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# PUBLIC INVESTMENT
## AND THE
# TRADE CYCLE
## IN GREAT BRITAIN

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# TRADE CYCLE
## IN GREAT BRITAIN

BY

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# PREFACE

THIS investigation into the recent past history and the future possibilities of 'Public Works' as an instrument of trade-cycle control was commenced in the summer of 1937. At that time it appeared probable that a violent trade recession was imminent, and that public expenditure on a large scale might be necessary as an antidote. That expenditure did in fact materialize, but in the form of a rearmament programme rather than of an expansion of the familiar forms of public works. We have devoted some attention to this development up to the outbreak of war, but we have in general kept to the more limited, and, it is to be hoped, more normal types of public expenditure on constructional works.

Our manuscript was in an advanced stage at the end of August 1939, and its publication has been long delayed by the uncertainties and distractions of other work which followed the outbreak of war. The results of our investigation must necessarily be rather of historical than of topical interest as long as the present conflict continues. Nevertheless, it appears to us that, though the objects and circumstances of expenditure on 'Public Works' will certainly be very different in a post-war world, its importance as an instrument of control of the 'trade cycle' is likely to remain as great as in the past, or to be even greater. If this expectation is realized, valuable practical lessons can certainly be learnt from a study of past experience such as we have attempted to make.

Our work has been carried out under the auspices of the Oxford Economists' Research Group, and financial assistance has been drawn from the grants made to the University by the Rockefeller Foundations without which its completion would hardly have been possible. The generosity of All Souls' College contributed also to the completion of the work. We owe much to the painstaking investigation of

expenditure by local authorities carried out by Dr. Marion Bowley as Secretary to the Research Group during the earlier stages of the inquiry, though we must hold ourselves responsible for the conclusions which have been drawn from her work. We are also greatly indebted for assistance and criticism to the staff of the Oxford University Institute of Statistics.

R. F. B.
F. A. B.
R. S. G. R.

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# I

# INTRODUCTION

## I

THE greatest economic problem of modern times is the trade cycle—the alternations of periods of general activity and general slackness in all or the greater part of the economic system. It is not, in itself, a new problem. Historical inquiry shows that these fluctuations of the volume of output, of prices, and of the level of employment and of incomes have occurred in most countries since the early days of their industrial development. For more than a century and a half there has been in most Western countries a rapid advance in men's powers of providing for their material wants, both through technical inventions, the spread of international and inter-regional trade, and through the accumulation of an ever greater store of the durable consumption goods, means of production such as roads and railways, buildings and machinery. But this process of material expansion has never been regular. It has proceeded in waves of more or less regular duration and intensity during which the economic system has worked at full pressure, separated by troughs when the existing resources of men and equipment failed to find full employment and when the creation of new and additional material equipment was checked. Each wave and each trough has had its own special characteristics; but there have been sufficient features common to them all to justify economists in talking about 'the trade cycle', in elaborating general laws of their course and causes, and in suggesting remedies which may be of general application, albeit with modifications to suit the peculiar circumstances of any particular situation.

But although the trade cycle has been long with us, it is clear that in the last twenty years its movements have been more violent and more world-wide than before, and its social and political results more disturbing and disastrous than they used to be. The proportion of the working population which was unemployed in 1921 or 1932 was greater in

almost every industrial country than at any previous time. The connexion between economic distress and political upheaval was also probably closer. There has been a greater legacy of prolonged economic distortion and difficulty after a measure of recovery has taken place. It is uncertain whether this greater violence of the trade cycle is due to temporary causes, such as the aftermath of the Great War, or whether the forces which make for instability grow stronger as wealth per head increases and the rate of growth of population slackens. Strong general arguments can be adduced to favour either view. But in any case it is certain that, with the greater violence of the trade cycle, knowledge of its characteristics has increased, and the wider spread of the economic activities of the State has created a demand—and perhaps has increased the means—for deliberate attempts at its control or mitigation. Governments can no longer remain aloof, content to balance their budgets in good times and bad and to dole out only some palliatory poor relief or unemployment benefit. The events of the great depression after 1929 make it abundantly clear that, when once bad times have come, governments will be forced willy-nilly to improvise a trade-cycle policy on active lines; and experience of such improvised policies suggests that they can as a rule only achieve substantial results if they are *not* improvised, but carefully prepared beforehand, and designed to curb the excesses of the trade boom as well as those of the slump.

During the past three years the economic situation has come to be dominated, in one country after another, by the need for gigantic public expenditure on armaments and civil defence. When this need first began to be seriously felt, in 1937, Great Britain appeared to be threatened with the recurrence of a severe cyclical depression; and an increase of expenditure on armaments was welcomed by many as affording at least a possibility of warding off this threat. By the summer of 1939 it was clear that this early phase was past. Rearmament, after being for a short time a mere absorbent for some of the country's unused resources, was already promising to strain its equipment and man-power to the full, and to produce a situation in many ways similar

to that of a great trade boom. That situation was inherently unstable; for it was clearly impossible that the rate of growth of the country's defence services which was then being achieved could be maintained for very long under peace-time conditions. Three possibilities appeared to present themselves. Rearmament might become merged in the catastrophe of a general war. Or the rate of growth of the defence services might diminish more or less quickly, until they became stabilized at a high level. Or at some time or other the process of rearmament might be reversed and the size of the defence services might be diminished.

Either of the two latter developments must have provided economic problems of very great importance and difficulty. Any slackening of the rate of increase of the country's stock of warships, aeroplanes, guns, and defensive works must have caused an absolute fall in the level of demand for the products of the industries which had been providing them. Still more must this have been true if the amount of armaments maintained had been actually reduced. The problem of creating an alternative source of demand for the constructional industries, or of easing the transfer of resources from them to the industries making goods for immediate consumption, must then have become acute.

In the event, rearmament was followed by war; and the preoccupations of the economist from 1937 to 1939 at once appeared to have been academic and unreal. But a moment's reflection shows that the outbreak of war has merely postponed the problem, without providing in itself any final solution. It has removed those psychological and financial difficulties which, in peace time, seemed most likely to curb the rate of growth of armaments, and it has made possible, once again, a temporary acceleration. But with the conclusion of the war, stabilization or disarmament must ultimately come; and the problem of transfer of demand and of resources will be with us yet again. The setting, indeed, will almost certainly be very different, in particulars about which it would be unprofitable to speculate here. The course of the trade cycle has been distorted by rearmament, and rearmament has become merged with war. But the economic problems of transition from war to peace, though

complicated by many unusual and unforseeable forces, must be at least in some elements the same as those presented by the slackening or decline of private investment in an ordinary business cycle. To consolidate peace, when that becomes politically possible, may be economically more difficult than to prepare for war or even than to wage it.

II

The causes of industrial fluctuations are still in many of their aspects a subject of dispute among the experts; but on some of their main characteristics there is pretty general agreement. All periods of prosperity in the past have been accompanied by a rapid extension of the real capital equipment of the community, in the form of producers' goods such as factories, machinery, ships, and of durable consumption goods such as houses and motor-cars; and this growth of equipment, whatever its initial stimulus may have been, has caused a rapid rise of money incomes and of the volume of spending on consumption, as a result of the additional wages and profits received by those engaged in its production. The growth of demand for consumption goods has in its turn reacted on the constructional industries, by creating a further demand for the equipment needed to produce them. Just why this process of cumulative expansion—increased investment, increased consumption, increased investment, and so on—should come to an end is still a matter for dispute; but it always does so, and there ensues a period of general contraction, which is also cumulative. In all periods of recession, addition to capital equipment (net investment) is reduced, or ceases altogether; the regular replacing of existing equipment as it wears out or becomes obsolete is checked and postponed, and sometimes even ordinary maintenance and repairs are curtailed. The result is unemployment of capital and labour in the constructional industries, and a consequent fall of incomes and of purchases of consumption goods; and this in its turn leads to unemployment and falling incomes in the trades which make goods for direct consumption. But the variations of employment and of output, whether measured in physical or in value terms, are always greater in the constructional industries taken as a whole than

in those making for immediate consumption—though it should be noticed that the production of relatively durable consumption goods, such as motor-cars and furniture, also shows large variations. This contrast between the cyclical

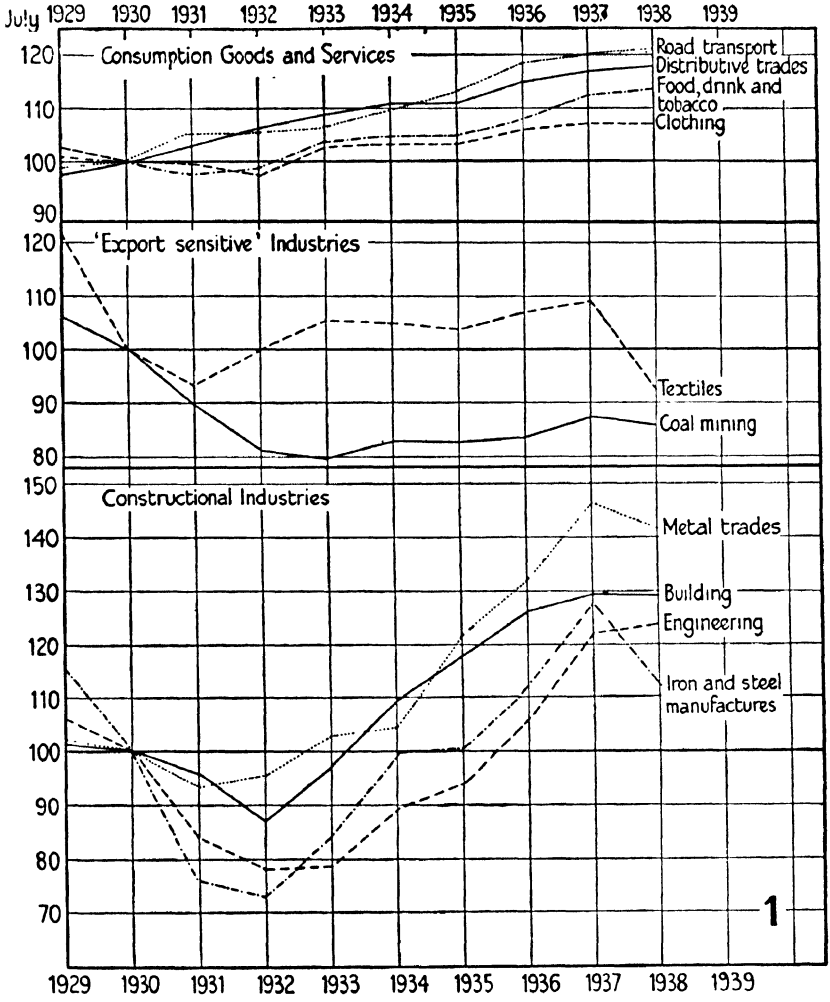



FIG. 1.

behaviour of the constructional and the consumption trades appears very clearly in Fig. 1. This shows the numbers of insured workers employed in Great Britain in certain trades in the two groups during recent years; and there is evidence that, if volume or, still more, value of output were examined,

instead of numbers of persons employed, the contrast would be still more pronounced. The constructional trades are indeed the chief beneficiaries from prosperity and the chief sufferers from depression; and it is through the variations in the incomes which they generate that their own disturbances are spread to other parts of the economic system. The system as a whole thus behaves like a ship in a heavy sea, rolling from one extreme to another; it needs some gyroscopic mechanism to keep it steady, checking each roll before it has gathered momentum.

Attempts have been made in recent years to describe the cumulative character of the trade cycle with the aid of two general conceptions, that of the 'Multiplier', and that of the 'Relation' or 'Acceleration Principle'. Let us suppose that, at a time when there is general unemployment in both constructional and consumption trades, there occurs an increase of investment of a given monetary amount over a certain period of time. This sum will be paid out to the factors of production directly employed, and in the purchase of the necessary materials and supplies, and will so cause some 'primary' employment and generate a certain flow of 'primary' incomes. After an interval, some or all of these incomes will be spent on the purchase of consumption goods, and will cause further 'secondary' employment and generate further 'secondary' incomes. All or a part of these will in their turn be spent, with similar results. Thus the initial injection of an additional sum of money expended has ultimate effects on incomes and employment over and above the 'primary' effects. It is the ratio of the total to the 'primary' employment caused, which is the 'Employment Multiplier'; and the ratio of the total to the 'primary' income generated, which is the 'Income Multiplier'.

At first sight it might seem that the Multipliers should be always infinitely great: new expenditure once injected into the system might be expected to go on circulating indefinitely, creating incomes and employment at each circuit. In fact, this is not likely to happen: there will be leakages at various stages of the process. Not all even of the initial expenditure will be creative either of income or employment. Some will go for the purchase of land, existing buildings,

and other capital assets. This will not be treated by its recipients as income to be spent on consumption goods, but rather as capital to be held in the form of money or spent on capital assets, such as securities. Some will go for the purchase of stocks of materials and semi-finished goods which may not, under depression conditions, be replaced by others newly made. Of that part which does become final income, not all will be spent on additions to consumption within a short period of time. Some will be hoarded, used to purchase capital assets, or simply be substituted for a previous source of income such as unemployment benefit or poor relief. Further, if we are considering only a particular part of the world's economic system—a single town or a single country—at each stage of the process some of the expenditure will create incomes and employment only outside our particular area, and the 'secondary' effects which are felt within it may be faint or non-existent. In general, the smaller the area under consideration and the less self-sufficient it is, the greater will be these leakages through 'imports'. And if we are considering the 'Employment Multiplier' rather than the 'Income Multiplier', we must take account of the effects of the process on wages and prices. If it causes these to rise, because some or all of the factors of production are not in perfectly elastic supply, the amount of 'secondary' and subsequent employment created will become smaller and smaller. When conditions of full employment are reached, the 'Employment Multiplier' becomes nil. The Multiplier of (money) Income may, of course, even increase, if rising prices and wages stimulate expenditure.

The Multiplier process takes the form of an infinite series, working itself out over a certain period of time. For example, if the Multiplier were 3, we might indicate the effects of a single increment of investment thus:

| Periods . . . | A | B | C | D | E | |
|---|---|---|---|---|---|---|
| Employment . . | 1 | $\frac{2}{3}$ | $\frac{4}{9}$ | $\frac{8}{27}$ | $\frac{16}{81}$ | . . . |

the series summing to a final limit of 3 times the primary employment.

It cannot be said that the attempts which have been made to give definite values to the Income and Employment Multipliers for this or for other countries are yet on very

firm ground; indeed, one of the difficulties is that their values must clearly vary widely at different stages of the cycle. Nor is much known yet about the time interval between an increment of investment and the appearance of considerable 'secondary' effects on incomes and employment. The evidence, such as it is, will be discussed in a later chapter. But there can be little doubt of the importance of the general principle, that an initial increment or decrement of investment or consumption has cumulative effects.

The Multiplier analysis describes the connexion between an increment of investment and an increase of consumption and employment. The 'Relation' or 'Acceleration Principle', on the other side, lays stress on the reverse connexion between an increase of consumption and an increase of investment. 'Investment', in the broadest sense, means the creation of durable instruments of production, durable consumption goods (including armaments), and stocks of raw materials and goods finished or in process of production. If consumption of goods and services was neither increasing nor diminishing nor changing its character, and if the technical methods of production and the rate of interest did not alter, a certain amount of durable goods and stocks must be maintained in existence. Stocks of materials and finished goods must be regularly replaced as they are bought and used up, and the instruments of production and durable consumption goods must be kept in repair and replaced as they wear out. The size of the constructional industries under such circumstances would be determined by the average length of life of the durable goods required. If it were ten years, the constructional industries must be sufficiently large to carry out normal repairs and to replace one-tenth of the durable goods every year. If their capacity were greater than that, either some part of their resources must remain unused or else the stock of durable goods—and consequently the community's power of consumption—must actually increase. If it were less, either the power of producing consumption goods and level of consumption must diminish or the constructional trades must be expanded. Under circumstances of stationary consumption there would, of course, be no *net* investment. But in the

actual world the level of consumption is not stationary. In almost all countries the general trend over a number of years has been upwards; population has grown, there have been technical inventions and improvements, and additions to the stock of durable goods have in fact been made. But this upward trend of consumption has not been regular; in the upswing of the trade cycle, consumption has usually increased rapidly, while in depression there has been a slackening of the rate of growth, stagnation, and even considerable decline. In the long run, the rate at which consumption *could* grow is determined by that of technical productive power; but in the short run—the course of a trade cycle—rather by the amounts of money incomes received, which are themselves, through the Multiplier, connected with the amount of investment, and by people's willingness to spend them. A continuous increase in consumer's demand must make necessary net additions to stocks and durable equipment, in addition to the regular repair and replacement of the old supplies. This is especially important for the industries making durable goods, because the demand for additional equipment may form a very considerable part of the whole demand for their products. If existing equipment were being replaced at the rate of one-twentieth every year, and there then occurred a steady rise in the demand for consumption goods of 5 per cent. per annum, involving a corresponding percentage increase in the amount of durable means of production, then the demand for the products of the constructional trades would be forthwith doubled. If the rate of increase of consumption then slackened to 2½ per cent., total demand for durable goods must fall from the new level by nearly a quarter;[1] and if consumption then actually diminished, demand for new equipment would disappear altogether, and replacements of some of the existing plant would become unnecessary. Thus the size of the constructional trades is intimately connected with the *rate of growth* of consumption; and stability in them depends rather on the maintenance of a regular rate of growth in consumption than on the maintenance of any given level. The more

[1] The fall will not be quite a quarter, because larger replacements will still be required, though not necessarily at once.

durable the goods, or the equipment required for making them, the greater is the importance of changes in the rate of growth of demand. A 5 per cent. increase in the demand for domestic service makes necessary a 5 per cent. increase in the number of domestic servants employed. But a 5 per cent. increase in the demand for house-room should mean, if houses last on the average fifty years, an increase of 250 per cent. in the activity of builders.

Thus an increase of investment activity, however initiated, causes, by the operation of the Multiplier, a secondary increase of consumption and of activity in the industries making goods for immediate consumption. This rise of consumption will in its turn react, through the operation of the 'Relation', on the demand for durable goods and the activity of the constructional industries, thus having what we propose in this book to call 'tertiary' effects. A decrease of investment activity is similarly transmitted with exaggerated force, causing secondary decreases in consumption and tertiary decreases in construction.

It must be noticed, however, that this 'Relation' between the rate of growth of consumption and the level of activity in the constructional trades is complicated and made uncertain in practice by the action of other forces. A fall in the rate of interest, or certain forms of technical inventions, may also lead to an increased demand for durable means of production, by making it profitable to use more of them in making consumption goods to satisfy an unchanged final demand. A sudden change in the direction of consumer's demand from, let us say, foreign to British-made motor-cars may cause a sudden rise in the demand for factories and machinery: it is true that the foreign factories have been rendered useless and will not be maintained or replaced as they become obsolete, but for the moment this merely means the cessation of a replacement demand which is much less than the new demand which the change has created. Moreover, in the various phases of the trade cycle, the 'Relation' is certainly subject, sometimes to exaggeration, sometimes to partial sterilization. In the course of the downswing, gloomy anticipations about the future, or difficulties in borrowing money, may lead to a fall in the demand for constructional

goods actually greater than the 'Relation' itself would justify. In the early stages of recovery, on the other hand, the presence of equipment which is not yet fully employed makes it possible to sustain a considerable increase of consumption above the level reached at the lowest point of the depression without much increase in the existing durable means of production—provided of course, that the increase of consumption does not take new forms. In the later stages, however, as trade after trade finds its plant and equipment coming to be fully used, the 'Relation' becomes operative once more; and later still its working may be even exaggerated, if speculative optimism leads to the floating of new enterprises and the creation of new equipment in anticipation of future extensions of consumers' demands. And if the actual rate of growth of consumption is, for a variety of reasons, likely to be fairly unstable and irregular, the anticipated rate of growth is certainly much more so. It seems to be highly probable that, at the peak of a trade boom, the level of activity in the constructional trades is sometimes appropriate to a rate of growth of consumption much greater than actually exists. In such a case, demand for the products of the constructional trades could only be maintained at boom levels by the initiation of some form of public investment, which was independent of the rate of growth of consumption, and which could be continued even at the expense of it. An armaments programme introduced at the top of a boom and financed wholly from the proceeds of taxation might provide an example of this.

Considerations such as those just discussed suggest that, although the 'Multiplier' and the 'Relation' processes are always interacting to some extent, their relative importance is likely to be very different at different phases of a trade cycle. We have seen that the Employment Multiplier, at least, is likely to become smaller as conditions of full employment are approached in the later stages of an upswing; it applies most strongly in depression, when supplies of labour and other factors of production are highly elastic. The 'Relation', on the other hand, is more or less sterilized in depression by the existence of excess capacity of plant and equipment; 'tertiary' effects are then restricted to replacements,

and to extensions only in industries subject to a steep upward trend of demand or subject to some very considerable stimulus, whether actual or anticipated. Its main importance comes only in the middle and later stages of the phase of expansion; its operation may then easily become exaggerated. This fact makes it both more difficult to get out of a depression and harder to control a boom.

III

We have seen that the instability of the consumption goods industries is very much less than that of the constructional trades. If we are considering the world as a whole, the contrast between their behaviour is one of the dominant features of the trade cycle. For a single country, however, it must often be supplemented by a contrast between industries making mainly for export and industries making mainly for the home market. It has been the regular experience of Great Britain, and a common experience elsewhere, that the export industries are considerably more sensitive to the trade cycle than those which supply the home demand. For instance, it appears from the Figure on page 5 that the fluctuations of the British cotton industry, which is a 'consumption good' industry but dominated by the export market, more resemble those of the constructional trades than those of consumption trades making mainly for the home market. There is a general reason for the greater sensitiveness of export industries in that they are subject to the special disturbances of tariffs, foreign exchange derangements, and the cessation of foreign lending and borrowing, which are the usual international concomitants of a trade depression. In Great Britain there is the special reason that sales of machinery, ships, and some other goods play a disproportionately important part in her export trade. Both in 1929 and in 1937 a decline in exports seems to have been the first symptom of the development of a general downward movement.

Whatever the exact reasons for the great sensitivity of the export trades may be, its effects are clear enough. A net variation of activity in the export trades, whether these are constructional or consumption, can have secondary and

tertiary effects on incomes and employment precisely similar to those caused by a variation in the level of investment at home. The cumulative spiral of depression, or of recovery, may be generated or intensified by an impetus from outside the country; and its course, causation, and remedy cannot be discussed entirely in terms of the interactions between home investment and home consumption. A policy of control designed to secure full stability of the constructional trades would need to provide an actual expansion of fixed investment at home whenever the export of capital goods fell off; and a policy which aimed at maintaining full activity of the whole economic system of the country would have further to produce either an expansion of home consumption when exports of consumption goods declined, or else a transfer of men and resources from export industries making for consumption to constructional industries expanding to provide an increase of home investment. Stabilization of home investment, or even of total demand for products of constructional industry, would not be sufficient to insulate the country from the effects of external disturbances; though the achievement of either of these limited objectives would do much to prevent such disturbances from having any considerable cumulative effects.

This type of analysis suggests two possible approaches to the problem of control over the trade cycle. The first, and most direct, would be an attempt to smooth out the variations in the demand for the products of the constructional industries, and so to reduce the fluctuations in the final consumers' incomes which they generate. This is to attack the problem at its centre, in the most unstable sector of the economic system. A second approach would be an attempt to make good artificially by means of liberal unemployment relief, 'consumers' credits', and the like, the gap in incomes and spending power caused by any initial decline of activity in the constructional trades. This might prevent that decline from infecting the consumption trades and from reacting again, by the operation of the 'Relation', to cause a further fall in the demand for constructional goods. The first approach is clearly the more ambitious, since it seeks to maintain both the level of constructional output and

employment, and consumers' incomes and expenditure; while the second merely seeks to sterilize the cumulative effects on the rest of the system of unemployment in the constructional trades, without providing a cure for it. In times of general depression the two policies—artificial maintenance of investment, and artificial maintenance of consumers' incomes without direct maintenance of investment—might well be pursued together, or the choice between them determined simply by the practical considerations of which is the easier. But in other circumstances the one policy or the other may be actually harmful. If it is desired to deal with a situation, such as many economists believe frequently arises at the end of a boom, in which the constructional trades have become over-expanded relatively to the size required by the long-term trend of the growth of consumption, it would be undesirable for the State to try artificially to maintain these industries at the level of activity which they had reached at the end of the boom. Under these circumstances, it would be desirable to secure a transfer of resources of labour and capital from the constructional to the consumption trades, without unleashing the forces of cumulative depression. A direct stimulus to consumption seems to be what is required in order that this transfer should be made; the gap in consumers' incomes caused by the necessary and salutary reduction of employment and profits in the constructional trades must be made good, or more than made good. Artificial maintenance of investment could provide no permanent remedy, unless the community were prepared indefinitely to devote to the production of durable goods a larger proportion of its resources than it really needed to do. This is not a speculative or fantastic situation. It might easily have arisen in this country had an end been made without war to the process of progressive rearmament. It must most certainly arise at the conclusion of the present war. But there is little reason to suppose that it arises automatically at the end of all periods of prosperity. Some trade booms in the past have undoubtedly come to an end before anything like a situation of general full employment has been reached; in other cases, as for example in this country in 1929, there was little evidence of real over-expansion of the construc-

tional trades, and the depression was apparently generated by the impact on the Stock Exchange and on the export trades of the difficulties of other countries. But in other phases of the trade cycle it may be desirable to administer a check to the rate of growth of consumption while maintaining the level of investment. Taxes on incomes and consumption, combined with an expansion of public investment, would then be the appropriate instruments.

## IV

The instruments which a modern government has at its disposal if it wishes to influence the general course of business fluctuations are numerous. Some of them have been used to a considerable extent in this and other countries recently; others are still in the stage of discussion or half-hearted experiment. They may be classified generally under a few main headings. There is monetary policy—the attempt to control by manipulation of the banking system the level of prices at home, the prices of exportable goods in terms of other currencies, or the terms on which would-be private investors can borrow. There is industrial policy—the attempt to stimulate or support particular industries by price or output control, or by selective subsidies, credit guarantees, or protective tariffs. There is fiscal policy—the manipulation of taxation and of the volume of ordinary budget surpluses or deficits. Finally, there is public investment policy—the variation of the volume of expenditure on construction undertaken by the State and other public authorities themselves; or what is often called 'public works'.

It is the last of these possible instruments of control over the trade cycle which is the main subject of this book. In the following pages an attempt is made to measure the annual amounts of public investment in Great Britain since the last War; to trace their variations in relation to the fluctuations of general business; and to discuss the possibilities and limitations of using deliberate variations of public investment as an instrument of control in the future.

The term 'public works' or 'public investment' requires definition. Broadly, it will be used here to cover all forms of constructional activity undertaken by or for the central

government, the local authorities, and semi-public or (in Great Britain) relatively easily controllable private undertakings such as the railways companies, the London Passenger Transport Board, the Central Electricity Board and the private electricity distributors, and certain other so-called 'public utility' enterprises. Constructional work by and on behalf of these bodies takes the form partly of the maintenance, repair, and replacement of existing buildings, machinery, and equipment of various kinds, and partly of additions to them; as a whole, it comprises what may be called the 'gross public investment' of the community in its capital equipment and durable consumption goods. As will be shown later, this 'gross public investment' has in recent times formed a very large part of the 'total gross investment' annually made in Great Britain, and has represented a somewhat smaller part of the total demand for the products of the constructional industries such as building, engineering, iron and steel, and shipbuilding, whose fluctuations play a central part in the course of the trade cycle.

The authorities and undertakings responsible for making this 'public investment' are, of course, far from forming a homogeneous group; but they have this common feature, that they exist primarily to render certain services to the community at minimum cost, and are not directed mainly with a view to maximizing pecuniary profits. Military and naval expenditure by the State, expenditure on education, roads, and the like by local authorities, is not conducted on a trading basis at all. The Post Office and publicly owned water and electricity supply enterprises usually aim at covering their costs from their trading receipts, but not necessarily at securing the maximum profit; and private enterprises in similar 'public utility' fields are subject to legal and administrative restrictions designed to make the profit motive a secondary one. Moreover, these public and semi-public trading enterprises cater usually for a demand which is fairly regular, does not fluctuate very greatly in the course of the trade cycle, and requires for its satisfaction capital equipment which must be planned and constructed with an eye to the distant rather than the immediate future. Extension

of such undertakings need not, therefore, be governed so much by the immediate state of business confidence as those of an ordinary private firm.

