most important seem to have been differences in management ability and differences in the level of government support. Among the other factors one can mention financial problems,



the size and sophistication of the market and the structural changes in the industry. Gaps in the electronic components industry have been only a marginal factor.

## The question of management

The history of individual companies — not only in the computer field — often shows that failures can be attributed to specific management weaknesses. It must be remembered that the computer industry was largely a creation of the office machinery industry, and the pioneering firms were companies like IBM, Remington, National Cash Register, Burroughs, Bull and ICT. One might say that the electronics industry had the technical know-how and the office machinery industry the customers. There are of course some exceptions to this pattern, notably in Japan and the United Kingdom, but most of the evidence points to the fact that a number of electronic firms failed to realise the potential offered by computer technology.

Since the computer industry of any country is made up of a relatively small number of firms, one interpretation of existing disparities between the main producing countries could be in terms of management decisions

taken by those individual companies. In France the history of Bull — and more specifically the story of the Gamma 60 for which the market never materialised, and the failure to develop a machine capable of competing with IBM in the development of a medium-sized computer specifically geared to commercial uses — is well-known. The failure of the British computer industry to exploit the emerging market for business applications in the late Fifties is another example. And in Germany, Zuse's decision to concentrate on certain very specialised scientific applications rather than expand in the newer and faster growing markets helps to explain why the initial lead of Germany was rapidly lost to the United States.

Conversely, the position of the United States can be explained to a large extent by the success of IBM, and the real question is why this firm has done so well. The first reason was a clear identification of what the market required: IBM realised very well that commercial customers were more interested in the services provided by the machine than in the machine itself: this meant large expenditure by IBM on software and supporting services. The second was the ability to stimulate and even create new markets. The third was IBM's flexible and responsive internal organisation. During the early 1950's, IBM skill-

fully exploited its strong position in punched card machines by turning its customers into computer users. The realisation that the company's purpose was to handle information in the widest sense, and not just to manufacture punched-card machines, allowed IBM to make full use of the possibilities offered by this new technology, rather than remaining confined to obsolete and slower growing technologies.

All companies make mistakes at some time or other, and it would be unrealistic to expect even the best managed ones not to have some weaknesses. Many European firms have failed, but so have many American ones, as witnessed by the fact that among the 100 or so companies which entered the computer industry in the United States between 1949 and 1967, about 45 still remain. By any standard, IBM can be considered as an outstanding success. However IBM was slow to realise the potential of the emerging computer industry and even turned down an offer to acquire the Eckert-Mauchly Co., which was later to become the technological basis for Remington Rand's pioneering entry into commercial computers in 1951. And some of IBM's computers, such as the Stretch, were unsuccessful. Technological gaps are to some extent a question of perspective: in the United States, where the number of firms is large, the failure of any one of them is of little significance, and probably contributes to a better utilisation of the available resources; but in smaller countries, where the computer industry may consist of no more than two or three companies, failure is a much more sensitive issue, and will almost necessarily have strong political undertones.

### Size and sophistication of the market

If differences in management ability help explain the gaps, it is still not clear why American firms are apparently better managed than their foreign competitors. One key factor appears to be the quality of the American environment. Not only is the market considerably larger than anywhere else in the world (four times as large as the European computer market in 1967) it is also much more sophisticated technologically: the great majority of the new applications are to be found in that country, as are most of the latest technological developments, and the importance of the time-lag between developments in the US and elsewhere is considerable, owing to the fact that these newer sectors are generally the fastest growing ones. The size disparity between the United States and Europe is thus much greater in these key sectors, and little can be done about this fact of life. The present position of the American computer industry is closely linked with the rapid development of the market for commercial applications in the mid-1950's; in Europe, this market did not begin to materialise until around 1960.

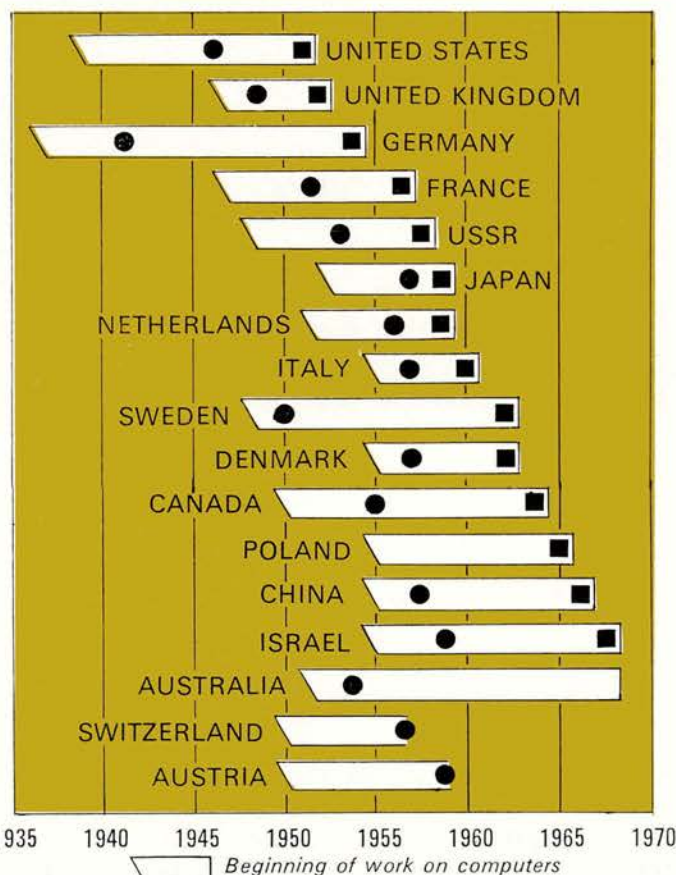
In the United States, there is also much closer interaction between the manufacturer and the customer. One of the best illustrations of this is the co-operation between IBM and its military customers around Los Angeles in the 1950's: the SHARE association made some important technological contributions, and by specifying what types of computers were required, allowed IBM to come out at the right moment with the right type of machines.

