IV-The pattern of transport demand between main centres in 1984

As in the case of the 1964 traffic flows described in Chapter II, the 1984 flows of the main categories of traffic were arrived at by considering the probable movements between some 40 centres of population and industry. For the purpose of presentation the movements were then grouped into flows between the 14 main traffic areas. The results are shown in diagrammatic form, and reference is given to the individual maps at appropriate places in the text. Examples of the matrices used are included in Appendices ' B ' and ' C '.

In assessing the role of the various forms of transport, i.e. road, rail, air and coastal shipping, consideration was given to their present characteristics, capacities, and costs. In order to determine their respective future roles a special study was made of the technological and cost changes likely to affect each of them during the next twenty years and an assessment was made of the relativity of their future cost levels.

Separate consideration is now given to the detailed estimates made for the principal categories of traffic, i.e. coal, iron and steel, oil, and other freight. This is followed by the estimate of total future trunk road and rail movement, reference being made to the role of coastal shipping. Finally inter-city passenger movements are considered.

Coal traffic

It was assumed that the total internal consumption of coal would remain fairly steady over the next twenty years, but that it is more likely to decline than to increase. It was also assumed that the Scottish and North Eastern coal fields would decline in importance, and that a greater proportion of production would be concentrated in South Yorkshire and the East Midlands.

The consumption of coal for electricity generation is likely to increase, possibly to no million tons per annum, and coking coal consumption for steel production should remain at about the 20 million tons per annum level. It was, on the other hand, assumed that the consumption of coal for other purposes, which require a more widespread distribution of the commodity, would decline to about half the present level.

In the assessment of 1984 coal traffic, provision was made for the main coal-fired generating stations which are at present rail served and for new coal-fired stations known to be contemplated. Provision was also made for the short haul to ports of coal passing to stations which are at present served by coastal shipping. In the main, this resulted in more intensive coal movements within and from the East Midlands, and a new longer distance flow from Nottinghamshire to the Didcot and Aylesbury areas.

Coal flows to centres of iron and steel production were considered individually, on the basis of forecasts of the probable growth of each centre and of the sources of coal supply to them.

It was assumed that the remainder of the coal consumed in the country will flow to the same consuming areas as at present, although with some change of source.

As will be seen, by comparing Map 4 with Map 13, it is expected that the heavy coal flows which exist at present will persist in 1984, with some changes in their relative intensity, but that the more widespread and lighter flows will diminish substantially.

Changes in the pattern of consumption and in the location of production are expected to cause a continued fall in the average length of haul of rail-borne coal. This, together with the probability of a decline in total production, leads to the expectation that the total demand for rail movement will be about 5,500 million ton-miles, which is in agreement with the Hall Report. The individual flows requiring trunk movement, identified in Map13, amount to some 3,500 million ton-miles. The remainder will be account-ed for by more localised movements.

Iron and steel traffic

Owing to the decided trend towards the use of lighter metals and other substitutes for steel, the development of new steels, and the expected and necessary concentration of British industry upon products of higher technical complexity and less raw material content, steel production is expected to grow at a lower rate than the average for all industries. Production is expected to rise to about 40 million tons by 1984.

Reference has already been made to the coal traffic necessary to support this level of production. Rail traffic arising from the supply of other raw materials to the industry was assessed in a similar manner, by considering the probable growth of each main centre of steel production and the probable sources of ore, limestone and scrap.

There is, at present, a substantial rail movement of intermediate products of the industry, sometimes over considerable distances, some of which are due to imbalances between production stages in individual steel plants. It has been assumed that these flows will decline rather than increase with the growth in total output, since better balancing will be possible as plants develop further.

It has been assumed that the broad geographical pattern of consumption of the finished products of the industry will remain much the same as at present, but, in considering individual flows of these products, account has-been taken of the relative growth of sources of supply, and of the location and probable growth or decline of large steel consumers.

In all, the total rail movement associated with the iron and steel industry is estimated at some 4,300 million ton-miles, of which 800 million ton-miles will be on liner trains and about 500 million will be movements of a local nature. The total figure of 4,300 million ton-miles may be compared with corresponding 1964 figure of 3,300 million, and the expected changes in the flow pattern may readily be seen by comparing Maps 5 and 14.