The 'Public Works' proposal, in its commonest form, is that constructional work by public authorities should be largely increased in times of depression, when investment activity by private firms is at a minimum, in order that the additional employment brought about by public expenditure should offset the unemployment caused by the contraction of private business. That is always the central idea, though variations of it are also often discussed. A more limited version of the proposal would simply advocate the stabilization of expenditure on public works (or possibly, going rather less far, of the physical volume of public works) in all phases of the cycle. This would not be a positive contribution to the offsetting of the fluctuations of private investment, but would at least prevent the State from accentuating them by its own actions, as it has certainly often done in the past. Then further, to the proposal for expansion of public works expenditure in times of depression there is often added the rider that it should be reduced below its usual level in times of prosperity, both in order to create a 'reserve' of necessary work to be carried out in a succeeding depression, and to reduce the over-expansion of certain parts of the economic system which is alleged to occur in times of boom. Finally, it must be noticed that expenditure on public works is often advocated as a remedy for types of unemployment which are really structural or seasonal in nature and which have no direct connexion with the trade cycle.

If we leave aside for the moment the question of the relation of public works to non-cyclical unemployment, it is clear that all varieties of the 'public works plan' are closely connected with the two types of control over industrial fluctuations which have already been outlined—the smoothing out of fluctuations in the demand for the products of the constructional trades, and the maintenance of consumers' incomes and spending power in the face of any unavoidable decline of activity there. In so far as the works in question are of a kind that makes direct demands on the constructional trades—as, for instance, housing or railway electri-

fication—they are an instrument appropriate to the first and more ambitious type. An increase of expenditure on them will maintain the level of constructional activity when private investment is falling off, will have some secondary effects on the volume of consumption, and may possibly have tertiary reactions on construction as well. Other forms of public works, such as the laying-out of parks and pleasure grounds, the clearance of pit-head rubbish in a mining town, and (to a lesser extent) the repair and improvement of roads, employ a large number of men directly, without much purchase of materials. They have little direct effect on the constructional trades, and are not a close substitute for the private demand which has diminished. Their function may be therefore mainly that of providing a convenient means of maintaining consumers' incomes. From a point of view of general trade-cycle policy they are not necessarily more effective than the granting of liberal unemployment benefits or the payment of direct subsidies to consumption, though they have the popular if somewhat specious advantage over them of giving work to the unemployed, the results of which may have some social utility. This distinction between what may be called the 'investment effect' and the 'income effect' of public works is certainly of considerable importance. An increase of public expenditure which stimulates or maintains normal business activity in the constructional trades is very different from one which causes merely a localized and necessarily temporary increase in the numbers and incomes of public employees. The main claims of public works to *special* utility as an instrument of general business stabilization must depend on the possibility of making the 'investment effects' substantial.

This point must be stressed from the first; for failure fully to appreciate it has certainly warped both the design and the execution of public works in Great Britain and in other countries in the past. The idea of 'public works' in England has been historically associated with the 'labour test' of the Poor Law from Elizabethan times onwards; and, in so far as they have been used as a conscious instrument of policy at all, they have often been designed, and nearly always administered, by the responsible local authorities, as 'relief

works'. Even when, in the years between 1920 and 1931, an organ of the central government, the Unemployment Grants Committee, had funds at its disposal for distribution among local authorities, it used them most often to subsidize those types of work in which it seemed that the maximum amount of unskilled labour could be directly employed. Later American experience has been much the same. With a few exceptions the public works programme of 1933 was administered with a view to finding immediate jobs for the greatest possible number of men and often with a deliberate sacrifice of efficiency by refusal to use labour-saving machinery. It is indeed true, as we shall show in detail later, that work of the 'relief' character usually gives the highest ratio of numbers of men 'directly' employed for a given expenditure; and, less universally, it shows the highest ratio of 'primary' employment, both direct and indirect, because the proportion of expenditure which goes to profits, imported materials, and the like is low. None the less, the extensive use of such works has undoubtedly had very unfortunate effects. It has led too often to the execution of works of minimum social utility at maximum money cost. It has minimized the revivifying effects of public expenditure on private industry. In some cases it has left as an aftermath a body of casual workers who could not be easily absorbed into normal industry when recovery took place. And it has certainly helped to bring the whole instrument of public works into undeserved disfavour as an extravagant and ineffective remedy for heavy unemployment.

It appears, therefore, that, although relief works must inevitably play some part, the best results would usually be obtained by maintaining or expanding in depression those types of public works which make the greatest demand on the ordinary constructional industries. But this may not be in itself enough to secure that increased public investment shall be a close substitute for diminished private investment; for the branches of the constructional trades affected are not necessarily the same. If we leave aside the case of rearmament, most of the generally recognized forms of public works make a proportionately much larger demand on the building and civil engineering industries than does private investment

as a whole; for in the latter (particularly if we include the export demand) machinery and ships bulk much more largely. There is some chance, therefore, that a large general expansion of public investment might over-tax the 'normal' capacity of the building trades while leaving heavy industry still much under-employed. And even if there were no over-expansion of particular trades for the country as a whole, there may be still a good deal of local maladjustment if, for instance, extensive public works are carried out in a particular town or district in which the level of private building activity has remained high. We know that even at the worst moment of a general depression the incidence of unemployment is very unevenly distributed over the country, so that this point cannot be neglected. But it is not clear that such local or general straining of the resources of any particular industry would be entirely a bad thing. It is true that, in so far as labour and other resources are not easily attracted from other places or other trades, the primary employment effect of a given expenditure may be reduced by a rise in profits and wage rates or total earnings per man; or, if resources are attracted, there may be difficulties about removing them again when the public works programme is concluded. On the other hand, 'tertiary' effects are more likely to occur at an early stage if expansion is uneven. A very large expansion of road works, for instance, would require the construction of additional mechanical excavators and other tools; and if it were concentrated in a prosperous area, might make necessary additional investment in housing accommodation, temporary or permanent, which would not be needed if labour were employed in its original place of residence. But in general, though such artificial distortions may have a greater stimulating effect at the moment, they are more likely to be wasteful and troublesome in the long run than a close substitution of public for private demand. These questions of distortion do not, of course, arise at all where the public works programme is limited to the stabilization of public investment in depression; and they are not likely to be very important unless a really considerable expansion is attempted.

Broader aspects of the issues between stabilization and expansion must also be discussed. It is clear that in order to

produce expansion in times of general depression, one of two alternatives must be adopted. Either the average amount of public investment over the cycle must be maintained as at present, but its timing reversed: that is, there must be deliberate contraction in prosperity as well as expansion in depression. Or, if contraction in prosperity is to be avoided, the average amount of public investment must be increased above its present level by the addition of a large special programme in times of depression.

The first alternative has been the more often discussed in this country up to the present. It has been supported on general grounds of 'public economy': the amount of constructional activity by the State is, it is often said, quite large enough already—there is no evidence that people want more public buildings, roads, or electricity supplies than they have at present, as compared with other forms of goods and services which are normally provided by private enterprise. This argument is not, however, altogether conclusive. It is necessarily true that an increase of public investment means a reduction of the amount of goods and services provided by private enterprise only if the public investment is undertaken in times of prosperity when the community's productive resources could have been fully employed in other ways. If the real cost to the community of public construction is regarded, as it ought to be, as the loss of the other goods which might have been produced instead, then the real cost of constructional work carried out in depression is very small or nothing at all. We are at present prepared to afford a certain diversion of productive resources to public uses in prosperity when they have a high value in other uses. It may be plausibly maintained that we should be willing to see the total stock of public buildings, roads, and the like, somewhat larger, if we could secure some of them in depression when there is no alternative use to which constructional resources will be put. In short, we might be prepared to see the total expanded until the marginal real cost of works carried out in depression was equal or nearly equal to that of those at present carried out in prosperity.

Moreover, it is necessary to consider what would be the effects of a contraction of public investment in prosperity

considerably below the present level. The conclusion most usually suggested is that the effect would be stabilizing—the 'excesses' of the boom would be reduced, and the intensity of the subsequent depression *ipso facto* diminished. In more detail, the expansion of output and employment in the constructional trades in the later stages of the boom would be smaller and less rapid than it is when public and private constructional expenditure occur simultaneously; in particular, there would be less need for the sharp rise of prices and the large expansion of productive capacity which begins as soon as the point of full employment of the existing resources in these industries is approached. The constructional trades then become disproportionately expanded relative to the rate of growth of consumption; and in any case, if there is full employment, any further expansion of them can only take place through a diversion of resources from the production of consumption goods. The slackening of the rate of growth of such production must then react unfavourably on the demand for the products of the constructional trades, making part of the new provision there redundant and so breaking and reversing the cycle of expanding investment and expanding incomes. This line of argument appears to be correct in certain cases; but it would not, of course, apply when the upswing of the cycle is interrupted before a situation of full employment has been approached. Moreover, there is certainly some danger lest too early or too sudden a contraction of public expenditure should itself precipitate a depression, if private investment has not sufficient momentum to continue the upswing. Such a check to public expenditure was at least a contributory cause of the recession which developed in the United States in the autumn of 1937. It is certain that the choice of the appropriate extent and timing of any contraction of public expenditure on construction would be a delicate one: no simple or automatic formula could be applied.

Some economists, notably J. M. Keynes, would apparently go much farther than this, and would argue that there is a chronic and increasing difficulty in ever reaching a condition of 'full employment', and that a much larger amount of public investment may be needed to secure it even in times

of prosperity. Keynes's view is based on the supposition that, on the one side, there is a strong tendency for consumption to increase less rapidly than incomes as wealth increases, and on the other side, that the marginal yield of fresh additions to the community's stock of durable means of production diminishes as the stock is increased. There results a situation in which savers try to save more money than the business community wants to borrow at any rate of interest at which the savers are willing to lend: there is consequently too little investment, too little consumption, and an irreducible minimum of unemployment even in relative prosperity. He instances as an illustration the high level of unemployment which remained in Great Britain, the United States, and Germany, even in such a prosperous year as 1929; and he forecasts an increase of these difficulties in future as a result of a further rise in real incomes and the coming of a stationary population. This account must, however, be regarded as still highly controversial, both as history and theory; and even if it be correct, it seems likely that the remedy should rather be found in direct measures to stimulate consumption rather than on the side of artificial stimuli to the constructional trades.

On the practical side there is a strong argument for contraction of public construction in prosperity, namely, that it makes easier an appropriate expansion in an ensuing depression. It is notoriously difficult to improvise, in depression, schemes of public expenditure which will be of a suitable kind and which will command public confidence and support; it is probable that expansions would be much easier if there were a reserve of public work, of whose desirability most people were convinced, carried over from the period of prosperity. But, as will be shown in detail in later chapters, some forms of public constructional work are so closely related to the expansion of private construction that either postponement in boom or anticipation in depression would present many practical difficulties.

The second main argument for the use of public works as an instrument of trade-cycle control is financial and monetary. It will be generally agreed that in circumstances of general unemployment one main condition for recovery

is a *net increase* of spending, both on consumption and investment. There is usually little point in expanding the expenditure of individuals, or of the community as a whole, in one direction while it is being simultaneously reduced in another.[1] As far as public authorities are concerned, a net increase of expenditure by the whole community can only be achieved by paying out more money than is being received from taxation and other current revenue receipts; for an increase of expenditure financed from increased taxation means, broadly speaking, only a substitution of expenditure by government for expenditure by private persons.[2] An excess of expenditure over current revenue can only be obtained in one of three ways: by drawing on accumulated reserves, such as those of the Unemployment Insurance Fund; by borrowing; or by the direct printing of notes. Now accumulated reserves are never in practice large enough for their expenditure to maintain the level of private incomes for very long, though, as will be shown later, something might well be done to increase the size of public reserves. The inconveniences of a direct increase in the note-issue for government use are sufficiently well known and need not be discussed. The expedient of borrowing remains. But against borrowing to finance ordinary current expenditure, even in times of emergency, there is a deeply engrained prejudice which may or may not be well founded. It does not extend, however, to the same extent to the financing of work on the creation of durable assets, which increase the real wealth of the community and often directly or indirectly help it to meet the interest and sinking fund on the loan. Even in the earlier stages of rearmament it was considered improper for the central government to borrow the cost of battleships and aeroplanes, which are, indeed, not at all self-liquidating and are only durable consumption goods in a very special sense; but nobody cavils at loans for the extension of telephones, and local authorities in Great Britain normally finance nine-tenths of their capital expenditure by borrowing, irrespective of whether it is directly productive

[1] This conclusion may require some modification where there is a big change in the *objects* of expenditure, so that 'tertiary' effects occur.

[2] Again, there are some qualifications, which are discussed in Chapter VIII.

of revenue. It may be doubted, indeed, whether these particular canons of public financial orthodoxy are always rationally defensible; but they exist, and they cannot be ignored without real, if unmeasurable, damage to public confidence and hence to the level of private spending and private investment.[1] Increased expenditure on public works, financed by borrowing, is therefore likely to be a superior instrument to a budget deficit on ordinary expenditure, both because it may provide a more direct stimulus to the constructional trades, and because it is less offensive to financial orthodoxy and business confidence.

The raising of loans is a necessary and essential part of a public works programme in depression. But nobody disputes that the borrowing authorities, whether central or local, must ultimately make provision out of an increase of ordinary revenue for the payment of interest and the repayment of principal; and in addition they will in most cases have to meet additional running costs and maintenance charges. In Great Britain, at any rate as far as the local authorities are concerned, the rules which govern the making of such provision out of revenue have been long established and are pretty rigidly enforced.[2] A public works programme must, therefore, have an early effect in increasing the financial burdens of local authorities; and the prospect of additional taxation at a time when revenue resources are already strained certainly acts as a powerful deterrent to the execution of capital works during depression. And the prospect, or still more its realization, may negative by its ill effects on the ability and willingness of taxpayers to spend and invest, some of the beneficial results of the original loan expenditure. On the other hand, it is often rightly maintained that if public works do succeed in assisting a general revival of business, they must cause an automatic increase in the yield of taxes at existing rates, and so to a greater or lesser extent 'pay for themselves', even though they may not be in the strict budgetary sense self-liquidating. An attempt is made

[1] It is significant that, in the financial and budgetary crisis of 1931, the main focus of criticism was on borrowing, not for public works, but to finance unemployment benefit after the reserves of the Insurance Fund were exhausted.

[2] See Chapters IV and VIII.

in a later chapter to discuss this question in detail; but some general observations may be made here. First, much depends on the length of time-lags between the spending of borrowed money, the need for additional revenue, and development of general recovery through the secondary and tertiary effects of the original expenditure. Second, the character of the tax system and the breadth of its base are of great importance; for the yield of some taxes varies largely and rapidly with changes in general business conditions, while others are less sensitive or more sluggish in their reactions. Third, though the revenue of the central government may experience considerable benefit from the effects of any public spending within the national boundaries, it does not follow that small local authorities will benefit at all in proportion to the amount of their own expenditure or the resultant increase in the charges on their own budgets; for the effects, particularly if the expenditure is not of the 'relief work' character, will be diffused over an area much wider than that of the local authority which makes it. The argument that 'public works pay for themselves' can only be used with any confidence if their ultimate costs are to be met from a really broad tax-base.

The repayment of public works loans also raises another problem. It is often said that, if expenditure from loans has financially stimulating effects in depression, rapid repayment of these loans in times of high prosperity ought to have a steadying effect. The symmetry of this argument is attractive; but it is not certain that it is justified. The immediate effect of taxation and repayment is to transfer monies from the general tax- and ratepayer to the holders of central and local government securities. Much of this money, had it been left in the possession of taxpayers, would probably have been used to increase expenditure on consumption—and thereby, through the operation of the 'Relation', to intensify activity in the constructional trades. But when, instead, it is received by the bondholder in exchange for his securities, it will probably be treated as a capital asset, and, under boom conditions, reinvested. The general effect of the process is likely to be to stimulate investment at the expense of consumption, though at the same time there will be some

complicated time-lags as a result of the passage of the money through the hands of the taxing and repaying authority. Whether this is desirable in any or all of the phases of the upswing of the trade cycle must be regarded as still a subject for further investigation. But if, as is probable, the process of repayment has not been completed before the onset of the next general depression, its continuance must have deflationary effects; for monies received by bondholders will certainly not be then quickly invested.

Other advocates of an inverse adjustment of public works to the phases of the trade cycle lay stress on the direct financial economies to be gained from it. Most public investment, they point out, is not conducted with a view to securing profits, but in order to provide a needed service at minimum cost to the taxpayer. A private business will have an incentive to build a new factory even when interest rates and building costs are abnormally inflated, if it thinks that it can see a prospect of still more inflated profits; while a fall in costs, be it ever so great, will not prove tempting if the business outlook is grey. A public authority, on the other hand, being not interested in profit, should be sharply deterred by high costs and encouraged by low. This argument has weight—but also limitations. In the first place, it must be noticed that any considerable application of the policy of expanding public works in depression would automatically be accompanied by some reduction of the proposed saving in cost; for the substitution of public demand in depression for private demand in prosperity would tend to maintain the prices of the materials and labour involved. That might in general be a good thing; but it would not save the taxpayer money. The argument therefore applies rather to the maintenance or moderate expansion of public investment in depression than to a really large programme. But the more important difficulty arises from the close connexion which exists in fact between the need for some public services and the prosperity of private industry. A public authority may not be interested in making a profit out of its sewers or its water-supplies; but it *is* interested in supplying them as and when they are wanted by its citizens. And the need for extensions of sewers and water-supplies is

a function of the rate of growth of private residential and industrial building more than of public building. The same principle applies with varying force to many other public services. Much may certainly be done by providing public services before, and not after, an acute need for them has arisen, though this necessarily involves some risk of loss through miscalculation of the character or place of the subsequent development. It must, however, be frankly admitted that a divorce between the timing of public and private investment will usually involve some loss of utility to the community, which must be set against the many other advantages which may be secured from it. And in the field of military, naval, and air-force expenditure—which, even before the outbreak of war, had become, in 1939, the widest field of all—the amount and timing of constructional work must of necessity be determined by imperative political needs. It may, in fact, dominate and mould the trade cycle, as war itself did for fifty-two hectic months within the memory of most of us and is doing once again to-day; but it can be treated only to a very small extent as a normal and regular instrument of trade-cycle control.

## V

The trade cycle impresses itself most strongly on popular imagination as a cause of unemployment; and most remedies for it are discussed mainly from the point of view of reducing unemployment. But though the trade cycle is certainly an important cause, it is far from being the only cause, even if in practice it is not always easy to draw a clear line between cyclical and non-cyclical unemployment. There is general agreement that at all times a large volume of unemployment is caused by purely seasonal fluctuations in demand for goods, or in the possibility of production as determined by the weather or other physical circumstances, by the existence of casual methods of engaging labour, and by the inability of workers leaving one employment to get in touch at once with employers who are in need of their services. Most important of all, perhaps, are changes in the structure or geographical location of industry, which may leave large groups of workers 'high and dry', unable to find a readily

accessible market for their particular kind of skill even though there is an unsatisfied demand for labour of other kinds, or for their own skill in distant places. Moreover, it is well known that prolonged unemployment, whether caused by a cyclical depression or otherwise, may involve a person in such loss of industrial quality as to make him unemployable at any wage which public opinion would permit employers to offer. It is also possible, of course, that unemployment may be caused by an attempt by trade unions or the State to maintain too high a level of wages in certain industries or over a large part of the economic system.

These non-cyclical types of unemployment are very important, and it is necessary to say something of the possibilities of using a controlled public works policy as a cure for them. In the first place, it must be noticed generally that, though the *cause* of these types of unemployment is not the trade cycle, a *remedy* for them may be much more easily found in times of general prosperity than in depression. Therefore any public works policy which reduced the violence of general trade depressions would probably also reduce the volume of some kinds of non-cyclical unemployment. The point may be illustrated from recent experience of the Special Areas in this country. Unemployment in most of them has been mainly attributable to the permanent decline or emigration of the industries for which they were specialized; and little direct relief was afforded by the general trade recovery. But the appropriate remedies—migration of the labour force to other places where there was a demand for its services, and the attraction of new kinds of industry to the areas—which proved incapable of application in 1932, were relatively easy in 1937. When there was heavy unemployment in the rest of the country there was little chance for an individual to benefit by leaving the Special Areas, and when very few new enterprises were being established anywhere, it was not possible to encourage or cajole many of them to go to the Special Areas. Similarly, it is probable that casual methods of engaging labour are more prevalent when there is a superabundant labour supply than when there is a shortage.

But apart from these possible indirect effects public works

are sometimes advocated as a means of directly reducing 'seasonal' and 'structural' unemployment. In the case of seasonal unemployment the problem is broadly similar to that of cyclical unemployment, though very much simpler, and on a smaller scale. Can public works be so timed as to offset seasonal reductions in the activity of private business? In those cases where the seasonal irregularity is due to weather, as in the building trade, clearly nothing can be done directly: frost must numb the city engineer and the speculative builder alike. The only possibility is that other forms of public work which are not affected by the weather, and which are suitable for unemployed building operatives, might as a matter of general policy be concentrated in the winter. In other cases, where the seasonal irregularity is mainly due to fashion or habit, as for instance in painting and house decorating, where private demand tends to concentrate itself in the spring, there should be no general difficulty in fitting the public demand into other seasons of the year. But there is little information available about the size of such seasonally 'movable' public demand, or about the administrative difficulties which might be involved.

The use of public works as a means of dealing with 'structural' unemployment in the Special Areas is on an entirely different footing. On the one side it might take the form of a considerable expansion above its present level of expenditure on roads, housing, and other conventional forms of local public works; on the other (as was begun before the outbreak of war) of the construction in the Special Areas rather than elsewhere of aircraft and munitions factories designed to supply a national demand. The desirability of the whole policy of attempting by artificial means to revivify the Special Areas raises wider issues than can be discussed here. But it is clear that any expansion of public works in them would be in principle independent of the trade cycle, and would not be suitable for short period variations of timing. If it is entered upon at all, it must be as a part of a long-range plan for the clearance and reconstruction of the areas and for a modernization and extension of their public capital equipment, designed to make good the deficiencies which poverty has imposed in the years since the last War.

If, on the other hand, an active general policy of reconstruction is not pursued, and a further decline or abandonment of an industrial area is envisaged, most forms of public works are valueless in themselves and may have the effect of checking the necessary movement of labour to other districts.

VI

Regulation of the amount and timing of public works is not the only possible means of influencing, even directly, the activity of constructional industry. It may be open to the State to stimulate—or possibly if necessary to restrict—the volume of investment by private industry; and there is indeed no single logical reason why this object should not also be pursued as part of a trade-cycle policy. The main instruments available would be subsidies in aid of capital works or of special repairs and maintenance, credit guarantees, and tariffs; and all of these are quite familiar in other uses. We shall, indeed, discuss in a later chapter the effect of such stimuli on some members of the group of 'semi-public' utility enterprises, including the railways; but the monopolistic position of these enterprises, their large size, and the considerable restrictions upon their economic freedom which already exist puts State assistance to them on a rather special footing, and justifies its discussion as part of a public works policy itself.

An attempt to control the level and timing of private investment is open to various objections, both of principle and in the details of execution, which apply not at all, or only in smaller degree, to public investment. Since it has no power of direct command over private investment, the State must proceed either by persuasion or by the offer of financial inducements sufficient to make any desired alteration in the timing of investment appear to be a good business proposition.

The way of persuasion may not seem to be very promising; and the required change in business psychology would certainly be a slow process. Anyone who has discussed these problems with persons responsible for the policy of private businesses must be impressed by the lack of realization of the effects of general movements of trade on any particular

business. In times of general depression—and even in retrospect—difficulties are almost always attributed to particular factors which affect the particular business or at best the particular industry, such as the activities of competitors at home and abroad, a shift in the direction of demand, and so on. Largely as a result of this, in depression there is little confidence in an automatic recovery of demand; and in boom there is usually excessive optimism. To carry out in depression works designed to prepare for recovery seems unwarrantably risky to an individual business. But it is none the less quite possible that in future a growth of trade-cycle consciousness may make industrialists more amenable to suggestions of deferring capital works in times of rising costs and of undertaking them in times of falling costs, as, apart from the risk factor, would often be to their direct financial interest. But uncertainties about the future will always cause any private business to embark only with great reluctance on any investment programme while unused capacity is increasing and prices and profits are falling; and, vice versa, higher costs must have little deterrent effect on extensions of equipment, if at the same time demand is brisk and plant is working at full capacity. Little reliance can therefore be placed on the method of persuasion as long as the risk of postponement of investment in good times and its anticipation in bad are in the general view of entrepreneurs greater than the opposite course. Economic policy must mainly try to reduce particular risks in bad times in relation to the prospective reward. It must depend on the merits of the particular case; whether State assistance should take the form of subsidies, tax exemptions or remissions, loan guarantees or special credit facilities, or special tariff protection. But it is essential that they should be given not as a steady permanent grant, but on a variable anti-cyclical basis.

Assistance to private investment clearly has certain advantages as compared with public works. It would widen the choice of capital works which could be used for trade-cycle regulation; and it would allow of a more equal distribution of 'stimulated' investment activity over the various branches of constructional industry. It would not be exposed to the traditional arguments of business men against what

they sometimes regard as 'unproductive' public works; for extensions of private investment would increase the 'productive power' of the community even in the narrowest sense. Finally, whereas additional public works are costly and fall heavily on the budget, some forms of stimuli to private investment—such as credit guarantees—may not involve any public expenditure at all, and others may produce an effect on investment much in excess of the public expenditure incurred.

But against these obvious advantages must be set a number of serious disadvantages. First, any form of State assistance to private industry may be regarded as an interference with a competitive situation which is likely to deflect resources from those channels where the most economic use would be made of them. This argument would not, perhaps, have very much weight if one could be sure that State assistance would, in fact, only be given in depression, because the main effect would be to bring into use resources which would have otherwise remained idle, rather than to deflect them from one use to another. But it need hardly be remarked that the political pressure of the interested parties would make it extremely difficult to retain this restriction, unless big steps were taken at the same time in the direction of a generally socialized economy.

Second, there is the practical difficulty of deciding fairly and wisely which industries, and individual enterprises, are to receive assistance. Flourishing and expanding concerns are not likely to demand, or even to accept, State assistance for investment; while for declining or stagnating industries which demand it, it may not be really in the public interest. And investment inducements given to particular industries may easily cause a reduction of demand or investment in other industries whose products are partly competitive with them.

Third, there is the extremely difficult administrative problem of securing that State assistance should be used only for additional investment; for it would serve no useful purpose to subsidize capital works which would have been carried out in depression in any case. The prospect of assistance may lead to the postponement of capital works,

in order that they may figure in an 'assisted' programme; or the execution of an assisted programme in one direction may be taken as an opportunity severely to cut down investment in other directions. In both cases the 'assisted' investment is not wholly a net gain. There can be no complete safeguard against this danger; for the firm or industry cannot enter into binding agreements about the future volume of its non-assisted investment, and without this any official judgement as to what investment is or is not 'additional' is of necessity largely guess-work.

Moreover, plans for assistance to private investment, if they are truly cyclical at all, are likely to be put forward in the later stages of a depression; for few private businesses will be able or willing to plan ahead additional capital works for a depression which may occur at some uncertain future date. For this reason State assistance to private investment cannot hope greatly to mitigate the cumulative downward movement in its earlier stages, when, according to some trade-cycle theorists, an antidote would be most effective. It will be shown in later chapters that ordinary public works have some natural tendency, which might be reinforced by control, to continue at a high level for a year or two after the downturn in private business, and are therefore a more appropriate instrument at this stage. State assistance to private investment must be regarded as a second line of defence, which may be used to antedate the recovery from the later stages of a prolonged recession. The few experiments which were made in this country during the last depression, such as the 'scrap and build' subsidy to shipping and the credit guarantees for the railways, did in fact become operative at this or even a later stage. In general, it seems that, though State assistance to private investment may have some part to play in trade-cycle control, it is, under the present economic and political conditions, a rather dangerous and not necessarily very effective weapon.

## II

## MEASUREMENT OF THE TRADE CYCLE, AND STANDARDS OF REFERENCE

PUBLIC works must be expanded and contracted inversely to the upward and downward movements of the trade cycle if they are to have stabilizing effects. It is therefore essential to determine the turning-points and to measure the amplitudes of 'the' trade cycle in order to see how far public works have actually had such effects, or to determine what amount of them would have been required to achieve steady development.

But what is meant by 'the' trade cycle? The various statistical series which can be used differ considerably in the timing and range of their fluctuations. Which of them can best serve as a standard of reference for a public works policy? The choice must largely depend upon what a public works policy is aiming at or could be expected to achieve. If the aim is to secure and to maintain full employment of the whole labour force of the country, a policy will be required different in quantity and quality, and related to other reference data, from that which would be appropriate to the more modest aims of stabilizing average employment over the cycle, or employment in the constructional trades only. Consideration must be given to differing causes of unemployment and of variations in output if the true significance and limitations of public works are to be understood.

First, public works may be regarded as an instrument of trade-cycle policy, and related to cyclical indices only: non-cyclical and structural changes which cause unemployment may be neglected. This, it is true, is difficult to do with complete consistency; for most forms of structural unemployment are increased in severity and made more difficult of cure by the existence of a general trade depression. But the very different character which must be given to a public works policy if it is to contribute much to the reduction of structural unemployment makes it desirable to separate the two cases as much as possible.