The size and sophistication of the market is to some

extent linked with government procurement or, more generally, with government support. This has been one of the major causes of the gaps in the computer industry. The impact of government intervention is difficult to assess for several reasons, first because of the lack of data: second because of a certain uneasiness, both on the part of the firms and the authorities, about the whole question; and third because although industry, particularly in the United States, has benefited from this support, there have until quite recently been no clear-cut government policies towards the computer industry. In effect, support has developed in the absence of policies.

One approach to the problem is to look at the importance of government procurement. The quality of the data is unfortunately very poor, partly because of the close involvement of computers with defence: military computers form a very large part of total government

## HISTORICAL LEAD-TIMES IN THE COMPUTER INDUSTRY



1935 1940 1945 1950 1955 1960 1965 1970

▭ Beginning of work on computers

● First working model

■ First commercialisation

Sources: National replies to checklist.

Communications from sector rapporteurs.

Discussions with experts.

*Research and Development in Electronic Capital Goods*, by C. Freeman, NIESR Review, Nov. 1965. *Computer Technology in Communist China*, by D.G. Audette, Communications of the ACM, Sept. 1966. *Computers in Japan*, Japan Electronic Industry Development Association, Tokyo, 1967. *Electronic Computers* by S.H. Hollingdale and G.C. Tootill, London 1965. *History of Computing in Europe*, by J. Connolly. IBM World Trade Corp., New York, 1967. *Chronology of Computing in Africa, Asia, Europe and Latin America*, by J. Connolly, New York, 1968.

procurement but are only seldom recorded. The only country for which information is available is the United States. In 1966, government markets represented approximately 30 per cent of the total number of installations; the figure would probably be much higher if one were to use the value of the computers installed rather than their number. The percentages are generally much lower in other countries. But in order to measure the real impact of government procurement, one has to look at the formative years of the industry: in 1953 for instance, government procurement in the United States accounted for 54 per cent of the total number of computers; since this figure leaves out the indirect government markets as well as all the special-purpose military computers, one must conclude that this form of support has been a very significant factor indeed. Histories of new modern industries often point to the key role of government support in these early stages.

Governments also finance an important part of the research and development activities in the industry. In this particular field, there is a very marked disparity between the United States and other countries. In 1965, the US government financed 32 per cent of the R and D activities of the American computer industry. In France, the corresponding figure was around 12 per cent, and in Japan less than 3 per cent. Industry however is not the only sector to perform research. Account must also be taken of the work done in universities, non-profit organisations and government laboratories. In the United States, this total R and D in computer technology amounted to approximately \$ 600 million, 49 per cent of which was government-financed. The corresponding figures for France were \$ 25 million (16 per cent of which was government-financed) and for Japan \$ 13 million (2.5 per cent). No precise data are available for other countries, though it does seem that they are closer to the French and Japanese figures than to the American ones. The present magnitude of government support in the United States suggests that it was also extremely important in the 1950's and the early 1960's and no doubt contributed significantly to the development of gaps.

## The Long-Term Implications

The preceding observations are based on OECD's study; in what follows the author of this article proposes to outline certain fields of action which might prove profitable in the long run, though it must be kept in mind that technological gaps are a multifaceted problem to which there are no clearcut solutions. Before doing so, it is however necessary to take into account certain basic facts of life:

- The world computer industry is almost entirely an American industry; as a result, the pace of technological change is determined by the United States or, more specifically, by the interplay of competition between a small number of American companies. While IBM does have a predominant position (approximately two thirds of the world market) this company is far from being the one which sets the pace; it has to contend with several highly sophisticated American companies such as Control Data, Burroughs or Univac. This dominant position of the United States has one advantage in that it facilitates the task of technological forecasting in other countries.
- American subsidiaries are a significant factor in the

computer industry of Western Europe. The firms to which they belong are becoming increasingly international, but there are certain limits to this process. One is that the central decision-making process tends to remain highly centralised in the parent company. Another is that the foreign subsidiaries of any particular American company are becoming increasingly interdependent; this is to a large extent the result of technological necessity.

- Markets are growing very rapidly and technology is still far from maturity. This means vast possibilities for new-comers; it also implies that the present position of the market leaders can be successfully challenged.
- Computers are coming to represent an increasingly small part of an information system. The key issue in the years to come will not be the manufacturing of computers, but rather their utilisation. In other terms, the most important segment of the industry is software.

In the computer industry, operating costs can be extremely high; this is due both to the size of a computer system and to rental practices. The launching of IBM's 360 series, which marked the beginning of the third generation of computers, involved a total expenditure in the region of \$ 5 billion, which is approximately equivalent to the development costs of the atom bomb (2 billion in 1945 dollars). Clearly no other company can hope to match this and the only possible strategy is to concentrate on those fields where entry costs are lower and opportunities more numerous. Several small companies have enjoyed great market success by selling small computers (two cases are Digital Equipment Corporation and Scientific Data Systems in the United States), or by focusing their efforts on certain specialised applications. The software sector of the industry is growing extremely fast, and entry costs are very low - in some cases as little as \$ 100,000. In order to succeed on the market, a firm needs only to have a few highly qualified specialists; capital investment is close to nil.

This may be one of the most rewarding fields for European and Japanese companies. One problem however is whether they can succeed without close contact with the American market where the majority of the latest technological developments are taking place. Governments have come to realise the importance of the computer industry and the necessity of supporting it; one line of action would thus be to help some of the best national firms penetrate the key American market.