Oil traffic

A feature of the forecast of the general state of the economy in 1984 is the greatly increased dependence upon oil and natural gas as a primary source of energy and as raw material.

The estimates are necessarily somewhat speculative, because of un-certainty about the development of nuclear power in the second decade, and because there is a margin of uncertainty about the probable use of coal. Another source of uncertainty is the prospect of discovering workable oil or natural gas fields under the North Sea. Also important, from a transport point of view, is uncertainty as to the future relative importance of liquid petroleum and natural gas. Even so, for reasons which will be explained, these uncertainties do not have such a pronounced effect upon the potential rail carriage of oil as might be expected.

About one-quarter to one-third of the 1984 consumption of oil or natural gas is expected to be in power stations. Because the sources are likely to be outside the country, most, if not all, of the generating stations consuming these products will be built on or near the coast, and any not on the coast are likely to have pipe-line connections to a coastal source of supply. Therefore, one of the largest but least quantitatively certain of the potential markets for oil is one which, in any case, cannot be expected to contribute traffic to rail.

A similar argument applies, though perhaps to a lesser degree, in the case of the gas industry.

In the main, therefore, rail-borne oil traffic will be derived from that proportion of the total which is consumed by general industry, by transport, and for domestic heating. Consumption in these fields is expected to be more than 150 million tons coal equivalent by 1984, as compared with 80 million tons at present.

Of the total oil and gas consumption for purposes other than the production of electricity or town gas, about half will be consumed for transport purposes, which means it is virtually certain to be in the form of liquid petroleum products. It is also probable, though less certain, that most of the domestic and general industrial consumption will be liquid fuel, although development of a North Sea gas field might affect the position considerably.

On balance, it seems reasonable to suppose that there will be, in 1984,some 160 to 180 million tons coal equivalent of liquid petroleum products requiring distribution within the country, which means an actual tonnage of95-110 million. It also seems reasonable to suppose that the geographical pattern of consumption of this oil will broadly match the distribution of population and industry, except that some of the larger individual users of oil will be located near refineries, as they tend to be at present. It is virtually certain that all the refineries supplying the demand will be on the coast, and probable that they will be confined to locations which have already been selected for that purpose. The general magnitude and nature of the oil distribution problem which will exist in 1984 is, therefore, reasonably clear.

What remains to be determined is the manner in which the oil is likely to move.

In this respect, the present position gives less guidance as to the probable future position than is the case with other major categories of freight traffic, because we are just entering a period of rapid change. Pipe-line construction is only just getting under weigh and new methods of rail handling and new contractual arrangements are just beginning to have effect. On the other hand, the potential importance of this traffic to the railways has led to intensive study of the problem, in conjunction with the oil companies, and a fairly good assessment of the probable rail traffic has been made.

By 1984, the very heavy flows (i.e. flows of several million tons per annum between main centres) are likely to be carried by pipe-line, over both short and long distances. The break-even level of flow between rail and pipe-line transport will depend upon the regularity of the flow and the nature of the products handled, but it is likely to be about 2 or 3 million tons per annum.

Final distribution to smaller consumers will, generally, be made by road, either from depots attached to the refineries or from other depots located in the more populous parts of the

country. There will, therefore, be little rail transport of small consignments direct to consumers. On the other hand, there will be a great deal of potential rail traffic, in flows ranging from about10,000 to 3,000,000 tons per annum, from refineries to depots and direct to medium and large consumers.

Within this range, movement in trainload quantities will compete favourably with either road or pipe-line transport, and the railways can expect to attract most of this traffic to inland destinations. In the case of similar flows passing to installations on the coast, the balance of cost advantage between rail and coastal shipping will depend upon local circumstances. In general, however, concentrations of population and industry on the coast are centred on major ports and upon oil refineries. For this reason, movements of oil from one coastal point to another are seen to offer very little potential rail traffic.