Second, we are usually concerned only with public works policy in a single country. But where, as in Great Britain, a considerable part of the national output is exported, general business activity is strongly influenced by the course of foreign trade. It is notorious that changes in foreign demand have been responsible for much structural unemployment; but it is also true that cyclical variations in the volume and value of exports have been at least as great as those in the demand for products destined for the home market. The question then arises whether public works are to be designed to counteract the impact on employment of fluctuations in exports, or rather be limited to the control of variations caused by internal forces. The point is particularly important because a decline of exports may take the form of a decline of the exports of consumption goods, or of capital goods, or of both. If public works are to offset the primary effects of a decline in the export of consumption goods, they must cause an actual transfer of workers from consumption trades to the constructional trades: that is, they must raise employment in the constructional trades actually above its 'normal' level. In the case of a decline of the exports of capital goods, this difficulty does not arise; for it may be possible to replace falling export orders for, let us say, ships, by an increase of public orders. Some transfer of labour would no doubt be necessary, but it would usually be much less. Thus even in a cyclical policy there are three possible aims of 'public works'—to offset the variations in private home demand for the products of the constructional trades; to offset also the variations in the export of capital goods; and, going farther still, to offset the variations in the export of consumption goods by an actual expansion of the constructional trades. It is, however, very doubtful whether it is even desirable to use public works for the last purpose.

Third, we must remember that it is not sufficient to consider merely the aggregate amount of public works in relation to the aggregate private demands on the constructional trades. Their detailed character becomes important the more the kinds of capital goods required by public bodies and by private enterprise differ, and the more a state of full employment is reached or maintained in particular branches

of the constructional trades. In particular, it appears that, apart from the exceptional rearmament demand, the proportion of building work has been much greater for public than for private investment, the metal and engineering trades being predominantly employed in meeting private orders. Since the exports of capital goods are also mainly composed of engineering products, the building and engineering sections of the constructional trades are likely to be affected in different degrees by public works. While one section may still have much unused capacity, the other may receive public orders far beyond its existing requirements. And this distinction may be emphasized by the greater degree of localization of the engineering trades. Uneven expansion after a depression is not, however, necessarily entirely undesirable; for it is more likely to give rise to 'tertiary' effects on investment as soon as full capacity is approached in certain branches of industry. In the short run this may be advantageous, even though it is likely to create difficulties later.

We thus have important distinctions between cyclical and structural and other unemployment; between variations of home demand and foreign demand and, in the latter case, between variations in foreign demand for capital goods and for consumption goods; and between variations in the public and private demand for different special branches of the constructional trades. Not all these distinctions are capable of satisfactory statistical measurement. This applies especially to the distinction between cyclical and structural factors, and between internal and external movements. Moreover, the investment data to be discussed later are not available for the whole of the reference period, and are deficient in other respects. As a first approach to measurement of the general course of the trade cycle we shall therefore examine the movements of output and employment as a whole.

## General Reference Cycles

There exist four general indices which can be taken to represent the movements of business activity in this country. Two of them, the Index of the Physical Volume of Production of the London and Cambridge Economic Service and

the *Economist*'s Index of Business Activity, are available for the period 1919 to 1939; two go back only to 1924 or 1923, namely, the Board of Trade's Index of Production and comparable employment data. All four series, re-calculated on the basis 1930 = 100, move fairly closely together. The employment figures fluctuate least, mainly because they make no allowance for the number of hours worked and do not reflect changes in productivity. The two output indices show the greatest variations, and the *Economist*'s Index of Business Activity, heavily weighted by employment data, moves between them. Between 1924 and 1931 the different series conform very well; but after that date, and particularly after 1935, they tend to diverge appreciably. This may be partly due to the revision of the three volume indices which took place about that year, and to our linking up of the revised and original series. The direction of the movement from year to year is the same for all four indices. There are only two exceptions. From 1923 to 1924 employment declines slightly while the two remaining indices rise moderately. That may be due to the deficiencies of our employment data. Second, for the year 1932 the Board of Trade's index and the revised index of the *Economist* are lower by a few points than the 1931 figure, while the original index of the *Economist* and the output index of the London and Cambridge service show a slight rise compared with 1931. We are inclined to side with the general opinion in this country that the year 1932 represented the bottom of the depression.

The main features of the movements are well known. The appearance of the curves suggests three depression periods with 1921, 1926, and 1932 as bottom years, and four upswing periods culminating in 1920, 1925, 1929, and 1937. But obviously the break in 1926 caused by the general strike cannot be regarded as a cyclical recession in the usual sense; nor was 1925 a typical boom year. The general strike was an exogenous factor which interfered with the normal mechanism of the cycle. But once one begins to distinguish between endogenous cyclical factors and exogenous factors, one is compelled to mention a number of similar events. In 1923 the occupation of the Ruhr district of Germany greatly stimulated the British coal industry, creating temporarily

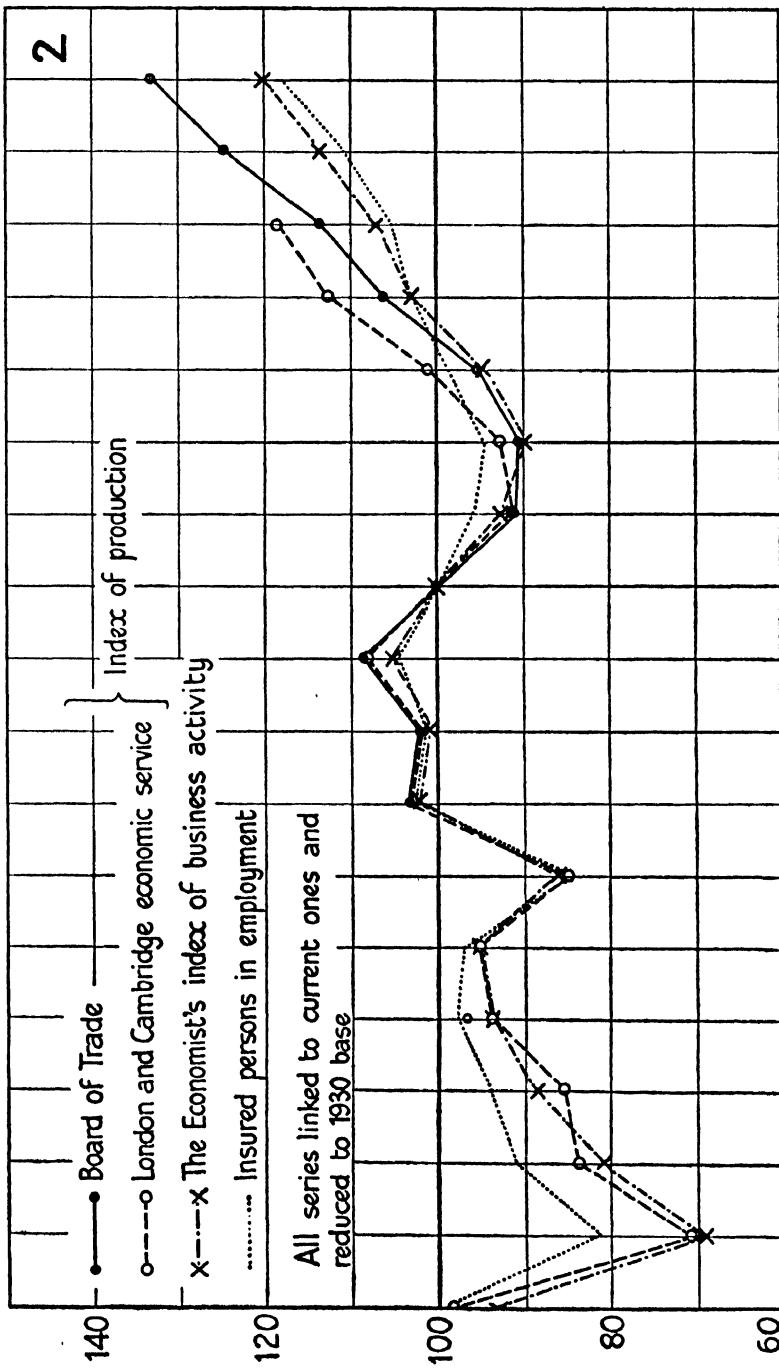

2
Board of Trade
London and Cambridge economic service
The Economist's index of business activity
Insured persons in employment
Index of production
All series linked to current ones and reduced to 1930 base
140
120
100
80
60
1920
1
2
3
4
5
6
7
8
9
1930
1
2
3
4
5
6
7
8

FIG. 2.

artificial conditions which were one of the causes of the coal strike in 1926. The position was reversed in 1924, and although the stabilization of the mark reduced Germany's export advantages in general, the British coal trade was hit severely by the recovery of the German coal industry. At the same time the gradual return of sterling to the old gold parity was in effect a deliberate policy of deflation which hampered home industries as well as export industries. Partly as a consequence of the general stoppage in 1926, business activity in 1927 was unusually high, making good arrears in replacement and new investment postponed in 1926. Exogenous factors were equally important during the next cycle from 1929 to 1937. The devaluation of the pound in 1931 assisted British exports and combined with the transition from free trade to protection to stimulate the expansion of the home industry. It is generally agreed that by securing at least temporary advantages this policy helped to shorten and mitigate the later stages of the depression and to set free forces making for an expansion. Finally, when the revival was well on the way the first impact of the rearmament programme was added to intensify the boom since 1935 and possibly to extend the life of the cycle.

Thus, during the whole reference period endogenous and exogenous factors are inextricably intermingled and it is impossible to say what the cycle would have been like without the interaction of these outside forces. We must, therefore, determine the amplitudes of the fluctuations from the data as they stand. The percentage variations between subsequent turning-points are given in the following table; the year 1926 has been treated alternatively as a non-cyclical break and as a depression year.

*Percentage Variations*

| | *Downswing* | | | *Upswing* | | | |
|---|---|---|---|---|---|---|---|
| | *1920 to 1921* | *1925 to 1926* | *1929 to 1932* | *1922 to 1925* | *1926 to 1929* | *1922 to 1929* | *1932 to 1937* |
| Economic service . | −28·2 | −10·7 | −15·4 | +34·4 | +27·7 | +54·0 | .. |
| Board of trade . | .. | .. | −16·5 | .. | .. | .. | +47·5 |
| *Economist* . . | −26·5 | −10·4 | −14·2 | +17·7 | +23·0 | +30·0 | +33·0 |

The table indicates that the crisis of 1921 was more pronounced, though much less lengthy, than the 1932 depression; but recovery was less complete and the subsequent rise to 1929 was accordingly less steep than the rise after 1932. As can be seen from Fig. 2, business activity exceeded the trend level in 1920 from 1923 to 1925, from 1927 to 1930, and from 1935 to 1937. Activity moved below the average for three years in the first half of the period and for four years during the second cycle. The fact that the number of years above the trend line exceeds the number of subnormal years seems to indicate that upswing periods were less pronounced than depression periods.[1]

The indices represent the volume of output, and should either be compared with series which are similarly corrected for price changes or be converted into money values. Most of our public works data are given in money values and we measure their effects primarily in terms of money income. The calculation of the real value of the resultant output requires rather complicated index numbers of prices: for investment and its primary effects the prices of capital goods are relevant, while for secondary effects mainly an index of consumer's goods prices is needed. On the other hand, it is hardly less difficult to obtain an appropriate index number for the gross value of output from a volume index of production. The price level of output as a whole is, however, bound to move between the index of wholesale prices as upper limit and the index of wage rate as lower limit; the former overstates considerably, the latter understates, its variations. The main result of converting the volume index to a value index would be to raise the level of the earlier years in the volume curve and to intensify the cyclical variations.

## Investment and the Output of Capital Goods

Output indices and employment figures can be used as reference data only after a common denominator has been determined by a precarious process of transformations. Most

[1] The use we can make of reference data for which the trend has been eliminated is rather restricted; for many of the public works and investment series are not available for the whole length of the period and a trend calculation can hardly be based upon a period of less than one and a half cycles.

of these difficulties can obviously be avoided by comparing public investment with other investment phenomena which have *eo ipso* the same dimension. We have already briefly indicated what kind of investment data should be used for our purposes, and we must now see how far they can be obtained.

Unfortunately size and direction of national investment have not been explored to the same extent statistically as movements of the national income and of total output. Only one serious attempt has been made to estimate comprehensively the amount and distribution of investment in this country that of Colin Clark.[1] A second estimate of a more limited nature by Marschak and Lederer[2] is largely based on Colin Clark's methods but leads to rather different results.

In spite of the divergence of the various estimates and the substantial revisions which Colin Clark has made from time to time, they will be regarded as sound approximations if they do not disagree with the magnitude and movements of other better known data. No attempt will be made to check the whole process of evaluation or to replace the existing estimates by an independent calculation. But estimates relating to various sub-periods will be linked up in order to get a continuous series covering the whole period from 1924 to 1938. That seems particularly desirable for the estimates of *Fixed Investment*[3] to which public works must be related above all.

[1] We shall refer mainly to: 'The National Income 1924–1931, National Income and Outlay, and National Income at its Climax,' *Economic Journal*, June 1937, and 'Determination of the Multiplier from National Income Statistics,' Sept. 1938.

[2] Marschak and Lederer, *Kapitalbildung*.

[3] Colin Clark's estimates of Gross Fixed Investment are based on Census of Production figures, corrected for imports and exports and interpolated by various indices of production, sales, and employment. This interpolation implies a considerable margin of error, as was shown by the upward revision of former estimates in the article of the *Economic Journal* (Sept. 1938). It seems that the corrected figures for shipbuilding and engineering exceed the former estimate based on employment data by 15 per cent. in 1935 and by 25 per cent. in the first half of 1936. The main reason for this big upward revision was the rise of output per head revealed by the 1935 Census but not foreseeable when the original estimates were made. As the distance from the Census years grows we must, therefore, make allowance for a wider margin of error. The construction of warships, aeroplanes, and similar equipment is not regarded as investment by Colin Clark.

The proportion of maintenance and repair work in the total is estimated by combining Inland Revenue Statistics, Returns of Railway Companies, the Road Fund Reports, and similar data.

At first sight the divergencies between various estimates[1] seem to make such a procedure impossible. But if allowances are made for the fact that certain estimates have been partly superseded by later revisions and that, for various reasons, Marschak-Lederer's estimates are, in general, 3 to 4 per cent. (i.e. 20 to 27 million pounds) higher than Colin Clark's figures, a comparison of the absolute figures and of the relative movements show sufficient agreement for the various series to be combined. This was done by taking Colin Clark's estimate for 1930 as a base and by multiplying this base by the respective indices of the other series, based on the same year.[1] Full allowances were made for the varying range of the indices, except for 1928, where Marschak-Lederer's estimate seemed to be unduly low. The result of the calculation is given in Table 4.

Compared with other trade-cycle data, the variations in fixed investment appear to be surprisingly small. Our general indices of production and of business activity which are corrected for price changes, or our index of employment in the capital goods industries show, in fact, the same or even a greater range of cyclical fluctuations, while one might expect fixed investment to vary more than total business activity, and certainly the value of investment to fluctuate more than the volume of employment or of output. Does not the similarity in the variation of output and investment indicate that the investment estimates are understating the actual degree of the fluctuations?

Now, it is evident that Colin Clark's figures cannot be confronted directly with general indices of business activity. For the latter include *exports* while the former by definition do not. Exports fluctuated violently during the period 1924 to 1936 and presumably influenced the general indices to a considerable extent. The fall in total exports between 1929 and 1932 amounted to 50 per cent. in value and 37 per cent. in volume, and the subsequent rise up to 1936 to 22 per cent. in value and about 20 per cent. in volume. If these severe ups and downs were eliminated from the general series, these would probably show a smaller variation than home investment.

[1] See Table 1 on p. 399. (Appendix.)

The question of exports has rightly no place in the definition and evaluation of fixed investment. But exports are undeniably a major factor in the trade cycle of this country, and it would seem desirable to take account of this fact in the choice of our reference data. If public works are regarded primarily as a means to mitigate fluctuations in the capital goods industries it would be appropriate to relate them to the output of capital goods. The greater part of this output goes, of course, into fixed investment at home and is identical with Colin Clark's gross fixed investment. A smaller but highly fluctuating part is exported in the form of finished and unfinished goods and materials. This export of capital goods—or more precisely, of products of the capital goods industries—is not directly connected with the amount of overseas investment as defined below. As a third element must be added changes in stocks in home-produced capital goods. Thus defined the total output of the capital goods industries measures the activity of the investment goods industries but in no sense any form of 'investment'.

As a statistical approach[1] to this output figure we can take Colin Clark's estimates of fixed investment and add on the value of products exported by the capital goods industries. Colin Clark's investment figures are estimated by deducting exports of *finished* capital goods (i.e. machinery and ships) from the estimated output, and by adding imports of finished capital goods. In order to avoid duplication, imports of raw material and semi-finished articles are rightly disregarded. For our purpose we must add back not only exports of finished capital goods but also exported unfinished goods of the capital goods industries, for both affect production and employment in these industries. No duplication is implied in this case.

The main result of this calculation[2] is that the output of capital goods declines far more than fixed investment between 1929 and 1932, while the rise from 1932 to 1936 is slightly damped down, because exports did not regain their pre-depression level. A 25 per cent. decline of investment activity—home investment and exports taken together—

[1] There is no reliable information about the changes in stocks of goods held by the capital goods industries.

[2] See Table 4 on p. 402. (Appendix.)

now compares with a decline of 16 per cent. for home investment alone, of 16·5 per cent. for the Board of Trade Index of Production, and of 15 per cent. for the *Economist* Index of Business Activity. The percentage increase up to 1936 amounted to 34, 38, and 27 per cent. respectively. If we make further allowances for (*a*) retained imports of finished capital goods, the calculation of which Colin Clark does not give in his *National Income and Outlay*, and (*b*) for investments in warships, military aeroplanes, and so forth, which are not taken into account in computing fixed investment, but which affected business activity considerably after 1935, the relatively small fluctuations of fixed investment are less improbable than they appeared at first.

This conclusion is also confirmed when we find in comparing fixed investment with consumption rather than with total production that the amplitude of investment fluctuations is considerably greater than that of consumption. Percentage variations of fixed investment were twice or three times those of consumption and nearly 50 per cent. greater than those of home-produced income.[1] The same does not apply, however, to the period 1924–9, where investment rose by about 8 per cent. according to *National Income and Outlay* and remained almost stationary according to the earlier book, whereas consumption was 12 per cent. and home-produced income 8·5 per cent. higher than in 1924.

These considerations about the amplitude of the cyclical variations of fixed investment and other general and related data cannot do more than remove some general objections which might be raised against Colin Clark's estimates, but they cannot positively confirm or disapprove them.

Public investment is mainly investment in fixed capital and must, therefore, be related first to this form of investment. Moreover, it is evident that variations in fixed investment exercise some indirect influence on the two other forms of investment: stocks in trade and overseas investment. But even perfect stabilization of fixed investment will not prevent fluctuations in working capital and foreign balances. If stocks always varied proportionately to output, these fluctuations would not present a separate problem. Primary,

[1] See Table 3 on p. 401. (Appendix.)

secondary, and further effects of public works would *eo ipso* tend to stabilize stocks to the same extent as they stabilize output. Stocks in the capital goods industries would be affected immediately, stocks in the consumer's goods industries and distributive trades according to the multiplier effects. But although the size of output is an important cause for fluctuation in stocks, it is not the sole cause. Other factors which are not directly controlled by a public works policy, such as expected changes of prices, economies in stockholding, and so on, affect entrepreneurial decisions about stockholding and make stocks fluctuate more than proportionately to variations of output. The relative importance of these excess fluctuations varies considerably from one period to another and is difficult to determine statistically.

Colin Clark defines *Investment in Working Capital* as net additions to or net deductions from the quantity of stocks in trade and work in progress[1] during any period measured not by the change in values of the quantity of stocks but by the current value of the change in quantities which has taken place during the year. Estimates of changes in working capital were originally derived from balance sheet data,[2] but later based on a comparison of the relative activities of the basic and finishing industries.[3] This change in method did not alter the general cyclical pattern but involved some drastic revisions of former estimates.[4]

Whether the revised figures represent an improvement over the previous estimates is difficult to say, since the data and methods are not known. Since the final estimate is the result of a succession of estimates and transformations, the margin of error is therefore likely to be greater in this case than in estimating gross investment in fixed capital, and the calculation seems to be a safer guide to the direction and

[1] According to Colin Clark's general definition net additions to the quantity of works in progress are included under working capital (*National Income and Outlay*, p. 167). On the other hand, it seems that they have been reckoned—at least partly—as investment in fixed capital goods (ibid., p. 177 f.). When the movements of fixed capital and working capital are considered separately, it does not matter whether the former or latter or both include variations in 'work in progress'. But if we proceed to add the two parts of investment in order to get total home investment double counting must be avoided.

[2] *National Income and Outlay*, Appendix III.

[3] *Economic Journal*, Sept. 1938. [4] See Table 2 on p. 400. (Appendix.)

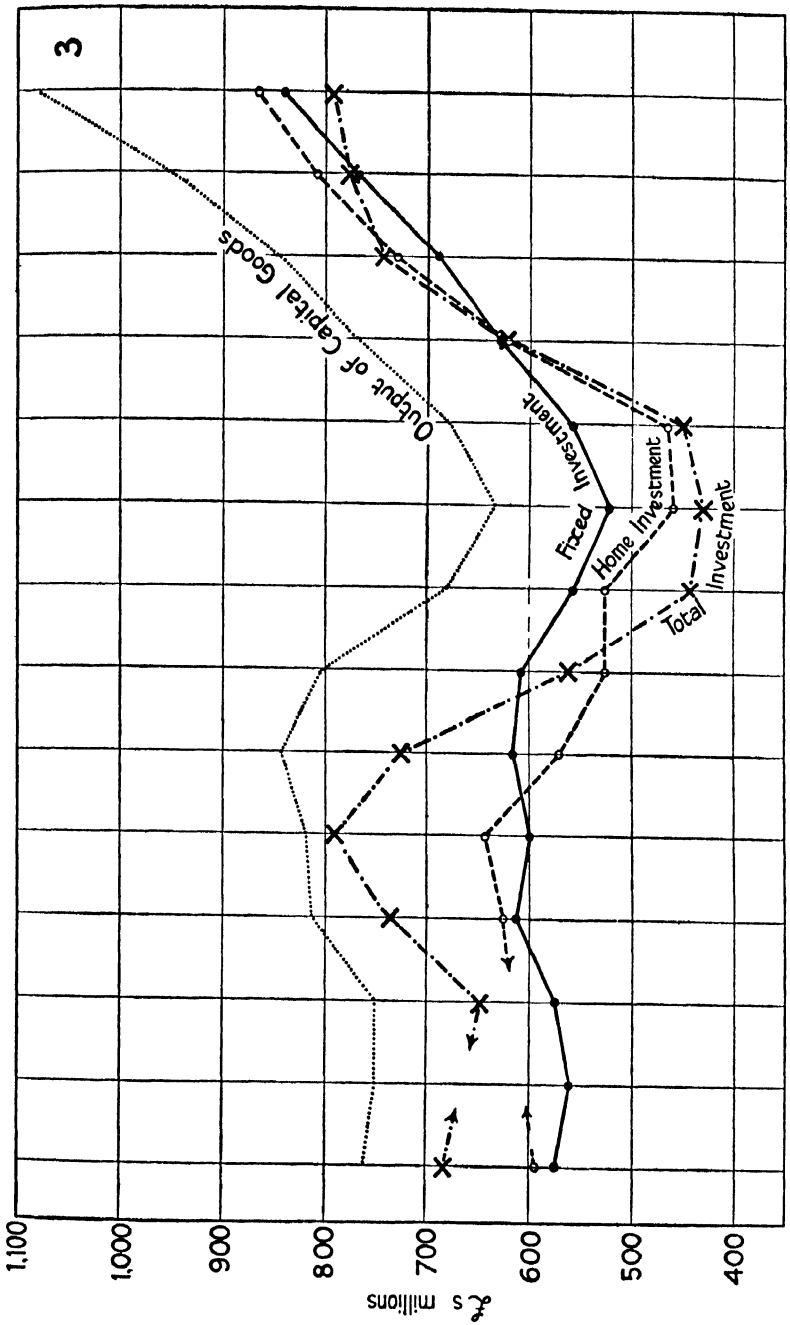

3
£'s millions
1,100
1,000
900
800
700
600
500
400
1924
5
6
7
8
9
1930
1
2
3
4
5
6
7
8
Output of Capital Goods
Investment
Fixed
Home Investment
Total
Investment

FIG. 3.

tendencies of variations in stocks than to their absolute amounts.

The cyclical pattern of the fixed investment curve shows the same turning-points as output and employment as a whole, and as consumption and production of capital goods. But if we consider home investment[1] we see that its fluctuations were more extreme and that the relative movements deviated from the usual cyclical pattern. The investment peak is shifted backwards from 1929 to 1928 and the bottom of the depression forwards from 1932 to 1933, thus extending the depression to five years. Further, home investment in the boom year 1929 was appreciably lower than it was in 1924 and 1927, and in 1934 and 1935.

This distortion of the usual cyclical pattern is brought about by the irregular movements of investment in working capital.[2] The decline in estimated stocks had already begun in 1929 and was just halted but not reversed in 1934. This rather delayed reaction of stock movements in the industrial revival is somewhat surprising. Even if allowance is made for economies in stockholding and for tendencies to shift the burden of stockholding from the manufacturer to the raw material producer abroad, one might expect that goods in process and stocks would increase more or less in proportion to national income and output, though perhaps with a few months' lag. It is quite possible that business men could not dispose of surplus stocks during the depression and tried successfully to reduce stocks farther when the turnover began to rise. They may also not have been certain that the recovery of demand and prices would continue, and may thus have carried on with the minimum of stocks consistent with their increasing sales. Surplus stocks and doubts of the lasting nature of the revival might, therefore, have been an important factor in 1933; but they could hardly have played a part in 1934 when prices were rising and national output had regained the 1928 level. Why stocks should not have expanded under these circumstances is difficult to see. An explanation must wait for more detailed information about the movements of stocks in various industries and trades.

[1] See Table 4 on p. 402. (Appendix.)
[2] See Table 2 on p. 400. (Appendix.)

From the point of view of public works policy these changes in stocks present a difficult problem. The decline in stocks is certainly not confined to the capital goods industries and applies as much or perhaps even more to the consumers' goods industries and distributive trades. Thus, in order to maintain the amount of employment which is due to home investment it might be necessary to increase fixed investment above the boom level and to transfer capital and labour set free by reduced stockholding in, say, the consumer's goods industries, to industries producing investment goods. Further, assuming that Colin Clark's estimates reflect the real movements of stocks, if public works had been aimed at stabilizing total home investment, it would not have been wrong to start additional public works even in 1929, at the height of the boom, and to increase them up to 1933 according to the fall of home investment.[1]

Such a course would have been theoretically legitimate and total home investment cannot, therefore, be entirely dismissed as a reference cycle pattern. Nevertheless, we shall not use it for our analysis. Apart from the fact that the data and methods on which the estimates of changes in working capital are based are apparently less reliable than those of fixed investment, changes in stocks are, obviously, not an entirely independent variable. For to stabilize fixed investment will automatically tend to reduce variations in stocks not only in the capital goods industries but also in the consumers' goods trades. In so far as stocks are a function of national output they do not represent a separate problem for public works policy, and it would therefore be misleading to relate public works to the total of home investment. Any excess variations of stocks due, say, to lack of confidence or to an anticipated fall in demand or prices which may occur in spite of—or perhaps because of—a stabilized fixed investment seems to call for other measures. Monetary measures and price policy, or public purchases and sales of commodity stocks, which have been advocated in recent years for various reasons, would perhaps be more suitable and less costly an instrument. It is doubtful, at least, whether public works can be regarded as a proper cure for this particular form of

[1] Until the autumn of 1931 this is pretty much what happened.

disinvestment. Moreover, attempts to stabilize home investment might imply an expansion of the capital goods industry beyond its actual capacity and its long-term equilibrium point.

What has been said about home investment applies *a fortiori* to total investment. Overseas investment, which must be added to home investment to get total investment, is defined rather from the money side than from the goods side of investment. It is the balance of exports of goods and services over imports of goods and services which might be negative or positive.[1] Interest on overseas investment is reckoned as service export and net imports of gold are considered as a form of foreign investment, gold being not treated as a commodity.