While the solution to the problem of technological gaps lies largely in the hands of private industry, government action can be extremely beneficial. Direct subsidies in the form of R and D grants and preferential procurement are already widespread and could usefully be complemented by certain investments in infrastructure for the computer industry. The development of time-sharing (i.e. computer systems which can be used simultaneously by large numbers of users in different locations) is putting tremendous demands upon the telephone network; in many countries, the quality and cost of telephone communications is such as to impair the growth of time-sharing. Another field of action for governments could be the training of computer specialists; up to now, this task has been performed mainly by the manufacturers. But with the increasing "softwarisation" of the industry, this is no longer sufficient, and the time is not far when computer usage will become part of the normal school and university curriculum.

# THE NEW TECHNOLOGY OF URBAN BUS TRANSPORTATION

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*The economic viability of our cities and the well-being of their residents depend to a large extent on the efficiency and the quality of the available transportation service. A recent meeting of the OECD Consultative Group on Transportation Research focused on one aspect of the problem : how to raise the standard of urban transportation service through improvements and innovations in the operation of bus systems. In the following article, C. Kenneth Orski, Chief of Transportation Research of OECD's Division of International Co-operation in Science, discusses some of the alternative techniques and policies which were examined during the meeting.*

**B**USES are the single most heavily patronised form of public transport in the cities today. They carry approximately 70 per cent of all urban transportation users. Most cities in OECD countries are entirely dependent on them for public mass transport. Even in the large cities which have rapid rail transit, buses continue to be an indispensable complement to rail systems.

Nevertheless, bus service has been falling increasingly short of the expectations of the modern traveller and patronage is declining sharply. A look at recent bus ridership statistics tells the story. Chart 1 shows changes in ridership which have occurred in 36 large cities of OECD countries between 1962 and 1966. In 80 per cent of the cities surveyed, bus ridership has declined, in some cases by as much as 30-40 per cent.

The causes for this massive shift in travel habits are complex. Partly they have to do with the changing shape of the modern city, resulting in a more diffuse pattern of origins and destinations which fixed bus routes are no longer able to serve; partly, with the competition offered by the private automobile which has become accessible to a steadily rising proportion of the urban population and which offers a superior level of service in terms of comfort, convenience and privacy; and partly, with the introduction or extension of rapid rail transit which provides more frequent and more reliable service. Then also, as metropolitan areas have grown in size, urban trips have increased in length. While on short trips the difference between the speed of the bus and that of the competing modes of transport is marginal, over longer distances the bus is definitely out-distanced by both the private automobile and rail transit because it spends large amounts of time in accelerating and decelerating and in boarding and discharging passengers.

Chart 2 shows changes in the average operating speed of surface transit in the centres of 19 large cities of OECD countries. In almost all of these cities, the average oper-

ating speeds declined during the period 1953-1963. In seven cities the speeds decreased by 25 per cent or more. In absolute terms, in none of the cities listed in the table did the average bus speed in 1963 exceed 16 km/hour. In many cities buses travelling in the congested central business districts averaged less than 7 km/hour. It is almost certain that the situation has further deteriorated since 1963 when the survey was conducted. (1)

If the decline in patronage is as inexorable as it appears, it may be wondered whether the bus, as it now functions, has in fact a future in the urban transportation picture, and whether cities are justified in continuing to rely on this mode of transport to satisfy urban travel needs. The truth, however, is that buses do not *have* to operate as they do today. Indeed, their natural attributes can be exploited to provide a superior level and quality of service.

Buses are the only form of mass transport which has the potential for providing door-to-door transportation. At the same time, because they can run on city streets, buses do not require heavy fixed investment and can be operated at costs below those of competing modes. Moreover, buses possess a degree of flexibility no other public transportation system can match: with proper innovation, they could be equally adept at serving the transportation needs of central business districts, the needs of the commuters and the needs of travellers within outlying low-density areas.

Unfortunately, while other public transportation systems have benefited from evolutionary advances in technology, the bus has been left largely untouched by technological innovation. While other modes have evolved to meet new needs, little effort has been made to adapt the bus to changing urban conditions or to make it responsive to the shifting patterns of travel demand. Lastly, too

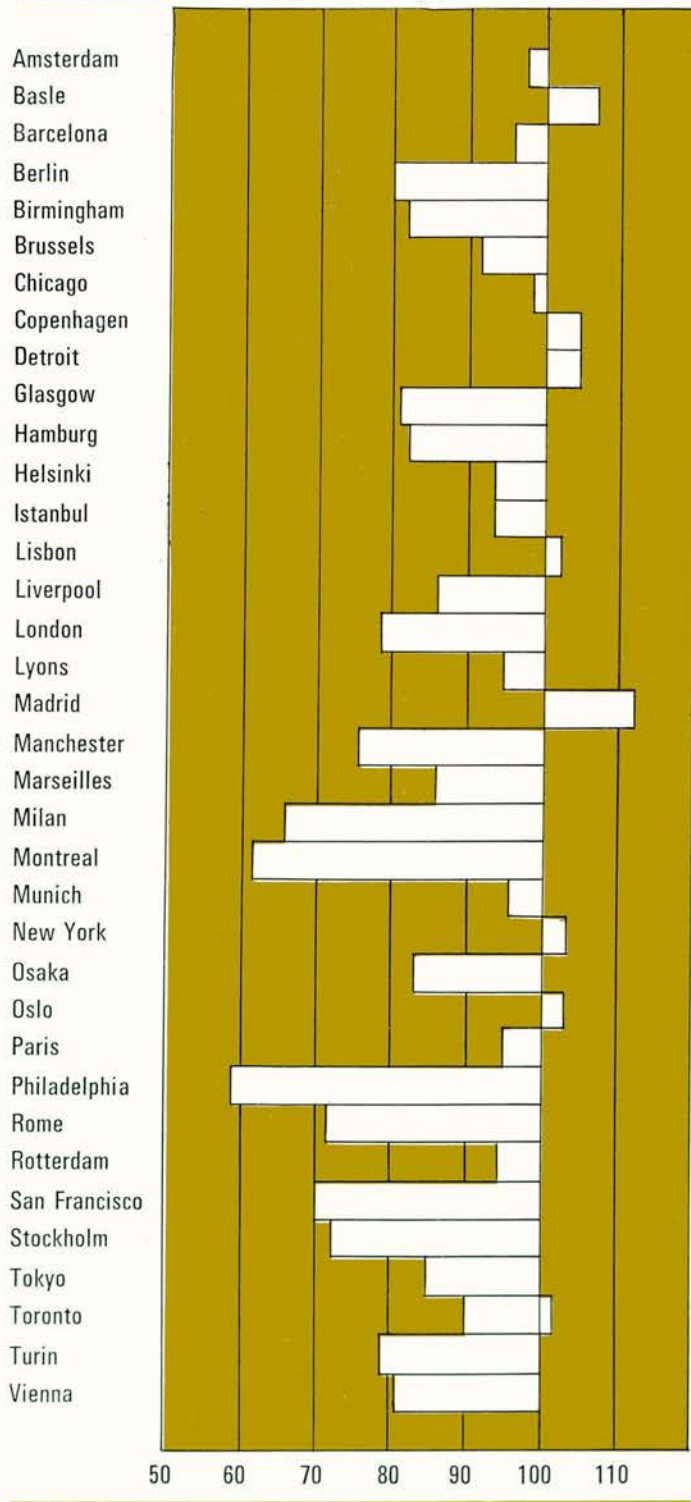
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(1) UITP survey conducted by E. Nielsen, 1965.