The probable 1984 flows of rail-borne oil traffic were assessed in the light of the foregoing considerations and are shown in Map 15. They amount to some 2,000 million ton-miles of traffic, as compared with an existing ton mileage on rail of only 700 million. It is considered that new operating methods and rates recently introduced may, in time, create conditions for an even larger increase in this traffic. In this respect, therefore, our estimate of total freight traffic may be conservative, but the relative effect will be small.

Other freight including general merchandise

This residual category of traffic, which includes commodities of all kinds other than coal, oil, and iron and steel (raw materials and products),has an important place in the present study for several reasons.

Firstly, it is a category which offers very substantial traffic potential at present, and, as mentioned on page 20, this potential is expected to grow roughly in proportion to the growth of the economy. By 1984, it is expected to be about 120% higher than now, if an average growth rate in the gross national product of 4% per annum is achieved.

At present, total railway freight in this category amounts to some 40million tons, of which about two-thirds is through movement between main centres and one-third local movement. A further 70 million tons or so is trunk hauled by road for distances of 100 miles or more. The way in which this tonnage flows is shown by Maps 7 and 9, and the forecast 1984 position is shown by Maps 16, 17 and 19.

Secondly, as is also shown by the maps, this form of traffic is spread more uniformly between the main centres of population and industry than coal, oil, or iron and steel traffic. It does, therefore, offer traffic potential to a greater part of the railway trunk route system than any of the other three freight categories, and, in this respect, does more to support routes required for inter-city passenger traffic.

Thirdly, this is the category of traffic for which competition between road and rail is bound to be most vigorous, and where most needs to be done to ensure that each form of transport provides those services for which it is best suited.

An important factor in assessing the roles of the two forms of transport is the extent to which road operators are called upon to cover the cost of the roads which they use. The Board have already expressed the view that, for heavy vehicles on the trunk routes, there is a substantial disparity between system costs and the contribution paid by the operators.

Nevertheless, no general increase in road taxation has been assumed for the purpose of making the rail traffic estimates described in the following paragraphs, but some increase has been assumed for the potential use of vehicles heavier and larger than those in general use today.

The Reshaping Report showed that much of the traffic in this category which is carried by the railways at present is unprofitable. The main exceptions are traffic which is carried in trainload quantities and traffic moving between the larger private sidings. Major changes are required both in selection of the kinds of traffic to be catered for and in the nature of the services offered on the railway network, in order that effort may be concentrated on the long distance bulk traffic which they can carry efficiently and economically. They will then be able to take their share of the growth in this category of traffic, instead of carrying a declining volume in a market of growing potential.

Under the plan for regular timetabled container services ('liner' trains) between the principal traffic centres, it is expected that much of the merchandise movement over the longer distances can be provided for at a cost significantly lower than that of road transport.

At present, some 70 million tons per annum of freight are carried byroad in direct trunk hauls for distances over 100 miles, and about 46 million tons per annum are carried more than 150 miles. Only a part of this traffic can be regarded as suitable for movement by liner trains because:—

(a) Liner trains will have their greatest advantage only over the longer distances;
(b) Liner train services will be operated efficiently only between main centres where they will cater for heavy traffic flows;
(c) Certain commodities will require specialised road conveyance.

After taking these three factors into account, it is estimated that some 19 million tons per annum of the existing traffic will be transferred to linertrain services, as they build up. Most of this will be traffic moving 150 miles or more, but particular circumstances will enable the railways to attract some traffic moving over somewhat shorter distances.

Some of the existing rail traffic is also suitable for transfer to liner trains. This will be derived partly from wagon load traffic, but also from the bulking of goods sundries and parcels traffic. The volume of existing traffics suitable for transfer is estimated to be 7 million tons per annum.

Thus, if transport demand were to stay static at its present level, liner train traffic would be expected to grow to a total of about 26 million tons per annum. If, however, total traffic demand grows by 120% by 1984, it is expected that liner train services will take their full share of such growth and that they will then carry some 57 million tons per annum of traffic. The average length of haul for this traffic will be about 200 miles, and the total ton-mileage will be about 12 thousand million.