Whether public works should be related to this excess of outgoing over incoming payments which has been 'invested' abroad in some form or another is doubtful. Several of the balance of payment items depend on exogenous factors. For example, the inflow or outflow of gold is greatly affected by the erratic movements of the international short term funds. They are by their very nature largely outside the control of a national policy. Moreover, public works undertaken by one country, say, during a depression in the rest of the world must affect the net balance of commodity, service, and gold exports and imports adversely: that is, must reduce overseas investment in favour of home investment in a depression and vice versa during a boom. Thus, other things being equal, they accentuate fluctuations in overseas investment. If they coincide with a general upswing abroad or are accompanied by an international policy of public works, home investment need not expand at the expense of overseas investment, as the latter could grow as well. A reduction of total investment due to a shrinkage of overseas investment may or may not affect home investment and home employment. When total investment is used as a

[1] It should be noted that the estimates were originally (in *The National Income 1924 to 1931*) based on the balance of commodity and gold exports and imports; later (in *National Income and Outlay*) the net balance of services was included. Whether the revised figures given in the *Economic Journal* (Sept. 1938) are again partly due to the redefinition of the Balance of Payments items or whether the actual estimates have been modified is not quite clear. For the various estimates see Table 2 on p. 400. (Appendix.)

reference datum it requires, therefore, careful interpretation. Since national public works are neither designed nor able to damp down or eliminate fluctuations in overseas investment they should, as a rule, not be set against total investment as a reference datum.

## The Movement of the Investment Cycle

We can now proceed to present the reference data which we found suitable for the purposes of our public works analysis in the various forms we need. For the period 1920 to 1923 we possess no investment data and must therefore substitute general output and employment indices. From 1924 onwards data referring to investment and output of capital goods are available, and have been compiled in Table 4. They are given in the form of absolute and relative figures; as value and volume figures for calendar years and fiscal years; and annual and cyclical variations are computed. The year 1930, which has been found to form a good base year for our general series, is also made the base year for our investment data. It is a Census of Production year and therefore free from possible extrapolation errors; it is not a year of extremely high or low investment and may be regarded as being near the trend point; it has the merit of standing half-way between two very different periods, 1924 to 1929 and 1931 to 1936; and it is also a year of transition between free trade and protection.

It will be remembered that the figures for fixed investment given by Colin Clark exclude investment in warships and military aeroplanes and, apparently, on guns, tanks, and similar equipment. Investment in other defence works and military building seems—according to Table 37 of *National Income and Outlay*—to be included under fixed investment or at any rate not explicitly excluded. There may be reasons to neglect one part of the military works and to take into account another part; and it must be admitted that some arbitrary decisions are involved in drawing a line between expenditure on capital works and working expenses. For our purposes—and particularly since armament is partly financed out of borrowings—it is clearly desirable to regard warships and aeroplanes as a kind of investment in fixed capital.

Expenditure on construction, maintenance, and repairs of warships and on aeroplanes (including engines and spare parts of aeroplanes) is taken from the Appropriation Accounts of the two services. No correction is made for that part of work which is done by stations abroad. On the other hand, expenditure on naval armaments (guns) and aeroplane accessories is not taken into account. On the whole, the figures given are rather on the low side. It may be, however, that Colin Clark's extrapolation of the engineering output by employment figures partly reflects work done for the defence services and thus leads to some duplication.

Defence investment amounted to £20 millions to £25 millions (or roughly 4 per cent. of fixed investment) during the period 1924 to 1934, but rose to nearly £50 millions in 1936 and about £80 millions in 1938, which was certainly more than 10 per cent. of total investment in fixed capital. Up to 1934 its absolute variations were small and on the whole in accordance with the general cycle. The cyclical pattern of the investment curve is therefore little affected, except for the last years of rearmament, by the addition of warships and aeroplanes to fixed investment.

Far more important for the state of activity in the capital goods industries are the fluctuations of exports of capital goods (Table 4). The amount of these was nearly one-third that of fixed investment in 1929 and about one-fifth in 1932. Their movements followed very closely the general cycle but show a far greater sensitivity. From 1929 to 1932 exports of capital goods fell by £112 millions from £204 millions to £92 millions, while fixed investment declined by about £100 millions and defence investment by about £5 millions. More than half of the fall of capital goods production is thus accounted for by loss of exports.

Exports contributed comparatively little to the subsequent revival, which was mainly due to the expansion of fixed investment. They rose by £42 millions from 1932 to 1936. That represents an increase of nearly 50 per cent. over the depression level but leaves them still more than 30 per cent. below the average of the period 1927 to 1929. It is noticeable, however, that the absolute increase of exports of capital goods exceeded the increase of expenditure

on warships and aeroplanes, which amounted to about £30 millions for the same period.

The sum of the three items represents the total output of capital goods, with the proviso that allowance should be made for variations in stocks held by the capital goods industries and for imports of finished capital goods which are contained in the figures for fixed investment.

The total output of capital goods, as given in Table 4, amounted to £600 millions to £1,000 millions a year, and showed a clear cyclical pattern. It rose from a high level of slightly over £800 millions in 1927 to about £850 millions in 1929, mainly owing to a growth of exports, and fell to a minimum of somewhat over £600 millions in 1932. This fall is accounted for half by the decline in exports, half by the contraction of fixed investment. In 1935 output of capital goods again reached the 1928 level, but its composition was changed. The level of fixed investment was then considerably in advance of what it was in 1928, but exports lagged far behind. The same is true for the later years. The 1936 output figure already exceeded that of 1929, and that of 1937 was still higher.

The investment and output data are given for calendar years and fiscal years[1] because the accounting years of our public works data differ. The turning-points of the two series coincide; but the year-by-year variations differ.[2] The fiscal year curves fell less and rose more than those for calendar years.

When prices between two dates have undergone large changes, a given amount of investment in money terms commands various amounts of investment in real terms. The measurement of the 'price of investment' or the 'price of output' involves, however, far greater difficulties than the construction of a commodity price index. This is chiefly because a substantial proportion of investment consists of 'net output' which must be measured by 'service prices'—say wage rates—and weighted according to the ratio in which services and commodities enter investment. To

[1] Fixed investment has been calculated from quarterly figures; defence expenditure and exports have been adjusted by proportionate allocations.

[2] See Table 5 on p. 403. (Appendix.)

determine appropriate weights—taking into account also the weights to be applied to import prices—is a rather intricate process on the basis of the available statistical information. Moreover, the ratio of services to commodities as well as the composition of investment as a whole, changes considerably between good and bad times and from one cycle to another, thus making it necessary to apply changing weights, which are still more difficult to determine. We do not intend to construct an index of our own and are using tentatively Colin Clark's index number of prices, for capital goods and exports.[1] The latter refers to total exports; but the error involved in applying it to capital goods exports is presumably small. As an alternative we use Bowley's index of wage rates,[2] which perhaps understates somewhat the fluctuations in output prices but seems to be a better approximation than any commodity price index.

Output prices fell by $8\frac{1}{2}$ per cent. from 1929 to 1932, wage rates by about 6 per cent., and export prices by about 18 per cent., and were still somewhat lower in 1933. During the revival prices did not recover appreciably and were not more than 1 to 2 per cent. higher in 1935–6 than in 1932. Wage rates rose by about $3\frac{1}{2}$ per cent., but some allowance should be made for changes in productivity. The revaluation of investment and exports at 1930 prices for calendar years and fiscal years is given in Table 3. It will be seen that the 1932 depression becomes less accentuated. The subsequent revival remains, however, nearly as steep in real terms as it is in money terms. Real investment in fixed capital hardly declined from 1929 to 1930 and fell only moderately from 1930 to 1932. In fact it was only £50 millions to £55 millions (or 9 per cent.) lower in 1932 than in 1929, while total output of capital goods declined by about £140 millions (or 16 per cent.). The difference between the two figures is accounted for by export losses, which are thus responsible for about three-fifths of the decline in capital goods production. It is also interesting that investment and output of capital goods measured at 1930 prices had already exceeded the 1929 level in 1934, and were 16–20 per cent. above it in 1936.

[1] See Table 7 on p. 404. (Appendix.)

[2] Table 6 on p. 403. (Appendix.)

The relative movements of the series are given independently of a fixed base year in the form of annual percentage changes, in order to show the acceleration and deceleration of the movement (Table 4).

In Table 8 an attempt has been made to calculate the percentage variations between subsequent turning-points which may be taken to indicate the amplitude of the cyclical fluctuations. Unfortunately the investment series do not extend over two full cycles. Investment estimates for the 1922 depression are not available. Variations have been calculated instead for the periods stated in the table. From the point of view of investment the year 1926 can hardly be described as a depression year. Although the general stoppage undoubtedly affected industrial investment, building activity was higher than either in 1925 or in 1927. Since a substantial part of fixed investment consists of building work, investment activity was well maintained in spite of the general break. This explains why the increase of fixed investment from 1926 to 1929 amounts only to 3–6 per cent. As an alternative 1929 is compared with 1924 which, again, was not a depression year but stands half-way between the 1921 crisis and the 1929 boom. The results of the table have been implicitly discussed in the preceding paragraphs.

Finally, these output and investment series are supplemented by appropriate employment data in Table 9 in order to compare the movements of employment with those of home consumption and output of capital goods.

The numbers of persons employed in certain capital goods industries at the end of June of each year are taken from the *Ministry of Labour Gazette*. The following industrial groups are regarded as producing investment goods: Brick and Tile, Building, Public Works Contracting, Engineering, Shipbuilding, Iron and Steel Manufacture, other Metal Industries, and Motor Vehicles, Cycles, &c. It will be noticed that the capital goods industries incorporated in our employment series are not identical with those incorporated in the investment and export series. The former include, for instance, the whole motor vehicle and cycle trade (the investment estimates include only commercial vehicles), and some

engineering products which are destined for consumption. On the other hand, they do not comprise the production of certain goods and services which enter investment, such as ore mining, manufacture of paint, certain wood manufacture, a proportionate share of transport services, or the industrial staff of government departments. The two series are therefore not strictly comparable. Moreover, the employment figures refer to a mid-year date, not to a twelve months' average. They also make no allowance for short time and overtime. In spite of these limitations their relative movements should represent a fairly good measure of the activity of the capital goods industries.

We can go one step farther and try to estimate the number of workers employed to produce those capital goods which are exported. The value of exported capital goods has been estimated from the Annual Trade Returns[1] and its employment effect is computed by applying a method which we developed for estimating the primary employment caused by public works. The method and its limitations will be described in detail later.[2] By deducting the resulting figure from the total number employed in the capital goods industries we obtain an estimate of the number of persons employed for the production of home fixed investment. These employment data can then be related to the movements of 'real' investment and output given above. Finally, we can estimate, in the same way as for exports, the employment value of 'real' investment, thus making the investment estimates directly comparable with the estimates obtained from the official employment data.

The various series move broadly together, but are not in close enough agreement for us to treat the one set of figures as a reasonable substitute for the other. The main deviations are these. First, estimates based on employment data vary less over the period as a whole than the investment data and the employment data derived from them. This tendency of the employment data to underestimate fluctuations in investment could be partly remedied by using the number of hours worked instead of the number of persons employed, which would cause the employment index to fall more in the down-

[1] For details see Chapter VI. [2] See Table 4.

swing and to rise more in the upswing, and by a more detailed selection of the trades contributing towards investment. The large sub-groups of the Ministry of Labour are only a rough guide. Second, primary employment estimated from investment data falls less in the downswing and rises more in the upswing than employment directly estimated from official employment figures. The percentage variations of the employment series $E$ and the investment series $I$ between the cyclical turning-points are as follows:

| | *1929–32* | *1932–6* |
|---|---|---|
| Output of capital goods, $I$, at 1930 prices | −17 | +48 |
| Number employed in certain capital goods industries, $E$ | −17·3 | +38·5 |
| Estimated primary employment caused by fixed investment plus capital goods exports, $I$ | −10·6 | +47·4 |
| Estimated number employed in producing fixed investment, $E$ | −11 | +37 |
| Estimated primary employment, $I$ created by fixed investment | −1·5 | +47 |

The smaller rise of the $E$ series might readily be accounted for by increased hours worked by the staff already employed. But their far greater fall, which would obviously have been still more accentuated by allowances for reduction of working hours, might suggest that the $I$ estimates understate the decline. Even this conclusion would be rather hazardous in view of the fact, already mentioned, that the employment and investment data do not cover exactly the same ground. Moreover, the different behaviour of the various series in good and bad times may be explained by changes in output per head which presumably show a secular rise as well as cyclical movements; by variations in the amount of employment generated by a given amount of 'real' investment, for instance, through changes in stocks; by the correction we made for price changes which may exaggerate the fall or understate the rise in the costs of fixed investment or of the unit of exports; and by the choice of our import ratios for the export of capital goods, the composition of which differs essentially from the composition of home fixed investment.

At any rate, the unrefined employment estimates as they stand cannot be regarded as a handy and safe substitute for estimating by an independent process the movements of fixed investment.

## Public Investment and Total Demand for Capital Goods

At the risk of anticipating some of the material which is to be discussed in later chapters, we may conveniently bring together here a summary of the course of public and semi-public investment, including expenditure on maintenance and repair work. This has been done in Table 10. This sector of fixed investment is made up of expenditure on construction by the central government, the local authorities, and the 'semi-public' group including the railway companies, the Central Electricity Board, and the private companies engaged in the generation and distribution of electricity. Until the development of the rearmament programme, expenditure by the local authorities was more important than that of the other two groups combined.

With certain minor qualifications,[1] we can regard these figures for public and semi-public fixed investment as a rough measure of the demand which this sector of investment has made for the output of the industries engaged in making capital goods. The other sources of demand are private fixed investment at home and the export of finished and unfinished capital goods. The values of exports of capital goods are known,[2] and can be deducted from the total output of capital goods in order to arrive at a measure of total home demand for them. No direct method of estimating the amount of private home demand for capital goods is available; but in default of one we may arrive at a rough idea of its magnitude and movements by deducting the amount of public and semi-public investment from the total home demand for capital goods.[3] It is then possible to compare the size and movements of the public and private home demands for

[1] Our figures for public investment include the costs of a (certainly small) amount of finished capital goods imported, which, of course, do not enter into the final output of home industries. They also still include some expenditure on purchase of land and existing capital assets, though for the most part such items have been eliminated.

[2] See Table 4.

[3] These figures for private home demand (private gross investment less imported capital goods) being arrived at only by a process of subtraction, are liable to a much larger error than the figures for public investment: they must therefore be used with caution.

capital goods, and their relation to the output of capital goods as a whole.

In this analysis the great relative and absolute magnitude of the 'public' sector stands out clearly. Even if we omit the years 1936 and 1937, which were affected by the rearmament programme, public gross investment varied from a maximum of £372 millions in 1927 to a minimum of £290 millions in 1933; if we include them, the figure for 1937 exceeded £500 millions. In only one year, 1934, did the public demand account for less than 40 per cent. of the total output of capital goods; and in 1931 it was over half. If exports of capital goods are excluded, the proportionate importance of the public demand was, of course, greater still: it was, in fact, more than half of the home demand for capital goods in every year except 1933 to 1935, and in 1931 it was over 60 per cent.

If we compare the movements of public and private home demand, considerable differences appear. The magnitude of the variations in public demand, though very considerable, was somewhat less than of those in private demand. Public demand remained, apart from a fall between 1927 and 1928, pretty stable around £350 millions a year until 1931; it reached its lowest point at £290 millions (a fall of only 17 per cent.) in 1933, whence it recovered with increasing rapidity to £420 millions in 1936 and to over £500 millions in 1937—a rise of 75 per cent. in four years. Private demand increased by 18 per cent. from about £250 millions to £300 millions between 1926 and 1929; fell by 26 per cent. to £220 millions in 1931; and had recovered by 90 per cent. to £410 millions in 1936.[1] But the main difference between the two curves, at least until rearmament was well started, lay rather in the timing than in the magnitude of fluctuations. Public demand remained practically stable for two years of general business depression, and only reached its lowest point in 1933, after recovery in private investment had already begun, though in 1935 and 1936 public and private investment were expanding rapidly together. It therefore appears that, to some extent at least, public and semi-public investment did exercise a stabilizing influence, both by the

[1] Private demand may have been rather less in 1937 than in 1936.

rather smaller magnitude of its fluctuations and by its different timing.

It is interesting as a speculation—it can hardly be more—to consider what changes in the distribution of the public demand for capital goods would have been required to stabilize total home demand altogether. It is apparent that over the eleven years 1926 to 1936 total home demand for capital goods shows a considerable upward trend. If we treat this trend as linear, it appears that the 'desirable' distribution of total home demand should have shown a steady rise from about £580 millions in 1926 to about £710 millions in 1936. If we assume for the moment the amount of private investment to be an independent variable, we may subtract the actual amount of private demand from the trend line in order to obtain an indication of what public demand should have been. On this basis, public demand should have been kept £20 millions to £40 millions below its actual level until 1929, but should have been expanded by something over £100 millions—£70 millions above its actual level—in 1931; after 1932 it should have declined rapidly, to fall considerably below its actual level in 1935 and 1936. Such a movement of public investment, had it been achieved, would probably have rather overdone the 'stabilization' of total home demand for capital goods; for it would have had beneficial tertiary effects on private investment also, and so would have produced an actual rise above the trend line. On the other hand, this would have offset in part the decline of the demand for exported capital goods, of which no account has otherwise been taken. Such *ex-post* reconstructions are no doubt very hazardous; but they may serve to indicate the order of magnitude of the changes in public investment which an enlightened trade-cycle policy would have required. On the whole, it may be noticed, they are surprisingly small.

## III

## EXPENDITURE ON CONSTRUCTION BY THE CENTRAL GOVERNMENT

THE main function of the central government in public works policy has been that of co-ordination and control and of assistance to other public and private investment. But the Government's own constructional activity, which is the subject of this chapter, has not been unimportant.

Public works carried out by and for the central State fall clearly into two parts—civil works and defence works. It is well known that most of the services which involve permanent works for civil purposes are in this country the care of local authorities. The central government's activities in this field have been restricted mainly to work done on 'Public Buildings' under the auspices of the Office of Works, and by or for the Post Office, which is a centrally administered public utility rather than an ordinary government department. To these have been added, since 1937, the care of 4,000 miles of trunk roads taken over from the local authorities; but it is for the moment most convenient to ignore this transfer. Together with permanent works carried out by two 'central agencies', the Forestry Commission and the Special Areas Commission, these cover almost the whole central expenditure on civil works. The small remainder consists of a great variety of works undertaken for many departments and spread over numerous accounting headings: for the Metropolitan Police Force,[1] for the mercantile marine, for exhibitions and fairs, for agricultural drainage, Crown lands, and so forth. The total annual expenditure on this remainder has been small in the past, and is for the most part clearly not cyclically plannable: it has, therefore, been neglected in our historical investigation. The central government need not, of course, be so restricted in future. It might extend its activities by undertaking works now not provided for at all, such as land reclamation; or by expanding at the expense of semi-public authorities like the Central

[1] Dealt with in the chapter on Local Authorities.

Electricity Board, or of the local authorities, or of private enterprise. But short of an administrative revolution, the civil works of the central government would still probably be less important than those of local authorities and than those of the central government on defence.

It is the work done for the three defence services which traditionally takes first place. We shall therefore begin by investigating the variations in expenditure on defence, and by discussing their trade-cycle significance both during the 'armament standstill' and in the phase of rapid rearmament which preceded the outbreak of war.

## I. Defence Works

Three stages of defence policy, reflected in changing trends of total defence expenditure, can be distinguished in the two decades of peace between 1919 and 1939. The first stage shows a falling expenditure from the inflated figures of 1919, and lasted until 1923.[1] It represents partly the liquidation of the war and the gradual return to peace-time conditions, partly a reduction in defence costs through the drastic fall in the general price level from the peak of 1920. Then followed a period of disarmament hopes and disarmament conferences which, though it did not noticeably reduce total expenditure on defence, stabilized it at about the level of 1924. During this decade, 1924 to 1934, annual expenditure on the three defence services (Table 1) averaged £110 millions; there was a maximum of £117 millions in 1927, and a minimum of £103 millions at the bottom of the depression in 1932. A third period, of rearmament, followed. Expenditure began to rise slowly in 1935, and gathered momentum in the succeeding years, reaching £340 millions in 1938 and an estimate[2] of more than £580 millions in 1939. In the disarmament decade the bill for defence expenditure represented from 10 to 12 per cent. of the total of the central government; in 1939 it would have accounted for over half had peace been maintained.

These changes in defence policy must obviously have their greatest effects on expenditure on works and equip-

[1] The dates throughout refer to fiscal years: i.e. 1919 is April 1919 to March 1920.

[2] April, 1939.

ment. A reduction of the armed forces leaves them with excess equipment which can be used up when other equipment wears out, and reduces to a minimum the need for extensions and additions. Thus expenditure on works is likely to be reduced disproportionately during such a period. Once a new and stable level of defence strength is established and the excess reserves are used up, replacement demand rises again to a normal figure, and more equipment per head is often needed to keep pace with the technical progress. Expenditure on works may take a rising share of the aggregate expenditure and will average higher than in a period of contraction. Finally, it is evident that in a period of rearmament expenditure on works will rise at a far greater rate than total expenditure, because modernized equipment has to be provided for the existing forces and additional equipment and accommodation for newly enlisted men. Other defence works, including manufacturing establishments, have therefore to be greatly extended. It may be estimated that expenditure on works and equipment absorbed less than 40 per cent. of total expenditure during the decade of the armament standstill, whereas in the fiscal year 1938 about 60 per cent. of the total was spent in this way.

It is, however, not only expansion and contraction of military expenditure as a whole, but also the distribution of the total between the three services, which has a bearing upon the variations in constructional activity. Navy, Army, and Air Force were not affected proportionately by these general movements of defence expenditure. Up to 1933 more than half of the total was allocated to the Navy, which by long tradition was the backbone of the British defence system. Slightly more than a sixth was spent by the Army and nearly one-sixth by the youngest branch, the Air Force. These proportions changed rapidly in the rearmament phase. In 1938 the Air Force already absorbed one-third of the total and its share slightly exceeded that of the Army; and in the 1939 estimates the Air Force ranked in the first place, with the Navy as a good second.

Now, it is significant that for technical reasons, and quite apart from changes in the trend of expenditure, the

proportion spent by the three services on equipment and works, and on other things, differed. The ratio is lowest with the Army, and highest, not, as one would expect, with the Navy but with the Air Force. Between 1924 and 1934, when total defence expenditure and the share of the three services remained nearly stable, the Army spent between one-seventh and one-third of its gross revenue on works and equipment, the Navy between two-fifths and one-half, and the Air Force between one-half and three-fifths. In other words, of a given expenditure the Air Force spent more than twice as much on technical works as the Army, and slightly more than the Navy. The accelerated expansion of the Air Force tended, therefore, to increase the proportion of works expenditure in the total.

Before we enter into a more detailed analysis of the constructional activity of the three services in relation to the trade cycle, it is necessary to define more precisely the rather vague term 'defence works'.

The 'Appropriation Accounts' and the 'Estimates' for the three services, which form the chief source of statistical information, record expenditure on works equipment and stores under various votes and a large number of subvotes. The vote 'Works, Buildings and Land' is common to all three services and includes the building and civil engineering work done for the services, and in addition expenditure on works and land under the 'shadow factory' scheme, but apparently excludes building work on government factories, dockyards, &c. Purchases of sites, expenditure on rent of land and buildings and similar items, must be deducted from the vote-total in order to get the amount of constructional work carried out under this heading.

Differences in the technical nature of the engineering works are probably the reason for the various ways in which they are classified by the three services. The Navy's most important engineering work is, of course, that of ship-building and ship repairing. This includes work done in government-owned dockyards as well as contract work; from this must be deducted the—necessarily rare—purchases of ships, expenditure on fuel used in armament vessels, and similar charges. Engineering work of the other two services

is mostly returned under 'Technical Stores' and comprises a great variety of equipment and products, beginning with aeroplanes, vehicles, artillery, and similar equipment, ammunition, horses, and research work. Expenditure on consumable supplies such as clothing, food, and fuel is partly included under technical votes, partly returned under separate votes.

Most of these technical stores cannot be regarded as 'permanent works'. 'Non-durable' technical goods have, nevertheless, been included in our public works analysis because they are mostly products of the 'constructional' industries, and affect their output and employment in the same way as does the production of permanent equipment, and because technical stores of this kind can be accumulated or decumulated and their purchase can therefore be adapted to timing for trade-cycle purposes. Purchases of clothing, food and fuel, and similar supplies have been excluded, although they are certainly storable, because they are not products of the capital goods industries and because the accumulation of such stocks on a greater scale would primarily be the concern of departments other than the defence services.

There is one further difficulty in determining the volume of defence works from the point of view of public works policy. A minor but not unsubstantial part of the works defined above is carried out for and in military and naval stations abroad. Apart from the fact that the statistical information about expenditure on these stations is incomplete, the returns do not distinguish between works on these stations done on the spot with foreign supplies of labour and material, and works carried out for these stations at home. Only the latter have direct effects on output and employment at home. But we cannot omit the whole expenditure on works abroad; for, although much of the building and civil engineering work and some repair work on ships is carried out by 'foreign' labour, presumably all the equipment, instruments, cables, and engineering work to be installed on the spot, as well as some skilled labour and some constructional materials, are likely to come from this country. Since export statistics do not furnish the specific information

wanted, we cannot do more than produce two sets of figures: one referring to the whole expenditure of defence works, the second stating the recorded expenditure on stations abroad. A certain—not precisely determinable—part of the latter must be deducted from the former in order to obtain the amount of works relevant to the home market.

We can now proceed to collect the data and to investigate the variations of defence works. We propose to discuss first the engineering works of the three services. They form the major part of the total, and deserve particular attention because engineering works play but a minor part in other fields of public investment, with the exception, perhaps, of the field of public utilities and assisted private investment. These works may be of particular importance for the engineering industries, which are usually severely hit by industrial fluctuations and cannot easily be relieved by other work for civil purposes. We shall then deal with the building and civil engineering work for stations at home and abroad, and finally pay attention to the investment in the manufacturing establishments of the armed forces, this is returned separately, but closely related by way of accountancy, with the works expenditure of the services and does not represent investment entirely additional to that already accounted for.

### (*a*) *Engineering Works*

#### 1. *The Navy*

For the greater part of the post-war period the Navy was the largest customer for engineering work.[1] In the period 1924 to 1934 the Navy spent between £14 and £22 millions annually on shipbuilding and another £3 to £4 millions on naval armaments; that is, 50 to 100 per cent. more than Army and Air Force together. The figure for expenditure on warships is quite impressive, too, when related to the gross value of output of merchant ships, which Colin Clark estimates at £54 millions in 1924 and £58 millions in 1930, or £48 and £39 millions respectively after deduction of exported ships. This gives an idea of the order of magnitude of gross investment in warships and merchant ships; but no premature conclusions must be drawn from the

[1] See Table 11 on p. 408. (Appendix.)

general figures as to the significance of warship building for British shipyards, which depends on a number of other factors which will become clearer in the course of this investigation.

First of all, merchant shipbuilding refers to work of private yards only, while a considerable part of warship building is carried out in naval dockyards. The Appropriation Accounts indicate the work done in State owned yards by dividing the total shipbuilding expenditure under Vote VIII into three main parts.[1] Section I shows wages and salaries paid to the staff in naval dockyards at home and abroad and includes wages of the dockyard police which also must be regarded as part of the costs of warship building. Section II comprises the expenditure on (raw) materials bought for yard purposes and covers payments for fuel,[2] timber, metals, hemp, water, and so forth. A substantial part of these materials has to be imported and may have small direct effects on home employment. No distinction is made here between materials used by home yards and by yards abroad, which makes it impossible to evaluate the gross value of work done in home yards and oversea yards. Moreover, the accounts record the expenditure on these materials, not the value of materials used in the constructional progress. Allowance must, therefore, be made for variations in the amount of stocks held. Section III returns the work given out to contractors. It refers to contract-built ships as well as to work placed with contractors for ships under construction or under repair in naval yards, and includes the costs of inspection as part of the total costs.

The absolute and relative movements of the three series and of the total is shown in Table 12. It will be seen that total expenditure on shipbuilding began to decline two years before the general turn of business activity and continued to fall during the depression. The decrease in constructional activity after 1927 was presumably due to a relaxation of international tension. The more pronounced fall after 1929 was, however, partly the result of cyclical factors. Public

[1] See Table 12, p. 409.

[2] Fuel for the fleet has been regarded as current expenditure and has been deducted from the total of Section II.

revenue tended to decline and the costs of social services to rise in consequence of diminishing industrial activity; and this made some adjustment in defence expenditure desirable if deficit borrowing on a larger scale was to be avoided. At the bottom of the depression in 1931 and 1932 shipbuilding expenditure moved more than 25 per cent. below the 1927 figure; this decrease partly reflects, of course, the fall in shipbuilding costs. There are no indices of the costs of warship building, but it is probably safe to assume that these fell by about 10 per cent. between 1929 and 1932. That would leave us with a fall of about 20 per cent. in the volume of warship work. The subsequent expansion, dictated by purely political motives, coincided roughly with the revival of industrial activity. The 1927 expenditure level was nearly regained in 1934. Since then expenditure has jumped upwards year by year. The £20 millions odd spent in 1934 were more than quintupled in 1938, and the 1939 Estimates made clear that expenditure would continue at that or a higher level. The problems of the rearmament period will be discussed as a whole, and we content ourselves here with a description of the facts.