little attention has been given to improving the comfort of bus travel and to alleviating its negative environmental and aesthetic impacts. In many ways the bus is a paradox of technological obsolescence in the midst of rapidly evolving technology.

**CHART 1. CHANGES IN URBAN SURFACE TRANSIT RIDERSHIP IN VARIOUS OECD CITIES, 1962-66**

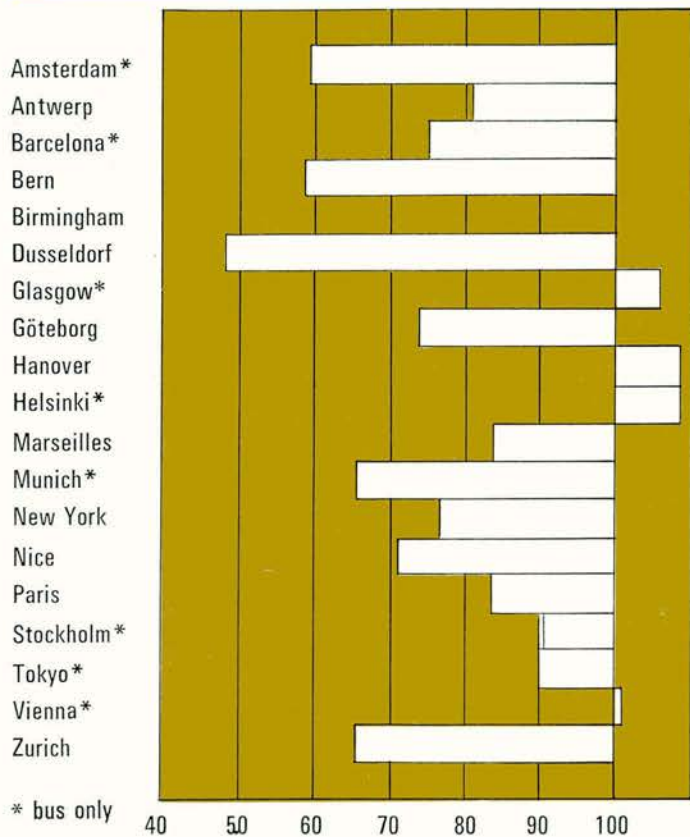
(Index : 1962 = 100)



The OECD Consultative Group on Transportation Research (see page 41), one of whose objectives is to evaluate the contribution of new technology and scientific innovation to transportation, has recently devoted part of its semi-annual meeting to an in-depth assessment of

**CHART 2. CHANGES IN AVERAGE OPERATING SPEED OF SURFACE TRANSIT IN CENTRAL CITIES OF OECD COUNTRIES, 1953-63**

(Index : 1953 = 100)



bus problems and their solutions. By drawing upon the ideas and practical experience of many different countries and by calling upon international experts to "testify" before the Consultative Group, the review provided a unique opportunity for policy makers to become acquainted with the best of the current proposals for improving bus system operation and to critically appraise their merits and feasibility.

The proposals examined by the Consultative Group fall into five categories.

### Bus Priority Schemes

At present, traffic management schemes are designed simply to move vehicles regardless of the numbers of passengers carried. In order to maximise the people-moving capacity of the street network, an approach must be devised which will give priority to *people* rather than vehicles. This means that vehicles which carry many people

(buses) should be allowed to move faster within the traffic stream than vehicles which carry only a few people (automobiles). The simplest method of accomplishing this is to separate the bus from the rest of the traffic flow by means of exclusive bus lanes. The use of separate bus lanes has been experimented within a number of cities, notably in Paris and Marseilles where enough experience has been accumulated to allow a meaningful appraisal of this method of speeding up bus travel and restoring regularity in service.

The approach appears to have been particularly effective during rush hours, when savings of time of 20 to 60 per cent have been registered.

No evaluation of the effectiveness of bus-only lanes would be complete without studying their impact on total traffic flow. Available experience — from Stockholm, for example — indicates that separate bus lanes may have an adverse effect upon the overall movement of vehicles. Hence, the total benefit to the community (which may be expressed roughly as time savings by bus passengers minus time losses incurred by automobile users) may be smaller than would otherwise appear. Still, as an instrument of public policy — and as a means of attracting bus patronage — separate bus lanes have demonstrated their effectiveness.

In many urban areas, however, separate lanes cannot be used intensively enough to be justified on total benefits grounds, and even where they can be so justified, it is not always possible to create them where they are needed. Hence, in most situations, buses must continue to share their right-of-way with other vehicles, and other means must be found to give buses priority over the rest of the traffic stream.