If the charges for trunk road use were increased for the larger freight vehicles generally, this would tend to augment the long term assessment of liner train potential and, under such circumstances, the 1984 liner train tonnage might reach 80 million. The significance of a change of this magnitude is not apparent at this stage of the report but it can with advantage be stated here that such an increase in train mileage would be absorbed within the spare route capacity provided by the route selection which is described subsequently.

Of the existing rail traffic in the broad category being considered here, about 6 million tons per annum are at present carried in train loads. Potential exists for expansion of this economic form of working, even at the present level of transport demand, and is being realised by increasing operation of company trains carrying chemicals, cement, car bodies, etc. By 1984,because of the combined effects of growth in total traffic and the trend towards concentration of production in larger units, it is estimated that the volume will reach 20 million tons per annum, or about 2,500 million ton-miles per annum.

The remaining wagon load traffic will diminish as suitable flows are converted to train load operation or are transferred to liner services or to road. So will the movement of goods sundries by the wagon load. A residue of profitable traffic will remain, however, composed mainly of freight moving between large private sidings.

The estimates for general merchandise traffic can be summarised as follows:—

TABLE 7

Estimate of Rail Merchandise Traffic						
	1964 (Actual)		Potential (without industrial growth]		1984	
	Tons	Ton-Miles	Tons	Ton-Miles	Tons	Ton-Miles
	(Millions)		(Millions}		(Millions)	
Wagon Loads	34*	4,800	10	1,500	10	1,500
Train Loads	6	700	9	1,000	20	2,500
Freight Liner Services (including road potential)	—	—	26*	5,500	57§	12,000
Total ..	40	5,500	45	8,000	87	16,000

* Includes 4 million tons of Goods Sundries and Parcels.

§ Includes 5 million tons of Goods Sundries and Parcels.

Total freight

The complete picture of the forecast 1984 trunk rail freight flows between the main centres is shown in Map 18. The flows between the main areas are given in matrix form in Appendix 'B' and between the traffic centers in Appendix ' G '. Since we are dealing with trunk movement, the traffic shown is mainly confined to flows conveyed more than 100 miles, although some flows of raw materials conveyed for somewhat shorter distances have been included because they will obviously move over the trunk system. The total volume is estimated as 24,500 million ton-miles per annum, compared with 12,000 million ton-miles in 1964.

An assessment has also been made of road freight movement between main centres in 1984, and is portrayed in Map 19. This covers the traffic expected to be hauled over 100 miles, and the estimated total is 17,500million ton-miles. Traffic moving over shorter distances has been omitted because it is unlikely to be of serious potential value to the railways.

The total volume of trunk movement by rail represents an increase to double the present level. That by road is approximately 60%greater than today. This may seem surprising, but it

does not represent the overall position for road and rail traffic, because it is expected that there will be a predominant growth of road traffic over the shorter distances.

The trend of coastwise freight movement will, in the main, depend on the needs of the generating stations situated on or near the coast. Oil movement will increase, both to meet this particular requirement and to meet that part of the general expansion in oil consumption (details of which are given in Table 6) which is best provided for by coastal depots. Where firm plans are known, these have been taken into account, but there is still doubt, in certain instances, as to the extent to which particular generating stations will use coal, oil or nuclear power. Although a substantial volume of coastal coal movement will probably remain, there may be some decline because the flows to consumers, other than the power stations, will fall away. The carriage of other commodities, which at present amounts to some five million tons per annum, is likely to remain a relatively small factor.

Therefore, whilst there may be a substantial margin of error in an assessment of the future volume of freight carried by coastal shipping, the reaction of this uncertainty on rail transport will be relatively small and will certainly not be of sufficient magnitude to affect the conclusions in this report. This is because the uncertainty is about the type of fuel to be used by the generating stations rather than about the method of transport which will be used to convey the fuel.

Passenger traffic

It appears evident that, if the economy continues to grow, and particularly if the growth rate accelerates to the 4% envisaged, there will be an accompanying growth in passenger travel for both business and social purposes. What is less certain is the way in which this growing demand will be split between the various forms of public transport and private personal transport.