The three component sections show very different reactions to the contraction and expansion of the total. Dockyard wages moved in fairly good conformity with total expenditure, though their fluctuations were rather milder and the turning-points did not always coincide. The wage bill fell as early as 1926, reached a minimum in 1930, and after a slight rise in 1931 when total expenditure was lowest, maintained about that level until 1933. Since the average number of workpeople employed in naval yards (excluding casual labour) varied similarly, we may take this series as an index of the volume of work done in naval yards.

Expenditure on shipbuilding materials varied more violently, as might be expected. Movements in excess of the volume curve must be the result chiefly of changes in raw material prices, of variations in the stocks of materials held, or of differences in the kind of work carried out in the yards. The slight rise of the curve between 1927 and 1929 when the volume of yard work was falling, the pronounced and prolonged fall up to 1933, and the very steep rise in the

following two years when the wage curve rose only moderately, must be largely attributed to the price factor, and possibly to a certain accumulation of stocks.

When we add together the costs of wages and materials of dockyard work and compare them with the value of contract work we find that dockyard work was of the same order of magnitude as contract work. This does not, however, imply that warship building in private yards was of the same importance as that of naval yards, since contract work in this connexion included contracts for machinery and equipment as well as for ships. Further, the value of contract work fluctuated violently, falling by about 50 per cent. from 1927 to 1931, thus intensifying the depression in the shipbuilding and marine engineering industries, and doubling again up to 1934. Thirdly, the proportion of dockyard work in the total varied inversely to the movements of the total, that is, tended to grow when the total contracted. Thus the main burden of variations in naval shipbuilding was placed on the shoulders of contractors, while employment in naval yards was kept comparatively stable.

The trade-cycle significance of these changing proportions of dockyard and contract work will become clearer when we consider a further set of figures which gives some information about the kind of work undertaken by naval and private yards respectively. The Naval Estimates distinguish (i) between new constructions and repairs—a distinction which is obviously important from the point of view of trade-cycle policy, (ii) between dockyard-built and contract-built ships, and (iii) subdivide each of these four categories according to work done by naval yards and by contractors. It will be understood that this subdivision is applicable to classification (ii) because naval yards do some finishing work on contract-built ships and parts of dockyard-built ships are given out to contractors. The relevant figures[1] are compiled in Tables 13 and 14.

[1] The Appropriation Accounts do not show these subdivisions. It will be noted that the figures of the Estimates for constructional expenditure generally fall short of the total shipbuilding expenditure given in the Appropriation Accounts. The lower figure of the Estimates results mainly from the fact that expenditure on 'Stores for Maintenance' and certain 'Unappropriated Charges' are excluded from the constructional figures proper. By adding these items which cannot be allocated to

The distinction between the new construction and repair deserves particular attention because it is mainly the former which is amenable to trade-cycle control. Repair work must, on the whole, be carried out currently. Its timing cannot be materially altered; and it is a firmly established principle, borrowed rightly or wrongly from commercial standards, that repairs are chargeable to revenue and must not be financed out of loans. New construction of ships, whether replacements or additions to the fleet, is, provided favourable political conditions allow economic considerations to affect the decisions, more shiftable in time and lends itself more readily to trade-cycle finance.

Actually new construction of warships intensified slump and recovery in the shipbuilding industry considerably. Like total expenditure, they fell moderately from 1927 to 1929, but dropped sharply for the first two years of the general depression, and then recovered substantially from 1932 onwards.

The absolute figures varied between about £5 to £10 millions in the years 1926 to 1934. Assuming that it had been possible to make this constructional activity vary inversely to the business cycle by allocating, for instance, the lower values of the lean years 1930 to 1932 to the triennium 1927 to 1929 and vice versa, the shipbuilding industry would have received roughly £3 millions more orders per depression year than it actually did. These would have been valuable to the shipbuilding industry at a time of rapidly declining work elsewhere; but since the gross output of the industry may be estimated to have exceeded £50 millions in 1930 and declined sharply with the shrinkage of international trade, the additional naval orders of £3 millions would not have materially relieved the plight of the British shipyards during the depression, especially as a considerable part of the constructional expenditure goes to subcontractors in the marine engineering and general engineering trades. It is notable that even the huge expendi-

the various categories of constructional work to the returned values for new constructions and repair one obtains the estimated total of shipbuilding expenditure. This total agrees, apart from minor deviations due to the fact that actual construction proceeds faster or slower or costs more or less than estimated, with the data of the Appropriation Accounts.

ture of 1938, when about £35 millions were spent on new construction, and when from the 1937 and 1938 programmes alone fifty-one ships were under construction, could not compensate for the rapid shrinkage of work on merchant vessels. Work on new warships can only be a minor factor in mitigating employment fluctuations of the shipbuilding industry and must be supplemented by other measures if this particular aim is to be achieved.[1] The general anti-slump effect of loan expenditure on warship construction is, of course, an entirely different question, which we shall discuss later.

Between 60 and 90 per cent. of the work on new construction is given out to contractors; the proportion is reversed for repair work, of which 80 to 90 per cent. is regularly done in naval yards. This distribution of new work and repair work between naval yards and contractors largely explains the greater stability of dockyard work which we mentioned earlier. Repair work fluctuates less than new works, which naturally makes for a steadier employment of the naval yards.

The steadier flow of dockyard work is partly, however, also caused by variations in the dockyard share of new works. Apparently a larger proportion of new works is deliberately reserved for naval yards in slack times. This tendency is recognizable from the data for naval yards and contract work, and still more clearly from the figures for dockyard-built and contract-built ships. The latter evidence shows that when there is little repair work at hand naval yards embark on new construction, while when sufficiently occupied with repair work they keep their own construction low. It is significant that in 1931 and 1932 when repairs were at the lowest, expenditure on dockyard-built ships rose and exceeded that of contract-built ships; while high or rising values for repairs before 1930 or after 1933 went together with high or rising excesses of the value of contracted ships over dockyard-built ships. The significance of these facts for trade-cycle policy seems to be this. If a public works policy aims at stimulating private industries, it is essential that new construction of ships should be fostered and at the same time repairs kept at a good average

[1] See Chapter V, pp. 283–7.

level. If, however, the primary aim is a maximum direct employment effect, repair work has definite advantages, because a higher percentage of repair expenditure goes to wages on the spot and no leakages through profits occur in the primary stage.

Similar considerations apply to the remainder of naval engineering expenditure, namely, on Naval Armaments, shown in Table 12. Part of these are produced in government establishments (at home and abroad) and their cost is shown as wages and salaries of artificers, crews, and police force. Equipment and ammunition bought from private firms is included in a second section of the same vote together with costs for inspection, freight charges, and so forth.

Total expenditure under this vote amounted to £3½ to £4¾ millions during the disarmament period, and rose to over £16 millions in 1938. Production of stores in government factories, as indicated by the movements of the wage bill, was remarkably stable for the whole period. The contraction between 1927 and 1930–2 amounted to less than 10 per cent., and the subsequent expansion up to 1938 did not even double the average of the previous disarmament period. Other expenditure on equipment and ammunition fluctuated more violently, and it is probably safe to assume that production in government factories was kept stable at the expense of store purchases. Looking at the total expenditure under this vote it appears that a different, i.e. anti-cyclical, timing would not have added much to the engineering work actually undertaken during the depression years. Moreover, the possibility of accumulating stocks of such armament stores seems to be rather limited in times of international calm, among other things because of lack of special storage facilities. This, accordingly, restricts the application of appropriate public works finance, if current consumption of these stores is generally to be charged to revenue.

If we assume that one year's consumption at the maximum could be stored and that the minimum consumption is represented by the lowest expenditure in 1932, stocks of about £3 to £4 millions could be accumulated. For a three years' depression period that would have meant an average anti-slump reserve of about £1 to £1·3 millions per annum.

Assuming further that new construction of ships could have been stabilized throughout the 1926 to 1934 period at the average level of that period, and that one-half of it—or, to make a more moderate assumption, one-half of the actual expenditure—could have been financed in a reflationary way, we should obtain a trade-cycle reserve of shipbuilding works of about £2½ to £4 millions per annum for the depression period 1930 to 1932.

Now, this estimate of about £3½ to £5 millions naval engineering work which could have been mobilized as an antidote to the 1932 depression represents presumably an upper limit. Taking into account political and strategical factors and the psychological and administrative difficulties of accumulating and manipulating financial reserves or of borrowing for normal defence expenditure, even a government most anxious to apply trade-cycle policy to defence works must probably have contented itself with far less than this amount. On the other hand, if the size of the Navy is to be permanently greater than in 1932, the possibilities are more considerable.

2. *The Air Force and Army.*

The Air Estimates and Appropriation Accounts return engineering works of the Royal Air Force and of the Naval Air Arm[1] mainly under the vote 'Technical and Warlike Stores' (Table 15). More than two-thirds of the total expenditure under this vote is accounted for by aeroplanes, engines, and spare parts of aeroplanes and balloons. The remainder goes to various kinds of equipment, armament, and ammunition stores.[2]

Work on aeroplanes and balloons is done by private firms and by government-owned but privately managed shadow factories. The Air Accounts, therefore, do not distinguish between work done in government factories and contract work. The Farnborough Establishment which appears in the Accounts is an experimental and research station, but not a producing unit. Also, evidently for military

[1] To be separated in 1939–40.

[2] Expenditure on petrol and oil for the fleet of aeroplanes and vehicles has been—for reasons given earlier—excluded from our tables.

reasons, the Accounts do not make a distinction between new constructions and repair work. The whole expenditure on planes and balloons is given in one lump sum, while the remaining fifth or third is subdivided into a number of small items.

The curve of aircraft expenditure differs from all other defence work services in moving nearly inversely to the general trade cycle between 1926 and 1934. It was practically stable at £5·4 millions for the period 1926 to 1928, rose from 1929 to 1931 to £6·7 millions, and then declined to a lower level of £5·8 millions, which was maintained from 1932 to 1934. After 1934 began the enormous expansion as a result of which the expenditure on aircraft in 1939 will be fifteen times as large as in 1933 or 1934, and will for the first time exceed the Navy's expenditure on shipbuilding and repair. It is very likely that this partly anti-cyclical behaviour of aircraft expenditure was caused by a chance combination of military and economic considerations. The rise between 1929 and 1931 may have been due to the natural tendency of the new air weapon to expand at a faster rate than the two older services or to changed views about the strategical importance of the Air Force in Empire defence or—to a minor extent—to the Labour Government's mild attempt at public works' policy in 1930 and 1931; while the decline after 1931 was probably largely a result of the economy campaign. It is notable, however, that aircraft orders were kept low in 1933 and 1934, while Navy and Army already showed an expansion.

Other expenditure on technical stores which amounted to about £1·7 to £2·1 millions between 1926 and 1934 was more or less closely tied up with aircraft production and shows, therefore, as a whole a similar movement, though the component parts deviate somewhat from the pattern of the aircraft series.

This expansion of Air Force works during the depression certainly gave some support to the aircraft and aircraft accessories industries; but the whole expenditure was met out of revenue and did not, therefore, represent a net addition to national income and employment.

Of the three services the Army has been the smallest

consumer of engineering products and has spent least on technical equipment per number of effectives. Before the rearmament in 1935 its expenditure on technical stores and mechanical and other transport amounted only to about £3·5 millions a year, of which a substantial part was spent on arms and ammunition, and only a small part represented durable goods in the usual sense.

The expenditure curves followed roughly the general business cycle, showing high values in the years 1926 to 1929 and low values during the depression, followed at first by a moderate rise which brought the 1934 figure back to the pre-depression level. To keep Army expenditure on technical equipment constant during the depression years would have implied the accumulation of stocks equal to less than half a year's normal expenditure on technical stores. If we assume that half the annual expenditure went to repairs for which not much material could be stored in advance, the stocks would represent a full year's requirements of new construction and complete replacements, which might well be for military reasons more than could be stored.

We are now in a position to sum up the main facts and draw some conclusions with respect to the engineering expenditure of the three services.

Aggregate engineering expenditure[1] varied between £28 and £36 millions a year during the peaceful period 1926 to 1934: it represented one-quarter to one-third of the total defence expenditure. The production of some £30 million of engineering products was clearly of some importance for capital goods industries and in particular for the engineering trades. It amounted to about 10 per cent. of the value of fixed investment outside the building trades. A comparison of the employment figures of the shipbuilding and engineering trades with the probable employment effect of these defence works leads to a similar result. Applying our estimates of the primary employment given by expenditure on capital goods (£1 million = 4,000 to 5,000 man-years) we may estimate that this kind of defence works provided employment for about 112,000 to 180,000 workers, including 35,000 to 42,000 workpeople employed in naval yards

[1] See Table 11. Sum of Col. (1) and Col. (3).

at home and in Ordnance Factories. That compares with a total employment in the shipbuilding and engineering trades of about 1·5 to 1·9 million insured persons. On the same basis it may be estimated that the decline in engineering expenditure between 1927 and 1932 resulted in a reduction of about 32,000 to 40,000 men primarily employed against a total decrease of employment in these trades of about 400,000 persons.

These comparisons are, evidently, subject to many restrictive qualifications and are intended solely to indicate the order of magnitude of defence works in relation to other works of a similar kind.

But it is not so much the absolute amount of expenditure as its trade-cycle behaviour which interests us. Let us first consider the timing and then the intensity of the fluctuations. Total engineering expenditure fell in a smooth curve from 1927 to 1932 and rose again to nearly the 1927 figure in 1934. Most of the sub-series, except Air Force works, followed this general pattern, though the upper and lower turning-point was sometimes delayed or anticipated by one year. We suggested that the decline of expenditure two years before the turn of and, therefore, slightly inverse to, the general cycle had mainly political causes; but that the further and in most cases steeper fall after 1929 was closely linked up with and partly caused by the industrial depression, and that such economy was bound to lead to an opposite reaction in the following revival, quite apart from changes in the political field. In other words, but for the impact of the business cycle on national revenue and expenditure, defence works would have been timed differently.

The amplitude of the fluctuations differs widely for the various kinds of works. We may distinguish the following types: (*a*) New construction (unfortunately only distinguished for shipbuilding, not for aircraft and other equipment) varied more violently than repair works, though the variations of the latter were quite considerable. The fall in the reference period amounted to about 30 per cent. against a 46 per cent. fall for new constructions, the rise from the bottom up to 1934 to 48 and 98 per cent. respectively. That indicates that regulation of new construction would need to

be the primary concern of a public works policy. (*b*) Closely connected is the distinction between contract work and work done by service establishments. Contract work fluctuated, at least in the case of shipbuilding, more severely (minus 52 and plus 125 per cent. in the reference periods) than service work (minus 25 and plus 5 per cent.). Evidence referring to naval armaments and technical stores, though incomplete and less detailed, seems to confirm the impression that contractors have a similar but less pronounced buffer function in other fields of defence expenditure. If public works policy aims, in the first place, at stabilizing the widely fluctuating private sector of the capital goods industries, it is therefore preferable to concentrate on smoothing out variations in new works which incidentally will tend to stabilize the amount of the contract work done by private industries. (*c*) Durable goods, on the whole, varied more than non-durable goods, though lack of information makes it sometimes difficult to prove this in detail. That would indicate that the main planning effort should be directed towards smoothing out fluctuations in the sphere of durable goods; these were, again, mostly produced by private firms, while a larger share of the non-durable goods, particularly of ammunition, was produced in government establishments. But we considered the non-durable technical goods to be amenable to trade-cycle control as far as temporary stocks of such goods can be accumulated or decumulated.

### (*b*) *Building Works*

After this survey of the engineering activity we must now briefly examine the building work done by the defence services. This kind of work is obviously of a permanent nature and of a more or less homogeneous sort for all three services. Against the £30 millions odd engineering expenditure, the total expenditure returned under the three Building Votes amounted to about £6 to £9 millions per year in the pre-armament period, and rose to about ten times that amount in 1939. After deducting 'ineffective expenditure' on purchases of land, on rent of land and buildings, payments to land agents, compensations, and so forth which do not cause primary employment, the greater part of this total

is returned as building work done for defence stations.[1] To this must be added certain general oncosts for superintendence, surveying work, telephone rent, and the like which refer to the total activity of the building department rather than to any particular part. Finally, there are grants towards the costs of works undertaken by State-operated establishments (mainly Ordnance Factories), and in more recent times grants towards the costs of works under the shadow factory scheme.

We shall consider mainly the works on defence stations which cover 70 per cent. and more of the total expenditure under the Building Votes. This is divided into new works and repairs. It is further subdivided into major works of a value of over £2,500 each and minor works of less than £2,500 each. The accounts allow further division, for the greater part of the new and repair works, into work done on stations at home and on stations abroad.

The variations in building work followed, on the whole, the pattern of the engineering expenditure. We can summarize the main features of the various series as follows:

1. The Army's total expenditure under the Building Vote, varying between £2·5 and £4·5 millions, was far greater than that of the Navy or Air Force, which was rather less than £2 millions each. At the same time Army expenditure varied more than that of the Navy and Air Force. Aggregate expenditure of the three services shows the usual movement; a continuous decline from a high level in 1926 and 1927 to a low level in 1932 and 1933, followed by a slight recovery in 1934 and a rapid expansion afterwards. It is, however, noticeable that the building activity of the Navy shows a different course, being actually higher during the depression years 1930 to 1932 than in the three preceding years, largely owing to the construction of the naval base at Singapore.

2. As is to be expected, 'major' works fluctuated more than 'minor' works; and repair work was practically stable. The value of major and minor works was about 30 per cent., or £1·25 millions, lower in 1932 and 1933 than it was in 1926 and 1927. But it will be observed that the decline

[1] See Tables 17–19 on pp. 412, 413. (Appendix.)

between 1930 and 1933 was slight owing to the increased building activity of the Navy, and hardly exceeded the fall in building costs.

3. The greater part of building work was done on home stations. In the case of major new works for which we have complete information, home stations account for more than two-thirds and sometimes for more than four-fifths of the total. In the case of minor new works and repairs it may be estimated, from what information is available, that the ratio is about the same or slightly higher.

Work at home tended to fall less than work on stations abroad from 1927 to 1932 and to rise more from 1933 to 1938. A shift towards work at home during depression times and towards works abroad in good times would obviously be desirable from a public works point of view, since building work done abroad affects home employment and home output only to a minor extent, namely, as far as home-produced goods are used in the construction of those works.[1] The actual shift towards home works between 1930 and 1933 was thus a stabilizing factor in the home market, while their comparatively high share in 1937 had rather a destabilizing effect. But the magnitudes concerned are in any case small.

If we make ample allowances for the effects of defence works abroad on home employment and assume that the timing of new works could be partly adopted to the needs of public works policy under peaceful conditions, the amount of building works which could have been carried over from good to bad times during the period 1926 to 1934 would have been less than a million pounds per year and probably less than half a million. This is not in itself a large amount from the point of view of trade-cycle regulations; but it is clearly on the best possible adjustment of all government departments that the success of a public works policy depends, even though their individual contributions may be small.

Finally, we have to consider the investment activity of Royal Ordnance Factories and Ordnance Workshops which

[1] And so far as wages and salaries earned abroad by workers normally domiciled in this country are sent home to be spent by their dependants.

is of little significance in ordinary times but attains considerable importance in a period of expansion, when factories and equipment need big extensions. As we mentioned already the Service Accounts state the amount granted towards works in Ordnance Factories. This sum is, however, only part of the total constructional work on Ordnance Factories; another part is met out of prices charged to the service departments for products delivered to them, and has been included under that heading of expenditure.

The actual expenditure on new works and repairs is given in separate Accounts of the Royal Ordnance Factories, and shown in Table 16. Total expenditure on works varied, between about £230,000 and £130,000 during the years 1926 to 1934, but rose rapidly during the period of expansion. Repair work moved fairly steadily round a level of £110,000. The 10 per cent. fall between 1927 and 1932 corresponded roughly to the fall in building costs. New works fluctuated more violently. They declined from £109,000 in 1927 to a minimum of £32,500 in 1932 and rose again to £92,000 in 1934. The investment activity of the Royal Ordnance Factories depends, like that of other industrial enterprises, largely on the volume of work in hand and the expected future demand. Smaller variations in the volume of orders of the three services would, therefore, tend to reduce the fluctuations in Ordnance Factory investment. Apart from that, the manufacturing establishments may plan their replacement of plant with regard to trade-cycle control and can probably take a longer view than many private firms. On the other hand, it is clear that because only a limited amount of works can be anticipated and be used to provide some relief during the first stages of a depression, the final result may be severe curtailments in the later stages of a prolonged depression. From the figures it is not clear whether the drop in new works in 1932 was partly the result of anticipation in the previous years or entirely due to the economy campaign of 1931.

We must now inquire generally how far variations in engineering and building expenditure for defence could be fitted into trade-cycle policy. We shall exclude for the moment the question of a great rearmament programme

and examine the possibilities of annual variations in defence expenditure in more normal circumstances. Can their timing and their finance be adapted to serve the aims of trade-cycle policy?

First, it may be doubted whether expenditure on defence can be shifted from good times to bad, because overriding political considerations, perhaps including treaty obligations, make the volume of work for defence rigid and unadjustable to trade-cycle needs. This rigidity is, however, clearly a matter of degree; it inevitably varies from time to time according to the state of international politics. We have shown that there was, in fact, some quite considerable relation between defence expenditure and the course of the trade cycle, though it was, from the point of view of public works policy, of the wrong kind. From this point of view, therefore, the anti-cyclical timing of defence works presents in only a more acute degree the same difficulties as the timing of civil works. In both fields there are 'urgent' works which politically do not allow of postponement, there are psychological obstacles in the way of reducing expenditure in times of rising revenue, there are uncertainties about future requirements, obsolescence, and so forth, which make it difficult to anticipate works in bad times. On the other hand, defence works have one advantage, in that their own utility does not depend on the variations of the cycle, while the need for many civil works is more or less closely dependent on the rate and direction of the expansion of economic activity in general. Many local services, for instance, must be provided when and where new housing centres are built or new factories spring up; but the defence services can plan ahead without such interference from joint demand.

But in contrast to civil works, defence works are under another restrictive condition. Since they represent a waste from a social point of view, and add nothing to the productive power or consumable wealth of the nation, only a minimum necessary for the country's political aims must be provided. The long-period average expenditure on defence must therefore not be increased in order to assist an anti-slump policy. This condition might very well come into conflict with the probable effects of a successful public works

policy. For it is probable that in fact the defence departments will always offer a strong resistance to any reduction of expenditure. In the past a major depression has often exercised sufficient pressure to overcome this resistance and perhaps to keep down their standards of expenditure even during the subsequent revival. Should defence expenditure instead be expanded in depression, it may prove impossible to reduce it again in prosperity, so that the level over the whole trade cycle would be progressively raised. The same thing might certainly happen with civil works; but the event would be economically less wasteful, and the political consequences probably less dangerous. From every point of view, however, it is clearly undesirable that depression economies should delay really necessary constructional work for defence, and that rising national revenues should accelerate it; and the possibilities of securing, at the least, stabilization must be seriously considered.

We have already seen that all kinds of works are not equally capable of being shifted from one phase of the cycle to another. New construction of durable goods seems to offer greater opportunities for postponement and acceleration than repair work; and for certain technical products of medium and short durability we have discussed the possibility of deliberate variations in stocks. But the possible margin of work reserves which could thus have been created and mobilized in the depression of 1930 to 1932 must not be exaggerated. Even under the favourable assumption of complete foresight, of ample storage facilities, and of the greater shiftability of constructional works, anti-cyclical redistribution of the given amount of new works and technical stores would hardly have added more than £5 or £6 millions per depression year. Under less favourable assumptions £3 millions might be a generous estimate. The transfer of works of this magnitude from one phase of the cycle to another would have some utility in reducing fluctuations in the rather narrow range of industries affected; and even without it, the comparative stability of expenditure on defence works was certainly important in that it provided for a certain considerable minimum of demand for their products.

A third difficulty in the way of effective use of variations in defence works for trade-cycle purposes might arise from the strength of the tradition that all the costs of 'normal' defence works should be met from current revenue, since they represent an extreme form of unproductive and non-self-liquidating expenditure. Even a considerable expansion of defence works in depression would add little or nothing to total employment or incomes (though it might relieve particular industries), if it were financed in this way. But if public opinion continues to regard defence works as ineligible for loan finance except in an acute political emergency, the only alternative is to develop a system of special reserve funds, nourished by regular contributions from revenue throughout the cycle, but spending in excess of the current contribution in times of depression. In some ways this might not be difficult; in principle to provide accumulating renewals and obsolescence funds for warships, and for the more durable military equipment and buildings, would only bring the defence departments into line with the usual practice of private business.

A period of rapid rearmament and of change in the whole scale of defence expenditure, such as we have experienced after 1935, presents entirely different problems. The rate of expansion is rigidly determined by political and military considerations, and cannot be increased or decreased for the sake of trade-cycle control: though this might, indeed, still have some bearing on the methods used to finance it. It would be otiose to inquire in these circumstances what part of defence works could be best postponed or accelerated in order to help private industry. Intense rearmament was soon to come to invert the ordinary public works problem and to present instead the problem of how to restrict private investment in order to set free resources for public use in the making of armaments. In any case, it is clear that while an ordinary public works policy should give priority to the claims of private investment, a rearmament programme cannot do so: it is superimposed on private investment, not supplementary to it.

Yet although rearmament programmes are almost completely outside trade-cycle control and very often conflict

with the purposes of an ordinary public works policy, they can be regarded as a kind of public works scheme, well timed or ill timed according as they happen to coincide with the downward or upward phase of the industrial cycle. They may thus give us some lessons in the working of ordinary public works which hitherto have not been undertaken on a comparable scale in a major depression. The experimental value of rearmament for ordinary public works policy must, however, not be overstressed; some caution is necessary in carrying over conclusions from the one to the other. The two kinds of schemes differ in essential points, of which two may be mentioned here. First, rearmament expenditure meets with almost universal approval of the business community under present conditions. A similar programme of civil works would produce considerable disagreement. Vested interests, financial orthodoxy and caution, prejudices against State interference would raise objections against the kind and scope of works. Such sectional disagreement is likely to affect adversely the state of confidence, and to raise liquidity preferences or cause a flight of capital, while a generally accepted rearmament programme may increase confidence in spite of disturbing international events. Secondly, ordinary public works must take account of the existing structure of industry and avoid creating *ad hoc* expansions of industrial capacity or diverting resources from other purposes. Such considerations of possible shifts in the structure of industry can be neglected by the defence departments, which must aim at increasing the war potential irrespective of whether an expansion of the capital goods industries is justified by the long-run demand for such goods. In both cases rearmament may have greater employment effects than can be expected of ordinary public works. In spite of such reservations it will clearly be of the greatest importance for future public works planning to determine the effects of the mounting defence expenditure on output and employment. Only a beginning of this task can be attempted here.

The rise of defence expenditure during the five years period 1934 to 1939 can be ascertained from the Accounts and Estimates of the three military services. On the basis

of the defence works data we can further give a rough estimate of the industrial man-power required to produce the rising volume of defence works. So far we are on relatively safe statistical ground. To determine the effects of this expenditure on the capital goods industries and on total employment in the various stages of the trade-cycle is a task which offers much more resistance to statistical penetration, and we shall have to content ourselves with indicating the main tendencies operating in the various phases of the process.

The essential data relating to defence expenditure are compiled in Table 11, which gives the movements of total defence expenditure, works and loan expenditure. Total defence expenditure amounted to £114 millions in 1934, of which £41 millions were spent on works. The 1939 Estimates[1] provide for an aggregate expenditure of £580 millions, of which about £400 millions are devoted to defence works. The absolute rise in military works by (say) £350 millions presents obviously a revolution in the relation of public and private spending on capital goods. The value of defence works was a mere fraction of the national gross investment in fixed capital in 1934, but may amount to one-half of the higher value of fixed investment in the current year. If we add that public investment for civil purposes expanded as well up to 1938, it will be clear that public demand for capital goods is likely to be approaching or outstripping private demand.

It will be noted that expenditure on works increased nearly twice as fast as total expenditure, and its rate of expansion grew steadily. The percentage increase over the preceding year was lowest in the first year of rearmament with about 20 per cent. for the total and over 40 per cent. for defence works; it rose steadily to nearly 50 per cent. and 655 per cent. respectively according to the Estimates for 1939.

The first instalments of the rearmament programmes in 1935 and 1936 were entirely met out of revenue like the normal defence expenditure throughout the period after 1919. In 1935 the Exchequer had to find about £23 millions more, and in 1936 a further £49 millions, of revenue

[1] Excluding Supplementary Estimates.

for defence purposes. The further and steeper rise of defence expenditure in the subsequent years was almost entirely met out of borrowings. Since defence loans have been until recently allocated to works services only, that implies a decreasing proportion and for 1939 even an absolute decline, of revenue expenditure on works. The following table gives the allocation of the defence loans sums to the three services and according to the main purposes. It shows that warships and aeroplanes account for more than half the annual total, and building works for less than a quarter.