The most promising of the new approaches is to discriminate in favour of buses at traffic signals and intersections. Today, traffic signals treat all vehicles equally. To give buses the priority they deserve, traffic control signals must be designed in such a way as to sense the approach of buses in the traffic stream and to allow them to pass ahead of the rest of the traffic, just as railroad signals give trains priority by actuating grade crossing signals. Although this concept is relatively new, and has not yet been applied on a wide scale, experiments in the Netherlands indicate that the preferential (or "people-activated") traffic signals are technically feasible and that their use offers a significant potential for speeding up buses and hence for increasing the total flow of people through city streets.

## Real-Time Bus Control

More important, perhaps, than speed is reliability of service. When buses get off schedule, gaps in the headway develop, for two reasons. The first is the inherently unpredictable nature of the environment in which buses operate. For example, variations in passenger arrival rates, accidents, malfunctions and traffic conditions will introduce fluctuations in bus travel time.

The second cause of gaps is the dynamic instability of the system itself. Once a bus falls behind, it finds more than its usual quota of passengers waiting at the next stop. The bus takes longer to load because of the extra passengers and, as a result, falls still further behind. The following bus, on the other hand, gets fewer passengers



*Separating public transport from the rest of the traffic flow by means of exclusive bus lanes.*

than it should. It takes less time to load and consequently begins to run *ahead* of schedule. This starts a chain reaction which finally results in "bunching" — a crowded bus followed by one or more empty ones.

The resolution of this problem demands a real-time control system which, in turn, requires early recognition of deviations from timetable — something that can be done only if the position of all buses is known at all times. Such a system already exists in Germany, in the city of Hamburg. Each bus signals its location at frequent intervals to a central control centre. There, a visual recording device plots the actual positions of the buses and compares them with their timetable positions. If the deviation from timetable exceeds a certain limit, the dispatcher takes corrective action by instructing the bus driver via a two-way radio to speed up or slow down in order to restore the bus to normal schedule.

## Demand-Responsive Bus Systems

When only a small number of people want to travel at a time, and in widely different directions — the typical travel pattern in low-density metropolitan areas — it is economically not feasible to provide frequent and regularly scheduled bus service. What is needed is a system whose routes and schedules are not fixed in advance — a system that can respond to demand as and when the demand occurs. Recent work in the United States and Sweden indicates that such a system can be developed, and that it can give door-to-door service at prices close to those of a conventional bus.

The system would operate like a group taxi. A person would call for service by telephoning a central dispatcher. The request would then be processed by a computer which would know where the vehicles were located, how many passengers were on them and where they were



## The Dual-Mode Bus

heading. The dispatching decision would be made on the basis of an algorithm which would weigh how long the customers have been waiting and travelling and how much it would cost to serve the customer by any given vehicle at any given time. Each customer would be picked up by the nearest vehicle going in this general direction, unless other customers were unduly inconvenienced; in that case the dispatching algorithm would assign him another vehicle.

Technically there is little question that the concept would work. Present techniques of communication and data processing are fully adequate to meet the needs of such a system. Mathematically-based dispatching decisions and associated computer programming present no real obstacles. What must be done is to put all these individual elements together into a unified system.

The demand-responsive system would be particularly suitable for outlying, low-density areas which are poorly served by public transportation and whose dominant travel pattern involves trips from many origins to many destinations. Today this travel demand can be met only by the automobile. For those who cannot drive, who do not have access to an automobile, or who simply do not wish to be bothered with the parking problem at the destination, some kind of door-to-door, demand-responsive system would be a welcome solution.

The present-day advantages of a rail system for commuting from outlying suburbs to the central city lie in the fact that rail vehicles operate on an exclusive right-of-way, whereas buses must cope with traffic congestion on access highways and city streets. One solution would be to build a private right-of-way for buses and thus combine a rapid, congestion-free ride to the central city with a collection and distribution service at each end of the trip. The marriage of these two capabilities in one vehicle would eliminate the need for transfers and thereby increase the speed and comfort of travel.

However, to build a private bus right-of-way is an extremely expensive undertaking. Indeed, the costs would be so high that one might as well consider building a rail system which would offer higher capacity and lower operating costs.

An attractive compromise may be for the bus to share an already *existing* under-utilised private right-of-way. A dual-mode rail bus, for example, could operate in the suburbs, picking up passengers close to where they live and, when full, get on rails for a direct, unobstructed run to the city. If the railroad line did not terminate close enough to where the passengers wanted to go, the bus

## OECD CONSULTATIVE GROUP ON TRANSPORTATION RESEARCH

The Consultative Group on Transportation Research is a group of senior government officials responsible in their own countries for the management of transportation research.

The basic objective of the Consultative Group is to anticipate future problems related to transportation and, with the help of scientific research and analysis, to develop a deeper understanding of alternative solutions to these problems and of their consequences, so that policy makers may have a wider range of options to choose from and a more informed basis for making transportation decisions.

Some of the issues on which the Consultative Group is currently focusing attention :

● **Technology Assessment Reviews**, whose aim is to provide the Consultative Group with an analytical overview of emerging concepts, ideas, techniques and policies for improving systems performance and the quality of transportation service in selected areas. The reviews are intended to identify a range of promising approaches and to provide an opportunity for a critical appraisal of their merits and liabilities in order that members of the Consultative Group may judge which of them offer the best potential for improving transportation in their own countries.

● **Transportation for New Communities**. The social and economic viability of new communities will depend to a large

extent on the ability to provide their residents with adequate access to the markets, services, attractions and opportunities of the nearest large city and with efficient and convenient means of circulating within the community. How can we improve our understanding of the special transportation needs of new communities and of the requirements for improved transportation service which would meet these needs?