For the purpose of considering the effect of the future passenger traffic demand on the railway trunk system we have accepted the unavoidable conclusion that stopping services on trunk routes will decline. Most of them are grossly under-used and hopelessly uneconomic now, and are likely to become more so in future because of road improvement and further growth in car ownership. We have, therefore, restricted our consideration to inter-city passenger movements.

Important local services will of course remain, particularly commuter services serving major centres, but these will require special consideration.

The present flows of passengers on scheduled rail, air, and coach services, between main centres are shown in Maps 10, 11 and 12. So far as the railways are concerned, the movement amounts to about 30 million passengers per annum, yielding gross revenue of about £60 million.

A substantial proportion of inter-city passenger traffic arises from business travel, and the industrial expansion described in preceding sections is expected to give rise to an increase in business travel which will be, proportionately, at least as great. Personal contact, personal investigation, and hence personal movement, seem to become even more necessary as the pace and complexity of business and industrial life increase. Therefore, even though the

population increase will fall far short of the increase in industrial activity, the proportion of people employed in industrial jobs likely to necessitate travel will increase very considerably.

Growth in the standard of living and in leisure time will generate an increase in personal travel for social purposes which will greatly reinforce the increase which can be expected to arise directly from the 15% growth in the population likely to occur by 1984.

Although it is difficult to assess the total volume of inter-city passenger traffic likely to develop by 1984 with any great precision, it seems reasonable to assume that it will be at least twice as great as it is at present. At the same time, however, it has to be recognised that the railways' share of the total is likely to decline substantially.

For flows between major centres over 200 miles apart, air transport will retain its speed advantage and is likely to take an increasing proportion of the total traffic. This applies particularly to business traffic, which is relatively insensitive to price but much influenced by speed. Here, air competition is likely to be a more potent factor than the private car. Helicopter and vertical take-off and landing aircraft have been taken into account but are not likely to make any appreciable adjustment to the picture as far as can be seen. In both cases there are problems in providing terminals in conurbations.

The effect of air travel on the Anglo-Scottish rail services by day is already very pronounced, and is likely to increase, but the effect on sleeping car services is, and is likely to remain, far less marked.

Over distances below about 100 miles or so, private transport is the main competitor for both business and social passenger traffic, reinforced, in the case of social travel, by coach services. With improvements in roads and growth in car ownership, partially offset by urban road congestion, further erosion of the shorter distance inter-city traffic on rail is likely.

By 1984, three-quarters of all households are likely to own a car, and a minority will have two or more cars. Once the decision to purchase a car has been made, the marginal cost of operating it is fairly low, and it is likely that the cost of operating a car will decline, in real terms, in future. More-over, a car owner's use of his car is not dominated by economic considerations, but by other real factors such as convenience and by more nebulous ones such as pride of possession. Therefore, despite an often expressed opinion to the contrary, the railways could not expect to retain a great part of this traffic by fare reductions. On the other hand, as a consequence of the economy becoming increasingly car-based, expansion can be expected in the conveyance of accompanied motor cars—whether by day or night services.

The role of the railways will be to concentrate upon the provision of bulk transport over routes of heavy demand, and over medium to long distances. By so doing, they will be able to provide a cheaper alternative to air, on certain longer routes, and provide a faster and more comfortable alternative to road over intermediate and long distances, while leaving shorter distances and cross country journeys to coaches and the private car, which these forms of transport are able to cover more economically. Only by so doing will it be possible for the railways to keep fares at an attractive competitive level, with an optional premium for a luxury standard of accommodation. The services will be frequent, will give a high standard of comfort, and will normally operate at point-to-point speeds of at least 70 miles per hour.

Having regard to all the foregoing considerations, it is estimated that the total volume of demand for inter-city travel on rail will fall slightly from its present level of 5,000 million passenger miles by 1984, but this total seems likely to be concentrated even more heavily into a few main flows. This will be seen from Maps 10 and 20, which show the 1964 and forecast 1984 flows of inter-city passenger traffic on rail.