*Allocation of Defence Loans*

(*From the Estimates of the Three Services*)

£s Millions

| | *1937–8* | | *1938–9* | *1939–40* |
|---|---|---|---|---|
| | *Estimates* | *Actual* | *Estimates* | *Estimates** |
| *Navy:* | | | | |
| Shipbuilding | 19·00 | 17·40 | 22·00 | 59·00 |
| Naval Armaments | 5·00 | 3·95 | 5·00 | 14·00 |
| Works and Buildings | 3·00 | 2·65 | 3·00 | 7·00 |
| TOTAL | 27·00 | 24·00 | 30·00 | 80·00 |
| *Air Force:* | | | | |
| Technical Stores | 12·00 | 12·00 | 35·00 | 98·00 |
| Works and Buildings | 14·00 | 14·00 | 26·00 | 44·00 |
| TOTAL | 26·00 | 26·00 | 61·00 | 142·00 |
| *Army:* | | | | |
| Technical Stores | 13·00 | 4·90 | 14·00 | 48·00 |
| Works and Buildings | 6·05 | 5·05 | 7·14 | 18·23 |
| TOTAL | 19·05 | 9·95 | 27·24 | 66·23 |
| Royal Ordnance Factories | 7·95 | 4·92 | 11·86 | 15·77 |
| *Grand Total* | 80·00 | 64·87 | 130·10† | 304·00‡ |

† Actual Loan Expenditure for the Three Services (excluding R.O.F.) £128·05 millions.

‡ Plus £48 millions allocated to Civil Defence works.

* April Estimates.

The calculation of the primary employment caused by military works is based on our general estimate that £1 million expenditure on capital goods provides about 4,000 to 5,000 man-years direct and indirect employment.[1]

[1] The calculation was based on the period 1928 to 1935 and may not entirely hold good for the later period. But the margin given above seems to be wide enough to cover possible changes in the determining factors after 1935.

The figures indicate that in 1937 about 400,000 to 500,000 more man-years employment were required for the constructional needs of the defence services than in 1934. These estimates are subject to all the qualifications mentioned in the analysis of the primary employment effect.[1] Moreover, additional man-years of employment do not imply a proportionate increase in the number of men employed, since the average length of the working day of workers already employed may vary. In comparing year-by-year changes further allowances must be made for variations in stocks and in output per head and for changes in prices and wages. Certain deductions have further to be made for work done abroad and for purchases of finished defence equipment from abroad.

Even after such corrections the lower limit given should represent a reasonably safe estimate of the industrial man-power engaged directly and indirectly in armament production. A very cautious interpretation of the figures would probably be that in 1936 twice as many, and in 1937 at least three times as many, man-years were devoted to armament production as in 1934; and that in the 1938 recession —after ample allowances for the depletion of stocks on the various stages of production—at least four times the 1934 man-power was required to produce the greater volume of defence works.

Now, it is important to know that in 1937 more than half a million workers were employed in carrying out armament orders and that this number would have risen to $1\frac{1}{2}$ million in 1939, particularly if this fact related to the estimated total employment in the capital goods industries. But it is neither the whole story nor that part which deserves our special attention from the point of view of public works policy. What we want to know is not so much the total labour directly and indirectly employed in producing armaments, but the additional employment caused by the armament expansion. How much the economic system as a whole expanded as a result of the rearmament process depends, of course, mainly upon the way in which it was financed, partly on the value of the multiplier and the amount of the tertiary effects.

[1] See Chap. VII.

It is generally agreed that revenue expenditure on works does not as such increase total income and employment, but represents a transfer of income via the State from one income recipient's pocket to another recipient's pocket, and a similar diversion of labour from one activity to another. In the case of increased State expenditure on works the presumption is that the capital goods industries will on balance benefit[1] from this transfer at the expense of the consumer's goods industries. Such revenue expenditure may give rise to additional income and employment in two ways: (1) if increased taxation diminishes the propensity to save and thus raises the multiplier effect of a given investment; (2) if increased armament orders induce additional investment in fixed capital and in stocks either because the supplying industries have reached their capacity or in anticipation of a further rise of demand.

As to loan expenditure of public authorities, it is clear that only the net increase of public borrowing after deduction of debt repayments and accumulation of reserves and similar charges creates additional income and employment, and then only if public borrowing does not replace private borrowing which would otherwise have taken place.

Neither the tertiary effects nor the degree to which public borrowing replaces private investment can be determined in a statistical way, at least for a particular section of public works. But we can perhaps indicate whether and when these forces were operating during the various phases of the rearmament process.

In the fiscal year 1935 and 1936 the whole burden of arms expenditure was borne on revenue, with the result that labour which might have been otherwise employed in producing consumption goods and ordinary capital goods was now employed in producing armaments. The capital goods industries which were already in the midst of a marked recovery thus received an additional stimulus. This did not in itself augment national income and employment. From a public works point of view this superimposition of increased armament orders on a high and still rising private demand for capital goods had rather unfavourable effects. It pro-

[1] Any deflationary effects of higher taxation are disregarded.

duced a tendency for wages and prices to rise and thus diminished *pro tanto* the employment effect of a given amount spent on public works. Raw material prices rose considerably, particularly in 1936, and the market reports frequently explained the speculative upward movement by pointing to the expected future demand for armament purposes. Further, there soon appeared preliminary bottle-necks in the market for skilled labour as well as for certain goods like machine tools. Another sign was the lengthening of delivery periods. Rising costs in their turn acted partly as a deterrent to private investment. It has been argued, for instance, for the shipbuilding industry, that urgent navy orders sent prices and wages up and drove away orders for merchant ships. In this and other cases public investment may have superseded private investment, which is clearly not in line with the principles of public works policy. It is, however, the trade-cycle effects rather than the trade-cycle policy aspect with which we are concerned here.

Higher armament orders gave rise to additional investment in two ways. First, the speculative upward movement of raw material prices favoured the holding of larger stocks. As far as additional and anticipatory investment in stocks was induced by expectation of the future demand from (British) rearmament it can be regarded as a tertiary effect of revenue expenditure on defence works. Its employment value for the home market was probably small because most of the raw materials were produced abroad and affected home employment only by way of transport services, storing, and processing. Additions to stocks of home-produced material would, of course, have an effect similar to any other investment. Secondly, the coincidence of the first stage of rearmament with the industrial revival brought the 'Relation' into play. Extensions of factories and additions to the equipment became necessary, when armament orders descended on industries already working almost to full capacity or on those, like the aircraft industry, adapted to a much smaller demand. New investment or accelerated reinvestment, induced by demand, causes, of course, further additional employment which again is concentrated in the capital goods industries. These effects were probably small in 1935, but

may have been of some importance in 1936. We can, therefore, say that the £18 millions additional works expenditure of 1935 presumably created little additional employment; but that the further increase of £30 millions in 1936 induced some new investment and hence additional employment.

The fiscal year 1937 presents two new aspects. The Government proceeded to finance a substantial part of the defence works out of borrowing, and the industrial activity turned downward in the middle of the year. The two events stand in no causal connexion. Borrowing was not resorted to because a recession was anticipated by the Government in the early spring of 1937, nor was the recession caused by the transition to government borrowing.

It will be noted first that *revenue* expenditure on defence works hardly increased in 1937 in comparison with the previous year. Consequently it did not give rise to higher employment in any sense. The only source for additional employment in 1937—and that applies also to the two following years—was the loan expenditure. According to our general employment ratio the loan expenditure in 1937 of roughly £70 millions should have provided an additional primary employment of 280,000 to 350,000 man-years. To the primary effect must be added—apart from secondary effects which we are not discussing here—the primary employment value of further private investment[1] induced by rising armament orders. These Relation-effects were certainly still operating in 1937 in certain arms-supplying factories. But stocks of raw materials tended to decline when prices dropped in the spring of 1937 and the industrial recession was unfavourable to anticipating purchases of goods and materials.

Even if we regard this defence borrowing as entirely additional, which it was not, owing to Sinking Fund payments and accumulation of Unemployment Fund reserves, and assume that the tertiary investment was just equal to the difference between gross and net borrowing, the additional primary employment created at home in 1937 by defence borrowing can hardly have exceeded 350,000 man-years.

[1] Clearly after deduction of government grants to shadow factories and of amounts spent on Royal Ordnance Factories.

To be on the safe side let us assume that it was 300,000 man-years. That may appear to be a small result. Its importance is, however, illustrated by the fact that the average employment of insured persons in Great Britain rose by less than 600,000 from 1936 to 1937. And clearly the increase in primary employment must be related not to total employment but to the employment in the capital goods industries, which increased by about 300,000 from 1936 to 1937; that is, by just the amount which according to our estimate was created by defence borrowing.

It appears that despite reduced building activity and a certain amount of disinvestment in stocks, investment activity as a whole was still rising in the first half of 1937 and that loan expenditure on defence works tended, therefore, to intensify the boom in the capital goods industries. In this critical phase of the cycle defence expenditure had, thanks to government borrowing, far greater effects on employment than in the two previous years of revenue expenditure. Labour supply in certain categories became rather inelastic owing to the demand for civilian purposes and for defence works and to the defence services' own requirements for trained men. Wage rates generally rose further. Still, there was a considerable general reserve of unemployed and employable workers, and it is likely that a general transfer and training would have reduced the inelasticity after some time. If the work could have been distributed more evenly over the various sections of industry and over different districts a still higher loan expenditure in that stage would have been possible and harmless.

In the second half of 1937–8 and throughout 1938 defence borrowing came into its own as an anti-slump instrument. For private investment in fixed capital, stockholding, and exports, all declined, while defence loan expenditure continued to rise from £70 millions in 1937 to (say) £120 millions in 1938. The latter amount should have provided about 500,000 to 600,000 man-years employment or 200,000 to 250,000 more than in the previous year. This increase in borrowing was not quite sufficient to compensate for the fall in industrial activity. The *Economist*'s Index of Business Activity, for instance, fell by slightly more than 10

per cent. from summer 1937 to summer 1938. Private building activity contracted severely and so did merchant shipbuilding, while activity in the engineering section was apparently better maintained. On the other hand, employment figures showed a remarkable stability, the decline between the peak in 1937 and the low point in 1938 amounting to only 2½ per cent. The explanation may be among other things that the recession has been met more by short time than by dismissals. If we assume that the number of hours worked decreased in proportion to the index of business activity the recession was still moderate. Moreover, the downward movement of employment lasted only for about a year, and was visibly checked after the summer of 1938. There can be little doubt that defence expenditure was one of the major factors which put the brake on the beginning of a cumulative downward process and helped to stabilize activity at a level only moderately below that of the previous peak.

It is not uninteresting to consider what would have happened, *ceteris paribus*, if the Government had not resorted to borrowing and had either cut down defence expenditure or charged the increase to revenue. Take the year 1938 and assume the State had attempted to balance the budget and had not taken up £120 millions loans for defence works. That would have implied (say) 500,000 or 600,000 man-years less primary employment, and, assuming a multiplier of 1·5 or 2, a possible total decline in employment of 750,000 to 1,200,000 man-years. Taking into account the effects of such a decline on the state of confidence, on entrepreneurial decisions about investment, and similar psychological reactions, it appears very likely that unemployment would have touched the 3 million mark instead of the actual figure of about 1·8 millions. The depression would thus have become more severe than that of 1932 and presumably would have been increased in length too.

Under the more realistic assumption that the State had continued borrowing on approximately the 1937 scale of, say, £60 millions, charging the remaining £60 millions to revenue, about 500,000 to 600,000 man-years less primary and secondary employment would have resulted and total

unemployment would have been in the neighbourhood of 2·5 millions people.

The case is a hypothetical one, and the *ceteris paribus* formula raises, naturally, many doubts. But to judge from former experiences, it seems to be very likely that, once a recession had begun and exogenous factors like a change in the political outlook did not intervene, the cumulative process would have gathered momentum. It seems further to be fairly certain that private investment would not have taken the place of public loan expenditure in the actual situation of 1938. In this sense government borrowing was entirely additional. Given the political and economic circumstances of 1938, a reduction of public borrowing by the above amounts would have intensified the recession to a degree shown by the estimated unemployment. Although allowances must be made for the spreading of work through short time, for changes in the adverse balance of trade, and other factors, these estimates indicate at least the order of magnitude with which one would have to reckon.

Finally our table gives preliminary figures for total expenditure and defence works expenditure for 1939, and the corresponding employment data. These employment estimates are based on exactly the same assumptions as the previous estimates and can be discussed on the same lines.[1]

Let us first consider the employment estimates. Provided that our general employment ratio holds good, an additional £230 million loan expenditure will create an additional primary employment of 920,000 to 1,150,000 man-years. If we make allowances for accumulation of reserves in the Unemployment Fund, of Sinking Fund payments and similar savings, the net government borrowing may be put at £200 millions which would cause 800,000 to 1,000,000 man-years of primary employment. Not the whole of this additional labour will, however, be drawn from the unemployed. Part of it will be provided by longer hours of the labour forces already employed, either by a reduction of short time or by transition to overtime. An all-round increase of half an hour a day per person employed in the capital goods industries would provide for about 200,000 to 250,000 man-

[1] The following four pages were written in April 1939.

years. Such an extension of the actual working day under present conditions seems to be rather the upper limit of the labour reserve which can be mobilized from this source. We are presumably on the safe side if we deduct 200,000 man-years on this account, which leaves us with an additional primary employment of about 600,000 to 800,000 people hitherto unemployed.

Add to this—taking a multiplier of 1·5 and again making some corrections for longer hours—a secondary employment of about 400,000 people, and, deliberately underestimating the stimulating force of the expansion, assume that there will be no 'tertiary' effects. On these assumptions the £200 millions net borrowing for defence would re-employ about 1,000,000 men which are now unemployed. The reduction of unemployment would be greater (smaller) if the multiplier were higher (lower) than 1·5, if the working day of those already employed were extended less (more) than assumed, or if positive (negative) tertiary effects occurred.

If we neglect the natural increase in the working population and the possibility of drawing into employment of persons who are not now insured workers, the absorption of 1,000,000 unemployed would bring down the registered number to something like 800,000. Part of this remainder must be regarded as unemployable in the short run and further allowances must be made for 'statistical unemployment' due to the normal turnover in the labour market: both categories together making up at least 500,000 to 600,000 persons. It then becomes clear that the additional loan expenditure, if it is additional, may lead to a state of full employment in the sense that, granted sufficient mobility and adaptability of the labour force, practically all available labour reserves will be exhausted.

Now, this whole chain of deductions rests on the validity of the original estimates of the employment value of a given capital expenditure. This primary employment effect depends mainly on the absolute level of wages and prices and on the proportion of leakages through profits and imports.[1] None of these factors is likely to remain constant during such a process of expansion. The rise in wage rates by about

[1] See Chap. VI.

10 per cent. from 1935 to 1938 was not even slowed down during the 1938 recession and may become accentuated when the hitherto sporadic inelasticity of labour supply becomes greater and more general. That will evidently reduce *pro tanto* the primary employment effect of a given expenditure. The same will happen if the profit share rises, which is also not unlikely during a strong upward movement. Ultimately our formula allows for a proportionate increase in imports as a result of the expansion. But owing to the pressure on the home market and the relative shortage of labour and, possibly, productive capacity, the demand for imports may rise disproportionately, which implies again a lowering of our primary employment values. These three tendencies seem to suggest that the lower limit of our primary employment estimates—or even less than that—represents a better approximation under the prospective conditions of 1939. On the other hand, it must not be overlooked that a higher profit ratio (and to a minor extent a higher import ratio) represents leakages on the primary stage but creates secondary employment; and further that we must also consider 'tertiary effects' on investment. Thus, assuming always a sufficient elasticity of labour supply, our rather cautious estimates may not be wide of the mark.

Up to now we have analysed the prospective employment effects on the tacit assumption that defence borrowing on the proposed scale is truly additional. After the allowances made we do not question that the extra £200 millions represent net borrowing of the Government. The question is rather whether this borrowing is or can be additional from the point of view of the community as a whole. In other words, whether the Government can invest an extra £200 millions on defence works without curtailing other public and private investment. In order to find at least a tentative answer to this question we must examine the possible sources which could produce the additional means.

Evidently part of the additional savings will be supplied automatically by the process of expansion. Profits will increase and losses diminish or be turned into surplus. The proportion of undistributed profits may be expected to rise because business will be more inclined to rely on self

financing for their expanding investment. Private incomes of wage earners and entrepreneurs will rise, too, and may be presumed to result in increased savings. What savings can be expected from this source? If we put the income multiplier rather high, say at 2, and assume that the extra borrowing were really additional, the national income would be raised by about £400 millions. It seems unlikely that more than a quarter of this additional income will be saved. Thus only half the amount of the borrowing would seem to be forthcoming from additional saving. Where does the other half come from? A higher average rate of saving from a given income or a diminution of maintenance and stockholding would apparently represent a mere diversion of resources; defence investment would grow partly at the expense of consumption or of other investment, and to that extent create no new employment. Labour shortage, capacity limits, and rising costs may indeed induce a reduction of private investment which would otherwise have taken place, but as long as suitable labour reserves are available this is by no means necessary. The additional source of savings which will be tapped automatically unless the central bank counteracts deliberately will be provided by credit expansion. This 'inflationary' process will make up for any temporary deficiency in current savings until total income has risen to a level sufficient to provide the necessary extra saving, and will generate additional employment until the employable labour reserves are exhausted.

It is on the assumptions that the Government's loan expenditure is truly additional, that labour supply is sufficiently elastic, and that private and other public investment rises by not more than is accounted for by the income multiplier, that we estimated a decrease of the statistical unemployment by about 1 million in response to £200 millions extra borrowing. If there is additional private investment, too, and consequently a further rise in primary and secondary employment, or if there appear numerous bottle-necks at an earlier stage of the expansion, owing to the immobility of factors, the short-run physical limits of the country's productive capacity will have been reached. In order to avoid a sharp rise in prices which the market forces would bring

about, and to secure priority for armaments orders in this case, a system of rationing and of a political allocation of the unexpansible resources between various types of private demand and civil and military public demand would become imperative. At the same time, however, additional borrowing in the above sense becomes superfluous, since the deliberate curtailment of civil investment and consumption will supply the means for further Treasury loans. If, when, and where, the country's production will meet its physical limits and pass over to a kind of war-time planning, and how far advance planning can put off this stage, the events of 1939 will show.

## II. Civil Works Expenditure

### (*a*) *The Office of Works*

All the civil departments together, with the exception of the self-balancing services, need very little constructional work. Their demand is almost restricted to work on offices and office equipment, and to the upkeep of other public property under the care of the central government. As long as the administrative functions of the central State do not grow, most of the work will be maintenance and repair work, though some replacements and major alterations will be necessary to meet modern standards and to increase the convenience and efficiency of the administration. Actually, the complex conditions after the 1914–18 war, which called for more State interference and also augmented the work of the revenue department, led to a steady expansion of administrative activity. Apart from this extension of existing services the central government has taken over a number of new and important tasks, particularly in the social field, which also required more office accommodation. This extension of State services does not necessarily mean a proportionately greater demand for new buildings, since part of the requirements may be satisfied by renting existing houses, particularly if the expansion is supposed to be of a temporary nature or if suitable accommodation is available.

Works for all the civil and revenue departments are done through a central agency, the Office of Works. The cost of works are voted separately from the amounts of the various departments and collected under a special work vote.

The total appropriation under the Office of Works votes amounted to about £4 to 6 millions. A substantial part of this sum is, however, not spent on constructional works and must be excluded from our investigations.[1] The remainder, £2 to 3 millions, constitutes the costs of building work and of furniture and equipment. For our purposes it is convenient to deduct from this all the expenditure on building overseas (embassies, consulates, &c.) and expenditure on new works done for the Post Office, the former because the building work is presumably mostly done by foreign labour, the latter because of changes in the statistical recording which make it profitable to discuss it together with other Post Office expenditure on works.

After these corrections the aggregate expenditure on civil and revenue buildings amounted to £1·5 to 2·5 millions a year, of which £1·25 to 1·5 millions represent maintenance and repair work and £0·5 to 1 million new works. If we add another £0·25 to 0·5 million expenditure on furniture and equipment which are more or less in joint demand with new works and repairs, the total still remains below £3 millions per year until 1937, when, presumably in connexion with civil defence measures, this amount was slightly exceeded.

The movements of the main series are shown in Table 20. In this as in other cases new works fluctuate less than repairs and maintenance work. Public works planning must, therefore, endeavour to regulate in the first line variations in new works, though the possibilities of adjusting the absolutely greater but less varying expenditure on repairs must not be neglected. Planning in this field of public building should be relatively easy because variations in private demand do not call for variations in this type of building activity. There is, for instance, no need to build employment exchanges or revenue buildings because industrial activity is rising or falling, and although it may not be possible for social or administrative reasons to postpone a particular work scheme for more than a year or two, a certain proportion of the

[1] Occupational charges and rates on government property, stationery, and printing costs of the various government departments, general administration costs, which do not provide for primary employment in the constructional trades and cannot be regarded as being amenable to trade-cycle control.

annual schemes under contemplation might be ear-marked as trade-cycle reserve without causing great inconvenience. It will be observed that work on public buildings during the depression years 1930 and 1931 exceeded that of the preceding two or three years, very likely as a result of deliberate attempts on the part of the Labour Government, then in power, to maintain public construction during the depression. The actual expansion was but small; but it must be remembered that there was no deliberate postponement of works in previous years. A 10 per cent. increase of works expenditure in a depression is perhaps all that can reasonably be achieved under similar circumstances. The two following years 1932 and 1933 show a drastic reduction of works expenditure, not so much as the natural reaction to previous anticipations but mainly as a result of the economy campaign of 1931, which encouraged the departments to postpone works in the final stages of the depression. There can be little doubt that part of these delayed works were then carried out in 1934 and 1935 when the industrial recovery was well on the way. These developments show that there is some scope for slowing down or accelerating works in this field. If it were possible to increase building work by about 10 per cent. in 1930–1 without previous postponements and to cut down expenditure by over 25 per cent. for two years through an economy campaign, a deliberate policy could perhaps succeed in securing an anti-slump reserve of 20 to 25 per cent. of the average total of, say, £2 to 2½ millions.

That would appear to be an upper limit, which may not be available in the course of normal trade-cycle policy. For it is obviously the impression of a severe slump which makes the various departments inclined to postpone work schemes, while it may prove to be a harder task to impose similar restrictions on the departmental demands in good times. Still, it would be possible by anticipating works in bad times to secure a fairly constant volume of works and to prevent actual contraction of State building work in a depression.

Any favourable effects which the rise of works expenditure in 1930 and 1931 would have had, or any unfavourable effects from the contraction of the work services in the final stages of the depression were, however, probably sterilized

by the fact that it was financed wholly from revenue. Even if financial orthodoxy should prevent borrowing for such purposes, there should be here little difficulty in the way of the accumulation of financial reserves in good times to meet an increase of expenditure in bad.

### (*b*) *The Post Office*

The military and civil departments so far discussed all satisfy some kind of collective demand and are financed out of taxation. Their services are not sold to individual consumers, and the citizen pays for them irrespective of the amount of them he may wish to consume. The Post Office is on a different footing. Its revenue is derived from the sale of postal services; each consumer decides how much he wishes to consume and contributes in proportion. The Post Office meets the whole of its costs from these trading receipts, and receives no grants from public revenue; indeed, the considerable annual profit on Post Office operations accrues to the Exchequer and supplements the revenue available for general public purposes.

This commercial character, which distinguishes the Post Office from the Supply Services, raises special problems if it is desired to fit its constructional activity into a trade-cycle plan. Obviously its investment depends in the end on the movements of market demand for its services. That part of its works which are done at the direct request of customers, such as the installation of telephones, must be carried out almost exactly when and where it is demanded. It cannot be much postponed or anticipated, and its volume will certainly grow when business is expanding and decline when general contraction sets in. Regional changes in the volume of postal traffic through the erection of new housing estates or migration of industry are also likely to require almost immediate investment and to be partly of a cyclical nature. In these cases the Post Office can but follow the cyclical movements of demand and must act like any other commercial undertaking.

There are, however, other parts of Post Office investment which depend less on the direct request of the consumer and on short-term cyclical variations in demand, and more on

the general trend of demand and technical expediency. Constructional work on post offices, telephone exchanges, trunk lines, and other works which serve groups of customers are likely to have a greater elasticity with respect to timing. The Post Office, like other public utilities, designs its plant with a view to a future growth of demand and carries capacities in excess of current requirements. The construction of an automatic telephone exchange is planned not for the actual number of telephone subscribers but with a reasonable margin for future subscribers. There is, therefore, no immediate need to extend this kind of work when demand arises. The Post Office may deliberately allow this margin to decrease in good times and to increase in bad times. These 'growth reserves' act in any case as a buffer and loosen the connexion between plant extensions and demand expansion. Secondly, the trend of the demand for various kinds of postal services can be reasonably foreseen. At least a minimum rate of growth, say, of the telephone system or of the letter and parcel traffic can be estimated in advance and can serve as a guide for anticyclical planning of investment.

The Post Office is in a privileged position to pursue such a policy because as a State monopoly it need not fear the actions of competitors and may, owing to its public utility character, be called upon to render services which do not produce profits at once, or even some which are not profitable in themselves but are socially desirable. Forecasts of future requirements cannot be perfect, and it may happen that the actual rate of expansion falls short of the estimated rate or that expansion takes an unexpected direction. Such risks are not entirely avoidable and are an inherent element of all anticipatory investment, though their importance must not be overestimated in view of the prevailing tendency in depression times to underestimate future demand. The more cautious the estimate of future demand the smaller will naturally be the risk of malinvestment; the smaller will be, on the other hand, the amount of work which is available for trade-cycle regulation. For a public works policy it is essential to find the right mean and to weigh up these risks against the advantages of greater stability and, possibly, lower constructional costs.

There is, moreover, a kind of technical trend partly interconnected with the trend of demand which offers opportunities for advance planning of investment. The introduction of technical improvements and particularly the pace at which the rationalization proceeds need not to be affected, in principal, by the ups and downs of demand. The transition to automatic telephone exchange or the motorization of the collection and the delivery services would have been profitable even without an upward trend of demand or with a gradual decline of demand. Moreover, there is much to be said on purely commercial grounds for speeding up the introduction of cost-saving devices precisely in depression times when revenue usually falls faster than costs. Such an acceleration, if technically feasible and within the limits of the long-term normal capacity of the specialized supply industries, would partly make up for the renunciation of profits which a slowing down of the rationalization in good times would imply. But even if there is no clear financial advantage in proceeding more slowly with technical improvements during the recovery, it is arguable that a State undertaking which is not exclusively led by the profit motive may be called upon to suffer some pecuniary losses for the sake of trade-cycle regulations.

Predictable demand and technical trends in conjunction with monopolistic and public utility character thus offer some chance of trade-cycle planning in the field of postal works. To determine that portion of postal investment which is (or could have been made) amenable to trade-cycle control, and to discover how much is undertaken in response to insufficiently foreseeable local and national developments and how much to consumer's demand of constructional work, is the foremost task of this section.

The significance of Post Office activities for our investigation rests on several factors. Firstly, the Post Office is the only public utility service owned and operated by the central government. The central State operates a number of producing establishments, but they lack the public utility character because they produce almost exclusively for the supply of State departments, not for the market. Secondly, it is one of the few instances where a public utility service is

administered centrally for the whole country. That makes it possible to plan work on a national scale without setting in motion a sometimes slow machinery of negotiations between various authorities. The immediate and complete control of the central State over the Post Office should make it easier to put into effect public works measures quicker than would be possible otherwise. Thirdly, the size of the undertaking and the range of its activities give the Post Office a prominent place in the national economy. The personnel employed by the Post Office numbers over a quarter million; its transactions of all kinds with the public amounted to slightly over £1,000 millions in 1937–8. This turnover figure includes, of course, the value of services sold as well as the value of all money and postal orders. The actual expenditure on the various postal services amounted to about £93 millions during the same year and was composed of £76 millions revenue expenditure and £17 millions capital expenditure. For comparison it may be mentioned that the expenditure of all the railway companies of Great Britain amounted to about £160 millions, and that the electricity undertakings of all local authorities showed working expenses of about £36 millions and a capital expenditure of about £21 millions.

It is important, too, that the postal revenue and expenditure show a clear upward trend. From 1926 to 1938 expenditure rose by about 45 per cent. or by over 3 per cent. per annum on the average. Even during the depression after 1929 the expansion continued, though at a reduced rate. The slowing down of the expansion was less marked in the case of expenditure in 1930 and 1931, years of depression, than in the case of income, while in 1932 and 1933 the reverse was true. Revenue began to grow at a greater rate, while the expansion of expenditure slowed down considerably. It is interesting that the total surplus after charging interest on capital was also little affected by the cycle. There was a slight absolute fall in the surplus in 1930, but otherwise it rose uninterruptedly from 1926 to 1933. If the profit figures after 1933 did not reflect the rising volume of business and actually fell for some years without regaining the 1933 record, that was largely due to changes in charges.[1]

[1] See Table 21 on p. 414. (Appendix.)