● **New Approaches to Transportation Analysis, Evaluation and Planning**. Underlying progressive transportation decisions is the belief that transportation is not an end in itself but a tool for bettering the total condition of urban life. Its ultimate objective is not just to move people but to enhance the form and quality of the cities and to improve the overall social well-being of their residents. Future decisions about transportation will have to be made with a greater recognition of their impact upon the **total** urban environment. How can the use of sophisticated techniques of analysis help decision makers in this task?

● **Advisory Conference on Tunnelling**. Many social and environmental problems could be mitigated by having an increased proportion of urban services and activities placed underground. Today, however, high cost and long construction time impose serious constraints upon underground construction. What public policies are needed

in order to stimulate technological progress in tunnelling so as to reduce these constraints to the point where they would cease to be a barrier to the intensive use of the subsurface?

● **Traffic Noise Abatement and Control**. Because of its growing pervasiveness, noise pollution is becoming a subject of growing national concern. Since market forces alone do not provide a sufficient incentive to reduce traffic noise levels, some mechanism for collective control is required. What public policies are available to this end, and what new alternatives may become available through further research and new technology?

● **Sonic Boom Research**. With the advent of the supersonic transport, exposure to sonic boom could become an increasingly common experience in the daily lives of many people. What is the state of our present understanding of the nature and effects of the sonic boom and what further research, tests and experiments must be carried out if sufficient information is to be available to enable governments to formulate rational policies with respect to the supersonic transport?

● **Technology Transfer**. What is the status and direction of national research and development programmes in the various fields of transportation technology? What new mechanisms can be developed to facilitate the flow of new technology and its application within Member countries?



*Experiments are being carried out in the use of rail buses.*

could get off the tracks and deliver the passengers close to their destinations.

Experiments in the United States indicate that technologically the rail bus is perfectly feasible. Several, in fact, have already been built and tested. Whether such a system would be able to attract sufficient demand to justify implementation is, however, still open to question.

### Bus Vehicle Design Improvements for the Benefit of Passengers and Non-Users

All transportation-related activities intrude to some extent upon the environment. With the disappearance of the elevated railway, however, the bus has become by far the single biggest offender upon the urban scene.

Among the most glaring costs and public annoyances generated by the urban bus are its bulk (and its effect upon congestion), its noise, and its exhausts, both in the form of fumes and noxious pollutants. The goals of an enlightened transportation policy must include a strategy to reduce the impact of these externalities. The available solutions include innovative propulsion concepts (e.g. on-board electric power), more functional vehicle design and the adoption of smaller-sized, more manoeuvrable buses which would contribute less to overall street congestion.

Increasing the amenities of bus travel must also form part of a progressive policy, if for no other reason than that it may be crucial for improving the public "image" of the bus and for attracting riders away from private automobiles. To this end the interior of the bus vehicle must be made more comfortable, and efforts must be undertaken to design more efficient and attractive terminals, to develop better means of protecting the waiting passengers from inclement weather and to provide better information concerning routes and schedules.



Without doubt, the necessary technological elements to achieve significant progress in bus system performance are already at hand. But technology alone is not enough. There must also be a proper institutional setting to encourage innovation and the rapid development and application of new transportation technology. Today, many conditions conspire to impede progress in this area.

Even the largest municipalities and transport companies cannot afford to experiment with largely untried ideas; the amount of investment capital required is too great to entertain the risks involved. Moreover, most transport operators lack the necessary in-house capability to evaluate the full range of promising innovation alternatives and to select the strategy which suits their particular needs best. Often, too, the administrative, legal and financial setting discourages the aggressive promotion of new ideas and favours inaction and the status quo. Finally, private industry has been slow to respond to the needs of urban transportation because it has lacked the necessary incentives in the form of clearly identified future market opportunities.

To overcome these barriers and to create a climate conducive to innovation, strong government leadership, reinforced by international co-operation, may prove to be necessary. Only governments have the resources to underwrite a programme of research and development which will provide local authorities and transport operators with a meaningful range of alternatives. And only governments can marshal sufficient resources to undertake a programme of urban experimentation and transportation demonstrations — the most effective tools for reducing the uncertainty inherent in the implementation of new technology.

However, even governments can ill afford the luxury of testing every promising idea or technology in a real-life context. The ultimate solution may lie in closer international co-operation, so that the evaluated experience of one city or country can be shared by many other nations. One of the aims of OECD's programme of co-operation in transportation research is to provide a forum for just this kind of mutual self-help.

# SWEDEN'S ENERGY POLICY

The OECD Energy Committee is reviewing the energy policy of each of the Member countries, and Sweden's policy has been submitted to a confrontation by two examining countries, the United Kingdom and Switzerland. The following article gives some points in a report based on the statement prepared in the fall of 1967 by the Swedish authorities.

Sweden has a special position as regards energy compared with the other OECD countries. National production is increasing rapidly and the per capita consumption is among the highest in the world; and yet the energy economy has been created without the substantial indigenous fuel resources available to other similarly highly developed countries as, for example, coal and natural gas in the case of the European OECD countries, and coal, gas and oil in Canada and the United States. Hydroelectric power covers only 18 per cent of the energy consumed in Sweden, and Sweden's imported oil supplies are not provided by Swedish companies operating overseas.

Sweden is therefore to a great extent free to carry out the energy policy which is the aim of all OECD countries: an adequate supply at the lowest cost. Although the other countries insist on the need for a competitive energy economy, they have to make reservations when it is a question of indigenous energy supplies. There are no such restrictions in Sweden. Hydroelectricity and the main imported fuel, oil, only really compete as far as consumption is concerned in certain sectors like heating. Therefore, in Sweden, the various objectives of energy policy do not come into such sharp conflict as in other OECD countries.

Sweden has chosen a liberal and competitive economy in the energy sector, as in industry as a whole. Roughly 95 per cent of industrial production is due to private enterprise which in every way is on an

equal footing with national undertakings. The Government's role is to follow the trend of the energy sector and within its competence to take the appropriate measures. Statistical material and forecasts of market trends are submitted to it regularly to help in planning the economy.