Now, it is evident that an expanding business offers greater opportunities for investment planning than a stagnant one; and the steadiness of the growth of postal income should make it particularly easy to adopt an anticyclical investment policy. It must, however, not be overlooked that the various classes of postal business require different doses of additional investment for a given rate of expansion. An increase in the letter and parcel traffic or in the volume of postal orders demands mainly additional labour and comparatively little new fixed investment; extension of the telephone system calls for considerable constructional works and few additions to the operating staff. The movements of the aggregate surplus are in a way misleading because they result almost entirely from general postal services which require little investment. The telegraph services show a deficit throughout the period, and offer, therefore, no particular incentive for additional investment unless for rationalization purposes. The telephone service, which always produced a surplus, though it fluctuated severely and rather independently of the industrial cycle, was by far the biggest factor in Post Office investment after the war. Its relative importance can be illustrated by the following figures relating to the quantity of various kinds of postal plant and equipment in service at the end of the fiscal year 1937:

| | |
|---|---|
| Total number of post offices | 24,717 |
| Telegraph offices | 13,881 |
| Telephone exchanges (of which 2,559 are automatic) | 5,663 |
| Telephone call offices | 48,157 |
| Telephones | 3,050,012 |
| Mileage of wire | 14,217,000 |

Another way of showing the present composition of the capital assets, which makes still clearer the predominance of the telephone system, is this: the net capital liability of the Post Office in March 1938 amounted to £182 millions. Nearly £140 millions of that sum are accounted by telephone and telegraph plant, about £31 millions by freehold land and buildings, slightly over £6 millions by engineering stores (mostly telephone engineering). The rest, about £5 millions, is taken up by leasehold land and buildings (£2·3 millions), light, heat, and power plant (£1·7 millions), and the Post Office (London) Railway (£1·2 millions). This statement

refers only to capital assets charged to capital account, and it must be remembered that extensions and improvements of a capital nature for general postal purposes were entirely met out of revenue up to March 1929. The figures tend, therefore, to overstate somewhat the importance of the telephone investment. We shall see later that four-fifths of the revenue expenditure on engineering works represent expenditure on the telephone system. For our purposes this classification is not entirely satisfactory. There are various other assets which represent capital goods and may be amenable to trade-cycle regulation like letter boxes and bags, postal apparatus, furniture, motor vehicles and cycles, clothing stores and certain other stores. They are treated as working expenses and charged against revenue as they are purchased. If allowance is made for this factor, the share of telephone investment within the total postal investment becomes somewhat smaller but still remains preponderant.

The relative share of the various services in the present stock of capital assets shows their relative investment intensity but does not indicate their cyclical sensitivity. We must, therefore, consider the actual variation of the various kinds of work during the trade cycle. The Post Office presents the data in two ways. As a government department it publishes an Appropriation Account like other government departments and on the same principles. As a trading concern it prepares also a Commercial Account on the lines of ordinary commercial accounting with a balance sheet as summary. The two types of accounts supplement each other in several ways.

The Appropriation Accounts distinguish between loan expenditure and engineering (revenue) expenditure and give some information about the movements of stock account. The Commercial Accounts state the net additions to capital and correspond roughly to the loan expenditure of the Appropriation Accounts.[1] The two pairs of works expenditure and their subdivisions overlap in various ways.

[1] The continuity of the main series is slightly disturbed by changes in statistical recording. The most important change took effect in 1929: annual grants for revenue building and for the Post Office no longer provide for expenditure of a capital nature for general postal and telegraph purposes. This expenditure which relates mainly to building works and to the acquisition of sites and the supply of fittings on behalf of the Post Office has been met since then out of money raised

Maintenance and renewals expenditure cover a wider field of works than engineering expenditure by including work on motor vehicles, letter boxes and bags, and similar items which are apparently not part of the engineering expenditure. The net additions to capital are—apart from different subdivisions—smaller than loan expenditure by the amount of write-offs and sale of capital assets.

Let us now consider the behaviour of the various classes of constructional work during the trade cycle.[1] The capital expenditure[2] of the Post Office was fairly constant at a level of about £10½ millions between 1926 and 1930. If we add the new works for general purposes shown up to 1929 under Work Votes but later met out of borrowings, the constancy of capital expenditure during the period becomes even more apparent. From 1930 to 1933 expenditure[2] declined by about 42 per cent. to £6¼ millions, the main fall occurring in 1932 and 1933. Then followed a steep rise to about £17¼ millions in 1937, i.e. far above the preceding boom level. Net additions to capital as shown by the Commercial Accounts moved very similarly. They varied slightly more between 1926 and 1930 and declined more from 1930 to 1933; but the shape of the curves is practically identical. Both series show a distinct and rather severe cycle, one year behind the industrial cycle. The belated turns can evidently not be ex-

under the Post Office and Telegraph Money Act (1928). We can bridge this break in continuity by adding back the new work (not the Repair Work and the provisions for furniture, which is still shown under Work Votes) carried out by the Office of Works for the Post Office in the pre-1929 period. The annual total of these works which are now provided out of borrowings amounts to about £340,000 and £400,000 between 1925 and 1928.

The second change relates similarly to the allocation of engineering expenditure between vote and loan expenditure. The principle of allocation is that the charge proper to the Vote is the original cost of the plant displaced plus the cost of recovery, and that the balance of expenditure representing the costs of additional plants is a capital charge. The ratios in use for the allocation under review were based on labour and material costs ruling at 1 April 1924. These out-of-date ratios were gradually revised after 1931, and at the same time the maintenance accounts, particularly of telephone plants, were improved by separately ascertaining the special labour costs of the various maintenance operations and allotting them to the items which form the constituent parts of any equipment. How far these allocations affected the year-by-year fluctuation of the various series is not known. It might be assumed, however, that they were not so big as to alter the general course of expenditure.

[1] See Tables 22–6 on pp. 415, 416, 417.

[2] Expenditure listed as 'capital expenditure'—i.e. excluding Engineering expenditure. See Table 22, page 415.

plained, like those of ordinary government department or local authorities' works, by the lag of government revenue behind industrial income. There is no such technical lag in postal revenue, and it is doubtful whether the lagging of postal investment behind the general cycle is a normal feature, which can be expected to recur. It may be that expenditure was maintained in 1930 as a result of a deliberate employment policy on the part of the Government and that the severe restrictions of 1932 and 1933 were partly effects of the economy drive. It may be that plans for capital expenditure were made before the beginning of the fiscal year and then carried out more or less on that scale irrespective of the economic development during that year; or it may have taken some time to slow down a large-scale programme of expansion once it had begun and to set it going after a period of contraction. It is likely that all these factors contributed to the belated downswing in 1930 and the delayed revival in 1934.

We can get, however, some further hints as to the forces which determined the shape of the expenditure curve by analysing the movements of its component parts.[1] It will be seen that net additions to telephone plant began to decline after 1928, slightly at first in 1929 and 1930, and more pronouncedly from 1931 to 1933. The early fall was largely compensated by increased additions to land and buildings and to non-telephone plant. But although these were well maintained in the later stages of the depression, they could not compensate for the severe fall of telephone investment. The marked expansion after 1933 is likewise determined by additions to telephone plant. With the help of the Appropriation Accounts we can subdivide this block of telephone investment further into four main groups, viz. expenditure on 'subscribers' circuits', on lines, trunk lines, and telephone exchanges. The movements of the four kinds of works differ characteristically.[2] Work on subscribers' circuits, which represents work done on behalf and on demand of customers, moves in complete agreement with general business activity: a slight fall from 1927 to 1928 is followed by an increase in 1929; the downswing begins in 1930, one

[1] See Table 24 on p. 416. [2] See Table 23 on p. 415.

year before that of total capital expenditure, and reaches bottom in 1932, again a year ahead of the turning-point of total loan expenditure; the rate of decline is smaller in 1930 than in 1931 and 1932, the total fall from 1929 to 1932 amounting to about 39 per cent.; the subsequent expansion is mild in 1933, but gathers momentum in the following years. This close agreement with the trade cycle is what one could expect of a kind of capital work which depends directly upon consumer's demand. The other classes of work depend, of course, ultimately on the market demand, but in a more remote way, and are determined rather by the trend of demand. That applies least, perhaps, to the construction of local lines, which are partly connected with the variations in work for subscribers and cannot always be planned ahead. On the other hand, not every increase in the number of subscribers requires the construction of a local line because the latter generally carries a certain amount of reserve capacity. The actual variations bear out this greater aloofness from the trade cycle. The construction peak for local lines was reached in 1928, two years before the fall of total loan expenditure. The moderate decline in 1929 and 1930 was accelerated in the following three years, and even in 1934 construction remained at the lowest level. The percentage fall from 1928 to 1934 is extraordinarily severe; it amounts to about 70 per cent. Neither the increase of work for subscribers in 1929 nor its expansion from 1932 to 1934 has made necessary an expansion of local line construction, although constructional activity was more severely restricted during the depression than any other class of work.

When we compare with this pattern the movements of constructional work on trunk lines we see at once that it is still less connected with the general cycle or with the total loan expenditure. Expenditure on trunk lines rises gradually from 1927 to 1930, recovers suddenly and strongly in 1931, and begins the downward movement in 1932, falling at a rate of about 25 per cent. per annum until 1934. What has been said about local lines applies *a fortiori* to trunk lines. They are designed not for the present demand but for the expected future demand some years hence, and are, therefore, undertaken independently of short-term variations in

demand. They can clearly be postponed for some time when demand is rising after a depression owing to their usual excess capacity. Moreover, they interconnect larger markets and are, therefore, less affected by uncertain local developments, which makes it easier to plan them ahead and to proceed with new construction in bad times. It is difficult to decide whether the sudden increase in trunk-line work was a deliberate piece of public works policy or merely necessitated by the rapid construction of telephone exchanges, and whether construction work could have been maintained at that high level for another year, if the economy drive had not discouraged such a policy.

Expenditure on construction and extension of telephone exchanges seems to be similarly independent of short-term variations of demand. It expanded considerably from 1928 to 1931, and though receding, remained at about the 1929 level in 1932. After a further fall in 1933 it increased again.

Exchange construction thus had the shortest depression period of all four series. They declined two years after the turn of the general cycle and one year after total loan expenditure, but recovered simultaneously with both in 1933. The explanation for this anti-slump behaviour is this: in 1928 the Post Office made a contract with five firms for at least £2 millions yearly supplies of telephone exchanges equipment from January 1928 to March 1933. Now, in none of the five years did capital expenditure on telephone exchanges reach £2 millions. During the initial period when the scheme came into operation delivery apparently began only slowly. Actually the 1928 expenditure of £1·1 million was hardly higher than that of 1927. In the second and third year expenditure rose to about £1·6 million, in the fourth year to about £1·75 million, but fell back to about £1·5 million in the fifth year.[1] The moderate rise of expenditure after the second year, when one would expect according to the general experience a large works programme to come into full force, and its fall in 1932, makes it rather probable that the full execution of the scheme was slowed down as a result

[1] It is possible that parts of this scheme may have been carried out on revenue account. Against that must be set, however, that there must have been some other work of a capital nature on telephone exchanges outside the five-year contract.

of the depression. Nevertheless, this programme, arranged in 1928 without any intention of trade-cycle stabilization, though with a view to securing stable employment for the industry concerned, did even in its restricted form act as an anti-slump factor.

What information there is about the volume of new construction tends to confirm our analysis of the expenditure side. The annual increment in the number of telephone exchanges was considerably higher during the three depression years than in the preceding or following period of good business activity. The mileage of underground wire likewise increased at a higher rate in 1930 and 1931, whereas the growth in the number of telephone stations slowed down after 1929, but recovered rather rapidly from 1933 onwards; and additions to the number of telephone exchanges and to the length of wire laid fell until 1934.

Thus the fact that Post Office loan expenditure was relatively well maintained during the first two years of the depression was largely due to the special scheme of exchange works and to the higher level of trunk-line construction. Their curtailment in 1932 and 1933 is one of the main elements which caused a sharp drop in loan expenditure during these years. If we add that additions to freehold land and buildings varied narrowly between £1 and 1¼ millions, and those on leasehold land and buildings rather violently but not cyclically between £0·12 and £0·44 millions, it becomes clear that these three groups of expenditure together show the least conformity with the general cycle and individually either an inverse relation or no distinct cycle at all.

From the point of view of public works policy these kinds of works offer the best scope for trade-cycle planning. They are remote from the direct influence of consumers' demand unlike installations for subscribers or to a smaller extent local lines; they are designed from the very beginning for future growth and carry therefore a certain amount of capacity in excess of present needs which might be allowed to narrow down in good times and to widen in bad times. They involve in any case a certain amount of advance planning. Finally, the transition to the automatization of telephone exchanges and similar technical improvements can apparently be made

independently of the trade cycle and the movements of demand, and can be freely postponed and accelerated in the interest of trade-cycle policy without serious disadvantages. Whether these opportunities have been fully exploited in the past is doubtful. The five years' programme of work on exchange equipment could perhaps have been extended instead of restricted, particularly in the last year of the depression. On the other hand, the slow increase of the number of telephone exchanges after 1933 might suggest that the foreseeable investment possibilities at that time were fairly exhausted. Trunk-line construction proceeded at a high level during the recovery periods before 1929 and after 1933 and could perhaps have been partly postponed in the former period and more anticipated with respect to the latter. Such an *ex-post* consideration does not, however, do full justice to the *ex-ante* problems which the investment authorities have to face. As the depression deepens, trend forecasts will be made with less certainty and previously made forecasts may be revised downwards as a precautionary measure. Moreover, an expansion like that of industrial activity from 1933 to 1939 could not have been completely foreseen, and therefore a certain amount of investment parallel with the cycle was inevitable. Part of the fall of loan expenditure in the later stages of the depression might also be due to the anticipations made in the earlier stages. The mere movements of the expenditure figures do thus not reveal sufficiently whether full use has been made of planning possibilities in this field of postal investment.

The other two classes of loan expenditure, viz. telephone installations on consumer's premises and the construction of local lines, are less amenable to trade-cycle control. The former are closely bound up with industrial fluctuations, the latter present difficulties for advance planning. There are only two ways by which the Post Office might attempt to mitigate these fluctuations: by accumulating materials and goods for this kind of work in depression periods, or by tariff reductions in bad times. The significance of a storage policy in this case depends very much on the ratio of materials to labour on the spot for this kind of work. The value of reductions of charge as a means of promoting telephone

consumption in depression times is even more doubtful, because the short-term elasticity of demand is presumably very low.

If we regard these two classes of expenditure as unadaptable to trade-cycle regulation, we cannot expect total loan expenditure to move inversely to the cycle; for expenditure on subscriber's circuits and local lines is substantial enough —amounting to between one-third and over one-half of the total—to influence the shape of the aggregate curve. All that can be hoped for is to flatten out the more or less cyclical movement by deliberately planning that part of the investment which is anyhow undertaken with a long-term view.

New investments depend very much on the growth of the postal system and on the expectations as to the future course of demand. When the growth of demand slows down or ceases, new investments will fall off rapidly or cease altogether unless technical improvements offer safe investment outlets. New works are thus particularly sensitive to changing expectations induced by variations in demand and therefore attract a special attention in trade-cycle policy. Moreover, additions to the stock of capital are usually met out of borrowings and are thus a medium through which a reflationary or deflationary policy may be carried out. In both respects maintenance expenditure is less important and less interesting from a public works point of view. Maintenance and repair work is usually done out of current revenue and is less affected by the trade cycle because it must go on a certain scale even if demand is falling. A decrease in the number of telephone subscribers would, for instance, hardly reduce the costs of maintaining the telephone plant and equipment for the remaining customers. Yet within certain limits maintenance and repair work can be postponed or accelerated and the methods of finance can also be subordinated to some extent to the needs of trade-cycle regulation.

Now, the Post Office carries out work on revenue account of about £7 to £10 millions a year.[1] More than 80 per cent. of this work is done on telephone plant; the telegraph services account for about £500,000 to £900,000; and postal

[1] See Tables 25, 26 on pp. 416, 417. (Appendix.)

and general services show a strongly increasing reinvestment of £400,000 to £1,400,000. Aggregate expenditure on these three kinds of work moved remarkably steadily and partly in opposite direction to the general cycle. It declined slightly from 1927 to 1929; and the average of the three depression years slightly exceeded that of the three preceding upswing years. The revival after 1934, finally, was reflected in a steady expansion of maintenance expenditure. The high average of the depression years could prima facie be interpreted as a deliberate effort. But we mentioned already that the trend of postal services was strong enough to prevent a decline in postal income. Except in 1931, when it was fractionally smaller than in the previous year, the decline of business activity only lowered its rate of increase. New construction also continued, as we saw, and the growing capital stock made a trend-like increase in the maintenance and repair expenditure inevitable. If account is taken of this trend of income and new constructions, total maintenance expenditure seems to have been rather subnormal, at least during the first two depression years, but to have caught up in the third year. Allowances must, however, be made for the higher price level ruling during the two upswing periods as compared with the depression period and for the change in the composition of the capital assets through automatization and other technical improvements. Thus it is not quite clear whether revenue expenditure was fully maintained or whether, above that, maintenance works were deliberately anticipated during the lean years.

An analysis of the subdivisions of engineering expenditure according to the main services does not lead very much farther. Telephone work shows much the same features as the main curves, namely, a 3 per cent. higher average expenditure during the three depression years as against the three preceding upswing years and a steady expansion after 1932. There was a strong expansion of maintenance works from 1929 to 1930 which was presumably due to deliberate acceleration efforts. This was followed by a slight recession in the following year, partly perhaps as a reaction, partly in conformity with the decline of total income in that year. But in 1932 expenditure increased again.

Maintenance expenditure of the postal and general services seemed to be even more affected by trend factors. It rose throughout the depression and shifted suddenly in 1932 to double the previous level, increasing gradually further in the subsequent years. Work on telegraph plant and equipment showed, on the other hand, rather a downward trend in accordance with the shrinkage of telegraph business. During the depression it fell about 25 per cent. below the 1927–9 level and did not recover markedly afterwards. It is notable, however, that on the lower level, expenditure tended to rise rather than to fall as the general depression deepened. This steadiness within the depression is presumably all that can be expected in a field of shrinking activity.

The Commercial Accounts allow us further to distinguish between maintenance expenditure and renewals expenditure on various categories of capital goods, including that on buildings, vehicles, boxes, and bags, which are not covered by the engineering expenditure of the Engineering Accounts. It will be observed from Table 25 that total maintenance expenditure had a clear upward trend and, with the exception of 1931, was rising continuously, while renewals varied round a constant level between 1926 and 1935. They were increased from 1929 to 1930 by about 10 per cent., but declined in 1931 by about 5 per cent. and kept that level in 1932. Whether more renewals could have been anticipated in the later stages of the depression or postponed in the subsequent recovery it is difficult to say. Taken absolutely, the 5 per cent. decline is mild, particularly in view of the fall in the general price level. But there again the trend should be taken into account in ascertaining the trade-cycle merits of the case. For general reasons it would appear that renewals can be more easily adapted to trade-cycle planning and that the accumulation of renewals funds in good times and their dispersion in bad times might be a helpful adjunct to anti-cyclical variations in loan expenditure.

Most of the engineering works on revenue account are done by the staff of the Post Office, while capital expenditure apparently relates mostly to contract work. Variations in the total industrial staff and in the wage bill of the engineering

establishments are, therefore, determined by the rather mild fluctuations of revenue expenditure. The number of engineering workers fell from the peak in 1927 to the trough in 1933 by almost 13 per cent., while wages, salaries, and allowances of the engineering establishments were at the lowest point in 1931, about 10 per cent. lower than in 1927. They rose from the lowest point to 1937 by 72 per cent. and 84 per cent. respectively.

When we now add together the expenditure of all the constructional work, whether done on revenue account or capital account, we get a curve which is mainly determined by the variations in capital expenditure. From 1926 to 1930 total works expenditure moved almost on a straight line between £17½ and 18¼ millions.[1] Delayed by one year behind the general cycle, the curve turned down for three years, the decline of capital expenditure being somewhat mitigated by the rise in revenue expenditure. After 1933 both kinds of expenditure increased and brought the total up to nearly £30 millions in 1937; that is, to roughly twice as much as in the trough year 1933. If we compare these clearly cyclical movements of postal gross investment with the estimates of national gross fixed investment, given in an earlier chapter, we find that the amplitude of the fluctuations of postal works is rather greater than that of national investment, but that the former turns a year later than the latter. In other words, except in the fiscal year 1930 the Post Office as a whole did not contribute towards a mitigation of the investment cycle.

[1] See Table 22, p. 415.

# IV

# EXPENDITURE ON CONSTRUCTION BY LOCAL AUTHORITIES

## I. The Field of Activity

THE larger part of public investment in Great Britain is in normal times carried out by the local authorities, and the objects of their expenditure cover a wide field and show great diversity of character. This fact gives their activities a potential influence on the course of the trade cycle which is much greater than that exercised by similar bodies in some other countries, notably the United States. The attempt to use public expenditure as an instrument for promoting trade recovery has meant in such countries a great extension of central rather than local government activity, and also a sudden encroachment on spheres which have been in the past there regarded as the exclusive preserve of private enterprise. In particular, Great Britain is distinguished by the high degree to which the building of houses for the masses of the people and the rendering of the 'public utility' services of water-supply, gas, electricity, and local transport have become a public duty. Together with the more inevitably public functions of the construction and upkeep of roads, and of provision for public health, poor relief, police, and education services, these make necessary a volume of expenditure on constructional work so large that variations in its timing must have quite a considerable effect on the general course of business, even when they are not actually designed to do so.

None the less, though local authorities in Great Britain have fingers in a great many pies, there are few which they bake alone. Their relations with the central government on one side, and with private and semi-private enterprise on the other, are complicated and important; and something must be said of them here.

Of the main groups of services which are administered by local authorities housing is that which has given rise to the largest amount of expenditure on construction since the

last War. Their activity in it was, however, almost a new thing in 1919.[1] It was first induced, by the Housing Act of 1919, as a part, but only a part, of a national drive to make good the housing shortage which existed at that time,[2] and to provide the famous 'homes fit for heroes to live in' for the demobilized fighting men. The local authorities were persuaded to enter the business of building and owning houses by the central government's offer to cover a large part of the annual loss in which their activities might involve them. For it was realized it could hardly be a paying proposition to build houses at the inflated post-war cost level, to be let at rents whose standard was roughly set at the pre-war level by the Rent Restrictions Acts. But grants of a similar kind were also made to private builders, as well as to public utility societies and housing trusts; and the local authorities were urged themselves to encourage private enterprise by making subsidies or lending money on easy terms. All were supposed to work together to meet an abnormal and temporary emergency. But it soon became apparent that public intervention in the housing field must be something more than an emergency matter; and its object gradually became that of raising the whole level of housing accommodation for the masses to a standard for which the poorer, at least, could not pay out of their own pockets. Thus, though assistance to private builders was continued and even increased by the Housing Acts of 1923 and 1924, building and ownership by local authorities at permanently uneconomic rents became more and more the centre of the national housing policy. More authorities also began to build houses without subsidy, to be let at economic rents to the better paid sections of the working and lower middle classes. The distribution of new building between assisted local authorities, assisted private enterprise, and unassisted private enterprise varied greatly from time to time. Between the Armistice and the spring of 1929 more than two-thirds of the round total of 1,280,000 houses built

[1] The capital expenditure of local authorities for 1913–14 was only some £800,000, and their total outstanding housing debt only about £13,000,000—about 2 per cent. of all local debt.

[2] There had, of course, been practically no new house building during the four years of the war. But some of the trouble also came from the accumulated results of a low level of building activity for some years even before 1914.

had been assisted, and about 37 per cent. had been built by local authorities. After that, however, there came a considerable change. The rates of State assistance had been considerably reduced in 1927, and were finally discontinued for straightforward house building after 1932. First building costs, then interest rates, had come down really substantially; and in 1930 unassisted building for the first time exceeded assisted. Under the Housing Acts of 1930 and 1935 the emphasis shifted again to an attempt to abate the specific and more or less accurately measurable evils of slums and overcrowding. General house building could be left to unassisted private enterprise; but in the new assisted programmes, which involved clearance and destruction as well as the construction of houses, there was little place for private enterprise. In the great housing boom of 1933 to 1936 the importance of public building was temporarily dwarfed, though it came into its own again in 1937 as private building slackened and the slum-clearance programme came to maturity. But even this phase was coming to an end before the outbreak of war. In the summer of 1939 the local authorities were within sight of their statutory objectives in the matter of slum-clearance and abatement of overcrowding. When these objectives are reached, they will be left with the apparently permanent function of owning and managing, at subsidized rents, the houses of a considerable part of the nation's wage-earners. Also, though more unevenly and precariously, they are in the field as providers of unsubsidized houses. The rest remains to private enterprise.

In the trading services there is also a mixture of public and private enterprise and, in the case of electricity and road transport, of the national 'public concern'. Local authorities have not, for the most part, general rights to enter the public utility field, but many of them have obtained powers to do so by local Acts of Parliament. In the exercise of these powers they are often regulated by statute in much the same way as private undertakers in the same field. Water-supply, the oldest of the public utility services, is the most generally in public hands. The supply to Greater London is made by the Metropolitan Water Board, which ranks as an *ad hoc* local authority; and in the rest of England

and Wales some fifty-eight out of the eighty-one county boroughs[1] and a considerably smaller proportion of municipal boroughs and urban districts have publicly owned supplies. The urban local authorities frequently make supply to parts of the rural areas around them; and where they do not, the duty has recently often been undertaken by rural district councils. But, particularly in the south of England, a number of cities, such as Bristol and Portsmouth, are supplied by private companies. The Ministry of Health exercises a general supervision over the enterprises of local authorities; but there is as yet no central authority which has any considerable powers of co-ordination or control of water-supply for the whole country.

Gas supply is in public hands over most of the north of England and in parts of the Midlands—twenty-nine county boroughs controlled their own supplies in 1935—but it is almost exclusively a private preserve elsewhere. In London the Gas, Light, and Coke Company is much the largest gas enterprise in the country. Of the 1,404 million therms supplied by statutory gas companies, 493 millions—a little over one-third—were supplied by local authorities. Here again, there is little general control from the centre.

In the case of electricity supply, the field of public control is larger. The main transmission system of the country—the 'grid'—has been constructed since 1927 and is owned by the Central Electricity Board, which is an independent 'public concern'. The business of generating electric power is divided. In 1936 rather over a half[2] of the units produced in Great Britain was generated in power stations *owned* by local authorities or joint boards; but almost nine-tenths of the total were generated in stations, local authority and private, under the *direction* of the Central Electricity Board, and were handed over to them for re-sale. Retail distribution is also divided, but only about 58 per cent. of units sold to consumers were distributed by local authority undertakings. More than half the Metropolitan boroughs and practically all the great cities have their own supplies; but the country

[1] Excluding East and West Ham, which are served by the Metropolitan Water Board.

[2] 11,089 million out of 20,524 million units.

districts are the preserve of private enterprise. The McGowan Committee recommended in 1937 a far-reaching reorganization of the retail distribution of electricity, but it is not clear whether adoption of its recommendations would increase or diminish the size of the public sector. A limited general supervision is exercised over both private and public undertakings by the Electricity Commissioners, and control over capital expenditure on generating stations is practically in the hands of the Central Electricity Board.

In local passenger transport there is again division of the field. Trams, buses, and the Underground in the area of Greater London have been managed since 1 July 1933 by the London Passenger Transport Board, a 'public concern'. Its creation involved the surrender by the London County Council of its tramways, and a similar sacrifice by some of the county and municipal boroughs in the Metropolitan area. The great majority of the county boroughs in the rest of England and Wales own and operate their own tramways and motor-bus services; but in the smaller towns and country districts private companies—now for the most part financially connected with the railway companies—are predominant. Only a very loose general control, confined to matters of safety and of the limitation of new competition, is exercised by the Ministry of Transport and by regional Traffic Commissioners. For harbours and docks there are nearly one hundred public authorities including the Port of London Authority and the Mersey Docks and Harbour Board, which are best regarded as *ad hoc* local authorities, and the councils of Bristol and a few other county boroughs. Most of the remaining ports, including some of the greatest, are owned by the railway companies. Aerodromes promise to provide a new and expanding field of public enterprise. But in 1935, though thirty county boroughs spent money under this heading, it was as yet mostly for the acquisition of land and other preparatory work: their total capital expenditure was only some £268,000.