Fuel imports have increased steadily during the last few decades. The Government realises the dangers of an interruption of fuel imports and keeps to its tradi-

tional liberal trade policy. There are no official restrictions and no customs duties; and the indigenous energy sources do not benefit from any subsidy or tax benefit. Although the types of fuel which are in competition are, in principle, not subject to any special tax aside from those which affect all forms of energy, this policy does not exclude initial support when there are prospects of long-term profitability.

(continued on page 44)

## ENERGY IN SWEDEN FROM 1955-1985 (in million tons of oil equivalent and percentages)

<i>Supplies by source</i>								
	1955		1965		1975 Estimates		1985 Estimates	
	Mtoe	%	Mtoe	%	Mtoe	%	Mtoe	%
Oil products (1)	7.5	46	16.6	64	30.7	69	38.8	54
Fuel and coke	4.0	25	2.2	8	1.8	4	2.1	3
Hydroelectric power	2.2	14	4.6	18	5.8	13	6.1	8
Nuclear power	—	—	—	—	3.4	8	22.1	31
Indigenous fuels	2.5	15	2.7	10	2.8	6	3.1	4
<b>TOTAL</b>	<b>16.2</b>	<b>100</b>	<b>26.0</b>	<b>100</b>	<b>44.6</b>	<b>100</b>	<b>72.2</b>	<b>100</b>
<i>Demand by sector</i>								
	1955		1965		1975 Estimates		1985 Estimates	
	Mtoe	%	Mtoe	%	Mtoe	%	Mtoe	%
Industry	6.7	45	10.8	44	16.9	44	24.3	46
Transport	2.3	16	3.9	16	6.2	16	8.5	16
Domestic uses, etc.	6.0	39	9.9	40	15.6	40	20.5	38
<b>TOTAL</b>	<b>15.0</b>	<b>100</b>	<b>24.6</b>	<b>100</b>	<b>38.7</b>	<b>100</b>	<b>53.3</b>	<b>100</b>

(1) Refined oil coming from refineries, excluding bunkering for maritime transport (foreign trade) and oil stocks.

The Swedish Government has taken no special measures to vary the sources of importation. If the import companies have added to their list of suppliers, they have done it for commercial reasons. The Government has introduced storage regulations to protect supplies; and it is mainly for this purpose that there is a tax on imported fuels. Likewise in the actual production of electricity, which is a field where hydroelectricity and oil might be in direct competition, there is no suggestion that any special preference is given to the indigenous rather than the imported source, once the tax on the latter, which was introduced to safeguard supplies, has been paid.

### Demand and Supply

A Royal Commission recently produced a detailed table of energy consumption in Sweden during the years 1955 to 1965 with forecasts for the period 1965 to 1985 (see table). The study is based on the assumptions that the GNP will increase each year by slightly more than 4 per cent and total industrial production by 5 per cent; and that the relative prices of the different fuels will remain the same.

From 1955 to 1965 energy demand in Sweden increased by 5.1 per cent per year. The Swedish authorities reckon that the rate of increase will probably fall to 4.6 per cent from 1965 to 1975 and to roughly 3.2 per cent from 1975 to 1985. They estimate that demand for energy in Sweden will probably have doubled by 1985 although the distribution of energy between the main categories of consumer is likely to stay the same.

There has been an exceptional shifting in the demand for oil products. At least 70 per cent of the country's energy supplies are covered by imports among which oil products come first. According to the forecasts, oil supplies will continue to increase at a fast rate, while the production of hydroelectricity will remain unchanged. The demand for coal and coke will continue to decrease until 1975, but afterwards will increase slightly. The figures have shown that there will be a rapid increase in the production of nuclear energy after about 1975 and that in 1985

it will become, after oil products, the main type of energy used in Sweden (see graph).

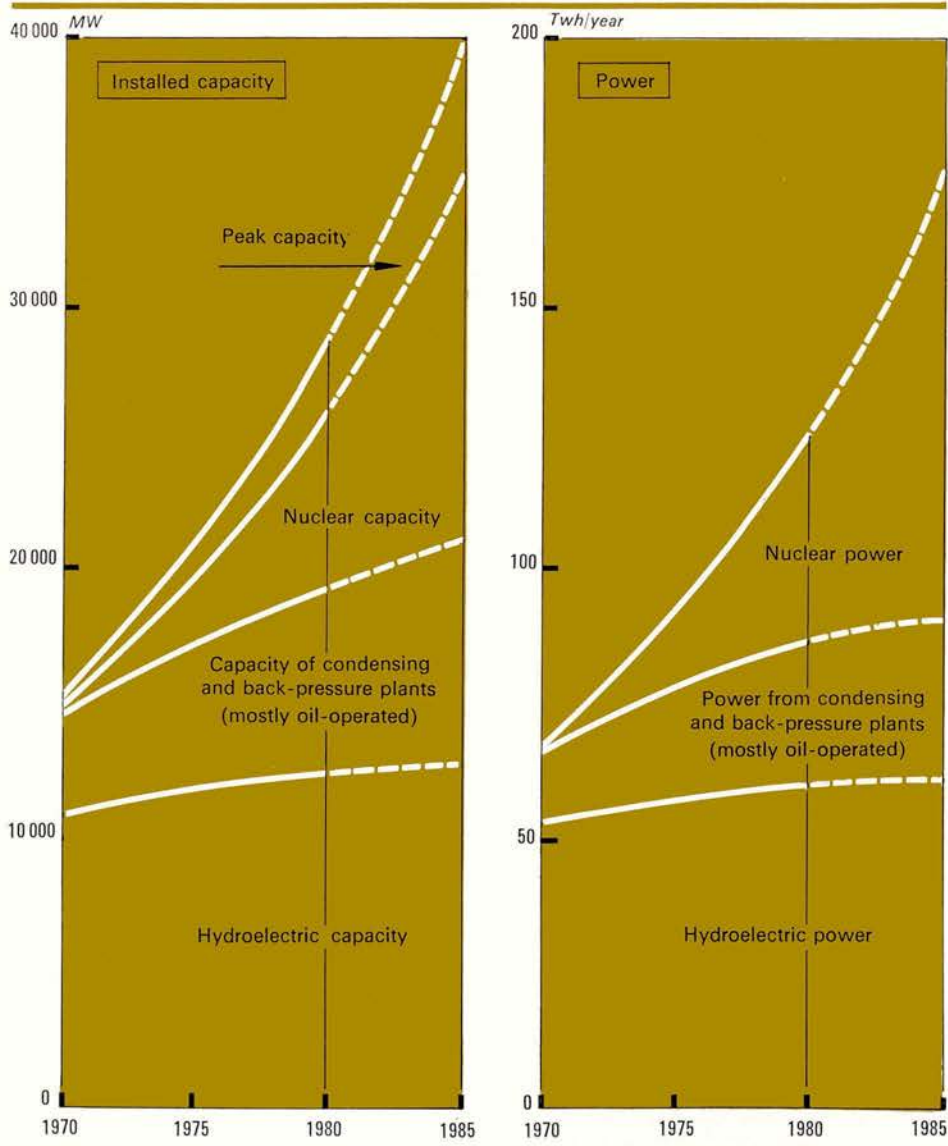
In 1947, an Atomic Energy Company was formed. The State holds 4/7ths of its capital, the rest being held by private industry and public utilities etc. although the development programme carried out by the company has been financed almost entirely by the State. The State Power Board has contributed to the development work which up to now has cost roughly \$ 300 million.

The first step in the development of commercial reactors was taken with the building of the nuclear power plant at Aagesta with a pressurised heavy water reactor. The first criticality was achieved in 1963. The second power sta-

tion, Marviken, is under construction and is expected to be connected to the grid in 1969. It comprises a boiling heavy water reactor of 140 MWe which later can be increased to 200 MWe. The Atomic Energy Company also assists Swedish industry to develop light water reactors. The first commercial nuclear power station is being built for a group of private firms at Oskarshamn. It has a boiling light water reactor of 400 MWe and is expected to be put into operation in 1970.

The Swedish State Power Board is planning a nuclear power station at Ringhals on the west coast of Sweden. The first unit of 500 to 750 MWe is due to operate in 1973 and the station will eventually comprise four units with a total

SWEDEN  
INSTALLED CAPACITY AND ELECTRICITY BALANCE, 1970-1985



capacity of some 3,000 MWe. Private companies, for their part, are planning to construct a new station before 1975. Between then and 1980 the Swedish power grid will be increased each year by at least one new unit. Swedish industry is now able to construct heavy and light water reactors and to make the fuel required for loading them, as well as continuing with research to improve and consolidate its techniques.

At Billingen, Sweden has one of the largest deposits of uranium ore in the world although the ore is of a low grade. Since 1965, the uranium mill at Ranstad has been operating as an experiment and the results confirm that the extraction method can be used on an industrial scale. Further studies are in progress.

## *Future Energy Policy Problems*

The Swedish authorities will concentrate some of their efforts on the development of atomic power in the coming years. In the hope of maintaining unrestricted competition whenever possible their other tasks will be to :

- safeguard supplies;
- develop indigenous resources;
- control and supervise prices;
- rationalise production and distribution of electric power and fuel consumption;
- decrease the cost of energy transportation;
- deal with the question of taxes paid by state and municipal enterprises;
- balance foreign payments;
- improve standards of living and public health.

According to the Swedish authorities, the widening gap between State energy resources and imported fuels makes it necessary for a further study to be made of security of supply in all its aspects. A special commission has been set up for this purpose.

By the end of this decade all the economic hydroelectric power resources will be fully harnessed so that the relative importance of this source of energy will begin to



*The economic hydroelectric potential of the Lule river basin in the north of Sweden is estimated at 14.6 million kWh per year. Above is one of the dams built to harness this energy.*

decline. Research is being carried out on methods for extending the production network and on the reorganisation of electricity distribution. As soon as these studies are finished, the state and private companies will be able to tackle financial and other problems, their solution having an impact on the long-term rationalisation of the energy sector.

Plans for increasing supplies of electric power should not only aim at bringing capacity up to a level sufficient to satisfy demand, but also at reducing to a minimum the cost of energy to consumers. For this it is essential to ensure the economies of scale characteristic of the big production units; and it is therefore particularly necessary for the electric power network to be extended in the closest possible co-operation with neighbouring countries. But the future expansion of power production lies mostly in atomic power, and efforts made in this direction will also make supplies more secure.

Rationalisation requires the highest proportion of additional electric capacity to be concentrated in a small number of large units giving optimum economic conditions. These power stations will no doubt be mainly situated on the coastline, as they will need great quantities of water for cooling.

The length of the coastline is an advantage which might help Sweden to maintain the relatively low costs which hydroelectric power has made possible. The coastal installations will make it necessary to establish an order of priority between these needs and the preservation of natural scenery and tourist areas.

With the development of transport the Swedish authorities will become actively interested in alternative methods for conveying energy, and in particular oil. The question of pipelines for long distance transportation to the centre of the country is becoming increasingly important. A special commission will study the possible extension of the oil pipelines. The possibility of importing natural gas either in liquid state or by means of pipelines and distributing it throughout the country by mains will also be examined by the responsible officials.

The Swedish authorities consider that other questions to be settled in the foreseeable future are, in particular, prospecting for oil and natural gas in Sweden; the capacity of oil refineries; special problems connected with electric heating; increased measures to be taken to prevent air pollution; and improved co-ordination between the different bodies dealing with energy.

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