Apart from these main branches of the trading services, there are municipal cemeteries, markets, and estates almost everywhere. There is also a miscellaneous series of experiments in entertainment services at Bournemouth, Brighton,

and other watering places, a municipal telephone service at Hull, a dairy at Worcester, and so on. They are not, even in the aggregate, of appreciable economic or financial importance, and their numbers do not show much sign of growing.

Even in the normal and regular 'social services' of local government there is in many cases no very sharp line between public and private enterprise and financial responsibility. In elementary education there is the curious dualism between the 'provided' and the 'non-provided' schools. In the one, the responsibility for the construction and maintenance of the school buildings rests with the local authority, in the other with private religious bodies. The running costs are provided in both cases from local rates and central government grants, and the local authority has now the power to make, if it wishes, a capital contribution towards the cost of new 'non-provided' schools. In secondary education there are secondary schools owned and managed by the local authority; there are schools which are rate-aided, but which none the less keep much independence in matters of building policy and otherwise; and there are the private and so-called 'public' schools which receive no kind of public financial assistance and are subject to no form of public financial control. For all except the last, the general standard of buildings required is set, it is true, by the Board of Education, but final financial control does not rest with it. Finally, there are the universities, receiving grants from the State and sometimes from local authorities as well, but guarding jealously their independence and the disposal of their funds. Probably not much more than a bare majority of capital expenditure on educational buildings and facilities is at present under the direct control of local authorities.

In several of the public health services the line between public and private responsibility is also blurred. There are hospitals built and maintained by local authorities, which since the final 'break-up of the Poor Law' in 1929 have been rapidly increasing in number. There are hospitals built and owned by private charitable bodies, but largely dependent on contributions by public authorities to their

annual costs or to the costs of extension and modernization. There are hospitals, like the great London hospitals, which are entirely dependent on endowments and fees for services rendered, and, for the cost of extensions, on the proceeds of private gifts. Parks, pleasure grounds, and playing fields open to the public are partly provided by public authorities, including the Crown itself, and partly by private bodies. Even the cost of laying sewers, though it is in the main a public charge, is often borne initially by the speculative builder who lays out a housing estate. In the public security services there is diversity between public, private, and public-assisted fire brigades; and the police of London are under the control of the Home Secretary and not of any local authority. Even the maintenance of roads and bridges, once regarded as the most exclusive responsibility of local authorities, is so no longer, for since 1937 the Minister of Transport has taken over full financial and administrative responsibility for trunk roads outside the county boroughs. And the spread of town-planning and the compact housing estate has thrown much of the cost of constructing service roads to private houses, like that of their sewers, on to private building firms.

This lack of definition in the boundaries of the field of local authority enterprise and investment in Great Britain has considerable bearing on the problems of control of public investment as a part of trade-cycle policy. It has certain disadvantages, in that it makes it very difficult to see the question of public investment in social and public utility services as a whole, and, particularly because of the irregular and unsystematic character of the control exercised by the central government, still more difficult to plan or to regulate it. There is the danger, well illustrated by the history of housing policy, that sudden development of a particular service may be pushed without regard for the effects on the economic system as a whole, and at the expense of much investment which would otherwise have been made by private enterprise. On the other hand, the diversity of the activity of local authorities means that relatively minor legislative and administrative changes could, without great disturbance of existing arrangements, very much increase the

amount of capital expenditure over which a determined control might be exercised. The fact that public and semi-public enterprise in Britain has already entered so many spheres undoubtedly increases the possibility of controlling the timing of a great volume of constructional work. But the task of weaving the constructional activities of so many independent and overlapping activities into a single plan, and of making that plan quickly responsive to a necessary change of economic policy, is bound to be very complicated. It requires determination, administrative flexibility, and financial boldness on the part of the central government, combined with a willingness on the part of local authorities and semi-public bodies to surrender, at any rate in an emergency, much of the independence of action which they so warmly cherish.

## II. The Course of Total Expenditure since 1919

An inquiry into the amount of expenditure on construction by local authorities must fall under two heads: expenditure charged to capital account and financed largely, though not entirely, from loans; and expenditure on the maintenance, repairs, and renewals of buildings and equipment, which is financed either from current revenue or from accumulated funds. Broadly speaking, the cost of creating or purchasing any durable asset is charged to capital account, and is amortised over periods of years equal to the conventional life of the asset. Expenditure on the maintenance and repair of such assets and, usually, renewals and replacements which become necessary within the amortisation period, is met from revenue and does not pass through the capital accounts. The definition of 'capital expenditure' is necessarily somewhat arbitrary, and is not altogether uniform between different authorities. Some county councils, for instance, seem to treat the cost of minor road improvements as a current charge which is unworthy of inclusion in capital expenditure; while most boroughs, particularly the smaller ones, enter such expenditure in capital accounts, even though it may be often financed by a transfer from revenue. Moreover, all authorities in varying degrees are accustomed to carry out small improvements and additions

to buildings, without showing their cost as capital expenditure. But since the practice of individual authorities in this matter is not subject to sudden change, minor diversities do not affect the reliability of the figures as a guide to *movements* of capital expenditure; and items of constructional work which are not entered in capital accounts are in any case covered by our other series which deal with maintenance, repairs, and renewals.

The theoretical and practical difficulties involved in drawing an exact line between what is properly 'capital' and 'current' expenditure are fortunately not relevant to our inquiry. But it should be noticed that capital expenditure does not correspond, even for an individual authority, to 'net investment'; for replacement of durable assets at the end of their conventional life, if it takes place at all, gives rise to new capital expenditure. A closer approach to the concept of 'net investment' by local authorities in any year would be provided by the increase of their net indebtedness.[1]

For expenditure on capital account, the first difficulty is to obtain a series of annual figures which are both comprehensive and continuous for the whole of the post-War period. The series most commonly used is that published annually in the *Statistical Abstract*. But down to the financial year 1928–9 this gives for England and Wales the total expenditure out of loans alone; only from that date onwards does it include expenditure on capital account financed from capital grants from the central government, and from the sale of capital assets; and at no time does it include expenditure on capital account financed by transfer from revenue or from reserve funds. It is possible to improve on these figures by making use of the Annual Local Taxation Returns.[2] These contain statements of annual capital expenditure, however financed, by each county, county borough, and metropolitan borough council; by each of these classes of local authority as a whole; and by the classes of municipal borough, urban, and rural district councils, and of miscellaneous authorities.[3]

[1] That is, of gross outstanding debt *less* accumulations in sinking funds.

[2] Since 1934 called 'Local Government Financial Statistics'.

[3] For Boards of Guardians until their disappearance in 1930, the information oversexpenditure from loans and 'special' expenditure financed from revenue; and for M.B.s and U.D.C.s in 1919–20, and the R.D.C.s until 1923–4, only expenditure

These are all based on uniform statutory returns made annually to the Ministry of Health. For the years since 1929–30 a summary has been published of expenditure by all authorities taken together, after the elimination of transfer payments between authorities of different classes which arise out of boundary extensions, capital grants in aid, and the like; and in 1938 there was published for the first time a comparative table of total expenditure, covering the years 1913–14 and 1927–8 to 1935–6, by all English and Welsh authorities. For the years before 1927–8 it is only possible to obtain annual totals of local expenditure on capital account by summing the expenditures of each class of authority.[1] A further slight complication is introduced because these figures of capital expenditure include a book-keeping item, 'unused balances of loans repaid to lenders, and receipts from sales of capital assets transferred to sinking funds', which does not represent effective new capital expenditure at all. The amount of this item is distinguished for all classes of authority only from 1932–3 onwards;[2] for earlier years it can only be extracted for the more important classes of authority, and, in detail, only for certain services. For Scotland the information given in the Scottish Local Taxation Returns is classified in a slightly different way, and refers throughout only to capital expenditure financed other than by transfer from revenue.

Subject to these qualifications, the Local Taxation Returns for both parts of Great Britain no doubt attain to a high degree of accuracy and reliability. They have, however,

from loans. For these last two classes of authority, however, other capital expenditure was negligible.

[1] These figures are not exactly comparable with the series obtained from the summary for later years, because transfers between authorities of different classes are included in them. But the discrepancy thus introduced is quite small, and for most purposes the two series can be linked, or a rough allowance made for it. For the years 1929–30 to 1935–6 the differences between the net totals given in the summary and those obtained by summation of expenditure by classes varied between £2,791,000 and £3,709,000.

[2] This item is not shown for county councils before 1932–3; for the London County Council and Miscellaneous Authorities before 1930–1; and for other authorities only in part before 1929–30. The high figures of £18 millions for 1933–4 was due to exceptional repayments arising out of the formation of the London Passenger Transport Board. Of the rest, an increasing amount was due to repayments by private individuals of loans on account of small dwellings.

the disadvantage of being very slow to appear. For England and Wales the figures at present available extend only to the year 1936–7,[1] and for Scotland only to the year 1933–4. However, the Ministry of Health has for some years released every August a statement of the amount of loans for capital works by English and Welsh authorities which it has sanctioned in the previous financial year; and, although the Ministry does not sanction all loan expenditure, or any expenditure financed otherwise than by way of loan, investigation reveals that in the past there has been a close and definite relation between the amount of loans sanctioned in one year and the total amount of capital expenditure in the next. On the assumption that this relation was continued, it is possible to make estimates, with a margin of error of perhaps 12 per cent., of the amount of capital expenditure which will be ultimately recorded for 1936–7 and 1937–8.

The information which can be extracted from these sources is summarized in Table 27. The column 'Total Capital Expenditure' includes all expenditure on capital account by local authorities in England and Wales, and expenditure from capital receipts for Scotland, as extracted from the Local Taxation Returns. In the column 'Effective Capital Expenditure' the book-keeping items and transfers between authorities are extracted as far as possible, and estimates of expenditure are given for the latest years.

But even the total of 'Effective Capital Expenditure' is not identical with capital expenditure on constructional work, since it includes the purchase of land and already existing buildings, occasional purchases of private trading enterprises, costs of transfer and compensation in connexion with permanent works, and also some costs of litigation and of the promotion of Local Acts of Parliament. These do not, of course, represent 'investment' from the point of view of the whole community, nor do they directly exercise any stimulating effect on the constructional trades. No comprehensive information has been published as to the amount of expenditure of this kind. A small sample investigation into the accounts of local authorities yielded the following

[1] For 1936–7, only in summary form. Complete information is available only to 1935–6.

percentages of 'Effective Capital Expenditure' which went in these ways during the period 1929 to 1936:

| | | | |
|---|---|---|---|
| Housing | 6·2 per cent. | Other Public Health Services | 15·5 per cent. |
| Education | 15·7 „ | Trading Services | 8·1 „ |
| Roads | 18·8 „ | Small Dwellings[1] | 100·0 „ |
| Sewerage | 2·1 „ | Miscellaneous | 3·0 „ |

On the assumption that these percentages were constant throughout the period, the annual amounts of expenditure of this kind can be calculated. They are shown in Table 27, column 3. If these amounts are then deducted from the totals of 'Effective Capital Expenditure', the results indicate the annual capital expenditure on constructional work (Table 27, column 4). These figures must, however, be regarded as only approximate.

But quite apart from this difficulty, movements in the annual figures of total capital expenditure do not accurately represent changes in the physical volume of constructional work done by or for local authorities. For changes in constructional costs have been at certain times very considerable. It is desirable, therefore, for some purposes to correct the figures of money expenditure by some index of the cost of capital goods.

One index of this kind is available for the years 1929 to 1935, and can be continued for later years.[2] A rough check on this index, and also some information about the earlier

[1] Expenditure on small dwellings consists of advances to private persons to enable them to purchase their houses. It may, or may not, induce new construction, according to the particular circumstances.

[2] Colin Clark, *National Income and Outlay*, Table 87: continued in slightly different form in *Economic Journal*, Sept. 1938. This index number is composed as follows:

| | *Weight* |
|---|---|
| Building costs | 360 |
| Machinery | 130 |
| Iron and steel | 100 |
| Commercial vehicles | 21 |
| | 611 |

The same author's *National Income, 1924 to 1931* (chap. 10, Table XLVII) contains material from which the series can be carried back to 1924, though the weights and items there used are slightly different. These various series, though not strictly continuous, can be linked together within the limits of accuracy of the other figures available, and can be adjusted for fiscal years, so as to cover the period from 1924–5 to 1937–8.

years, can be obtained by constructing a weighted index of commodity prices and wages, as follows:

| | *Weight* |
|---|---|
| Commodity prices (not food): Board of Trade, reduced to base 1930 | 1 |
| Wage rates: Rueff (quoted in Beveridge, *Unemployment*) and Bowley, as used in the Bank of England Statistical Summary. Both reduced to base 1930 | 2 |

For the years for which both are available, the Capital Goods Index and this rough Special Index move fairly closely together; so that the Special Index can be used as at least an approximate guide for the years 1920 to 1924.

The effect of making corrections by means of these two index numbers is shown in Fig. 4. The correction required to the money figures in the earlier years is very great, the peak of 1921–2 being reduced to a very minor maximum. After that, the effect is approximately to equate the peaks of 1927–8 and 1931–2, considerably accentuating the degree of expansion between 1928–9 and the latter date. The precipitate decline after 1931–2 is little affected, and now stands in its true place as much the largest reduction of local activity during the period. The degree of recovery from that date is seriously affected only in the last year, when it appears that the level of real activity had not yet reached that of 1931–2, instead of somewhat surpassing it.

It would be wrong, however, to lay too much stress on the importance of these figures. From the point of view of the financial burden on local authorities, especially the burden of loan charges, it is the money expenditure, adjusted, if at all, for movements of interest rates, which is important. Price and cost movements are themselves part causes, part symptoms, of the trade cycle.

If we examine the course of capital expenditure, whether in real or in money terms, as set out in Fig. 4 for the whole of the period since the last War, the first impression must be one of amazement at its instability. In only six of the eighteen years covered was the annual percentage change in 'Effective Capital Expenditure' less than 10, up or down; and the total magnitude of the fluctuations is enormous. For part of the period there is a strong suggestion that the course of expenditure was determined by cyclical influences.

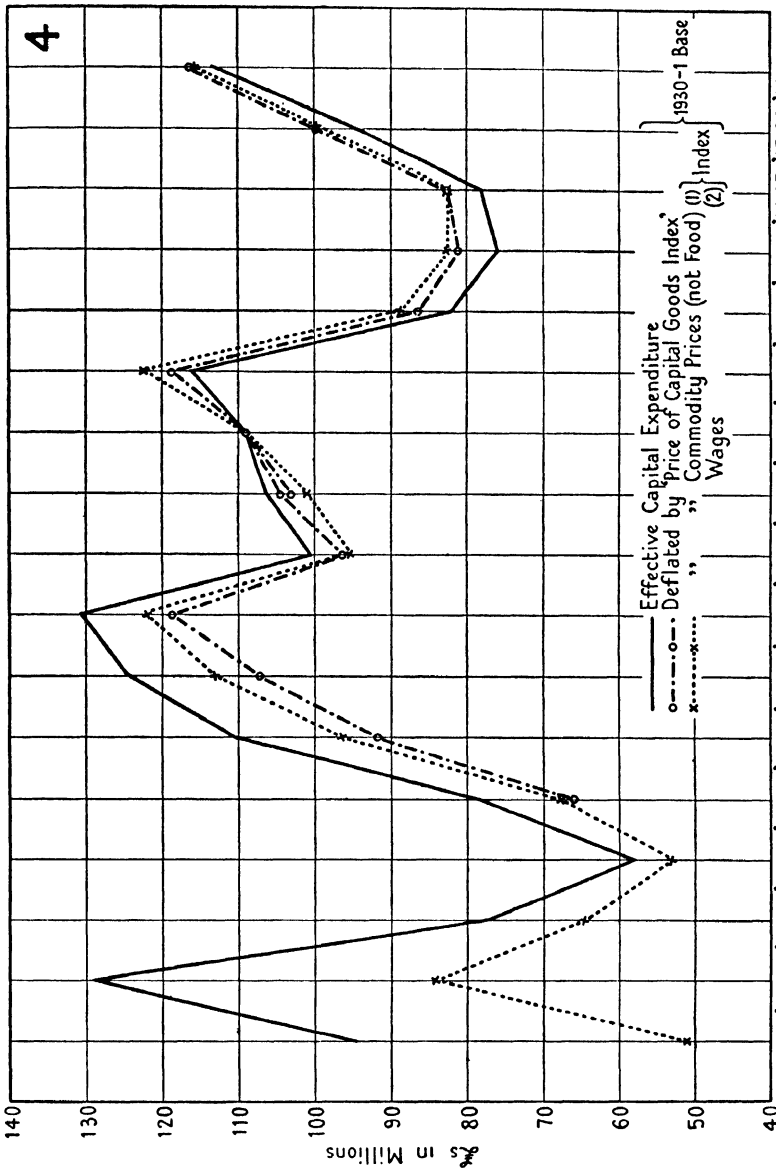



FIG. 4. Capital Expenditure of Local Authorities. Great Britain.

The general trade recessions which centre on 1921 and 1931 are matched by declines in local expenditure—but in each case after a lag of two years. The trade boom of 1920 is represented, after a lag of one year, by a sharp peak of local expenditure. The general prosperity of 1936 and 1937 was also accompanied by a considerable expansion. In the period from 1923 to 1931, however, it is clear that other influences than a delayed reaction to the state of trade must have caused the peaks of 1927–8 and 1931–2, and the low point of 1928–9. But the relative and absolute magnitudes of the fluctuations must have been large enough at all times to exercise a considerable influence on the general course of national economic activity. Between 1921–2 and 1923–4 expenditure was reduced by £83 millions, or more than one-half. The recovery to 1927–8 brought it back almost to its previous level in money terms, and considerably higher in real terms. The fall in the next two years involved a decrease of nearly £30 millions, and this was followed by an expansion of about half as much to 1931–2. The fall from the level of £128 millions in that year was to £87 millions two years later; but by 1937–8 the total had risen once more to between £130 and £140 millions. The fluctuations in the capital expenditure of local authorities have been of at least as large a relative order of magnitude as those of private investment.

But in order to understand the course of events in detail, it is necessary to examine the main objects of local expenditure one by one. This is done in the next section.

The second part of the inquiry concerns expenditure on maintenance, repairs, and renewals. For this there is no single source of published information, and only a little can be gleaned from the Local Taxation Returns. Different methods of approach have been used for different services, as is indicated in the footnotes to Table 28; and the difficulties of definition and interpretation were considerable. The total amount of expenditure of this kind which has been obtained by summing the series for the various services must therefore be regarded as only approximate. More reliance can be placed on the accuracy of the size and directions of the annual movements than on that of the absolute size of

the totals. None the less, the latter may serve to show the general order of magnitude of expenditure on repairs and maintenance by local authorities. Over the years 1929 to 1935 this averaged about £71·2 millions, against £94·7 millions of 'Effective Capital Expenditure'—roughly in the ratio of 3 to 4. This may be compared with Colin Clark's estimate,[1] based mainly on the Census of Production, that for the whole country in 1930 maintenance and repair work accounted for £259·5 millions of a total 'Output of all Capital Goods for the Home Market' of £607 millions. This gives a ratio of almost exactly 3 to 4 between repairs and maintenance, and new work.

A summary estimate of all expenditure on construction by local authorities in England and Wales during the years 1929 to 1935 is given in Table 29. The relative steadiness of expenditure on maintenance, and its rather different timing, served to damp down the movements of the total. But these were none the less considerable. There was an upward movement of about £14 millions from 1929 to 1931, a reduction of over £40 millions spread over the next two years, and a recovery of nearly £23 millions between 1933 and 1935. The different timing of the movements of capital and maintenance expenditure are of considerable interest. At both the upper and the lower turning-points the curve of maintenance expenditure moved one year ahead of that of capital expenditure, and was, therefore, more closely related to the movement of the general business cycle.

It is also interesting to examine the movements of other categories of local expenditure in recent years, in order to observe their varying degrees of sensitivity to the trade cycle. These are shown in Fig. 5. 'Working expenses', which include expenditure on repairs and maintenance, had a strong tendency towards secular increase and showed very little sensitivity to trade depression. That is undoubtedly because the economies which were made in bad times on repairs and maintenance were offset by increased expenditure on relief and poverty services. Repairs and maintenance showed, over the limited period for which figures are available, a smaller trend of growth but much greater cyclical

[1] Colin Clark, *National Income and Outlay*, Tables 79 and 80.

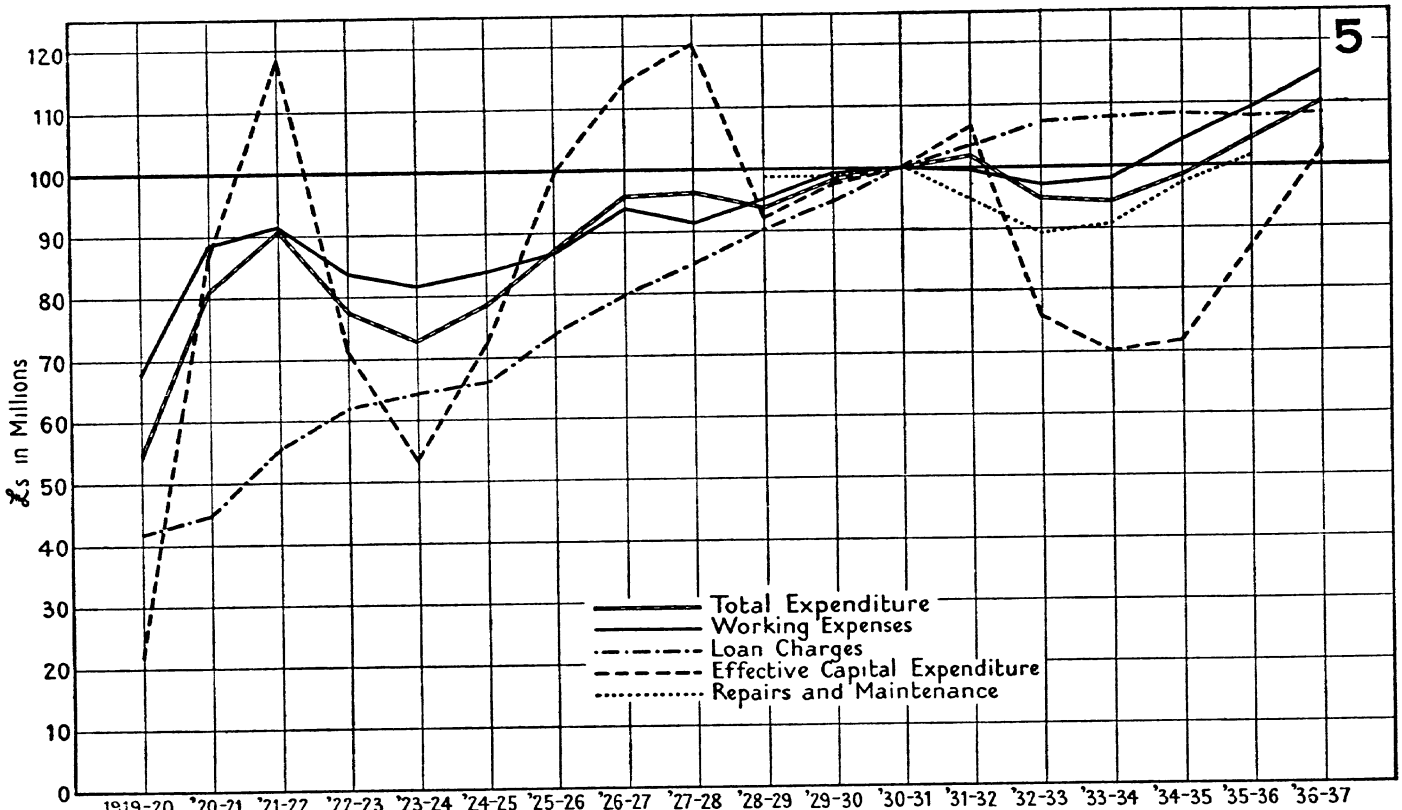



FIG. 5. Expenditure of Local Authorities. England and Wales.

sensitivity. Capital expenditure showed a cyclical decline of over one-half in the first depression and one-third in the second, and was thus by far the most sensitive. Interest and repayment of loans, after rising rapidly until 1932, then became practically stabilized as a result of the fall of interest rates and the slackening of capital expenditure.

## III. Housing

The course of capital expenditure on five main groups of services is set out in Table 30. The most cursory inspection shows that the variations in total capital expenditure have been dominated by expenditure on housing. The course of housing policy therefore demands investigation first of all.

Housing has been the main constructional activity of local authorities since the war. At its maximum in 1921–2 it accounted for £90 millions out of a total capital expenditure of £153 millions, or roughly three-fifths. In only one year, 1923–4, did its absolute amount fall below £20 millions; and at its most recent minimum in 1932–3 it was still the object of more than one-quarter of total expenditure. Its general course presents a series of wild fluctuations, which, both in their relative and absolute magnitudes, are truly enormous.

It may be said at once that the chief, though not the only, cause of these fluctuations have been changes in the conditions and amounts of the subsidies which have been offered by the central government to encourage local authorities to carry out the changing national policies embodied in the successive Housing Acts.[1] The first great outburst of expenditure, which culminated in 1921, was occasioned by the Housing Act of 1919. The main financial provision of this Act was an undertaking by the State to meet all that part of the annual deficit on approved housing schemes which should exceed the proceeds of a 1*d.* rate in the area of each housing authority. This meant that the actual grant payable from year to year would depend on several factors—changes in the rate product, savings effected through reduction of the rate of interest payable on the money borrowed origi-

[1] For a convenient account see H. C. Heaks and C. H. Kirby, *Housing Finance in Great Britain* (1938).

nally, and changes in the total rents received. The Act was well suited to produce general activity among local authorities. The limitation of the burden to the amount of a 1*d.* rate made it almost as advantageous for poor authorities as for rich authorities to build. The level of construction costs per house, or of the rents to be charged, were thereby made considerations entirely secondary to those of getting on with the programme as fast as possible. But it was also, as events soon proved, extremely extravagant. The sudden rush of building, and the lack of incentive to keep down costs, played into the hands of private builders and contractors at a time when building costs were in any case inflated as a result of the post-War monetary disturbances. As a result, when the short-lived post-War boom in industry gave way, the housing programme felt the full force of the axe of economy. At the beginning of 1921 a policy of limiting of commitments was adopted, and in July it was decided that only the houses built, building, or for which tenders had already been accepted (176,000 in number) should rank for grant. There was indeed some time-lag between the decree of economy and the actual reduction of expenditure; but when the fall in expenditure came, it was catastrophic.

The housing problem, however, could not be shirked for long. A renewal of expenditure was soon provided for by the 'Chamberlain' Housing Act of 1923 and by the 'Wheatley' Housing Act of 1924. These Acts abandoned the principle of a limited financial liability for the local authority and an unlimited liability for the State, in favour of a system of fixed annual grants for each house built, irrespective of the particular financial resources of each local authority. Under the Chamberlain Act the grant was fixed at £6 per house for twenty years, which was usually taken as being equivalent to a capital sum of £75; and the local authority could sell the resultant houses, or let them at such rents as it thought fit. Under the Wheatley Act the amount of the grant was very much higher—£9 per house in urban areas, and £12. 10*s.* per house in rural areas, for a period of forty years. This worked out in urban areas at a capital sum of about £155 per house. But under this Act local authorities could not sell, and were required to observe certain conditions about

maximum rents and, on the other hand, were not allowed to carry to the rates a greater loss than £4. 10*s*. per house. Under both Acts local authorities were empowered to grant subsidies to approved building by private enterprise. The grants were, however, reviewed in 1926. For the Chamberlain Act the amount was reduced to £4 for each house completed after 30 September 1927, and for the Wheatley Act to £7. 10*s*. (£11 in agricultural parishes) from the same date. In 1928 it was decided that houses built under the Chamberlain Act and not completed before 30 September 1929 should not be eligible for grant at all, and in 1931 grants under the Wheatley Act were discontinued for houses built under proposals submitted after 30 September 1932.[1]

These two Acts produced another burst of housing expenditure, which reached its peak in 1927–8, though it was very unevenly spread over the country, both in its amount and in its timing. But, as with the 1919 Act, heavy subsidies and rapid building were accompanied by a sharp rise of costs. It has been estimated[2] that between 1923 and 1924 the rise in the average all-in building cost of a non-parlour house was £40, as compared with the Chamberlain subsidy of capital value of £75; and between June 1924 and June 1926 costs rose another £52, as compared with the increase of £80 in the capital value of the subsidy which was made by the Wheatley Act. In all, building costs rose by about £92 on the cheapest kind of house, which was about 60 per cent. of the value of the whole subsidy under the Wheatley Act. In the following year, 1926–7 costs fell by £10, and when the reductions of subsidy became effective, much more: by June 1932 they had fallen by £122 from the peak level of 1925–6. In the meantime, the number of houses completed (under both Acts) had fallen from nearly 104,000 in the financial year 1927–8 to about 52,000 in 1930–1. The movement of the costs of land, roads, and sewers also appears to have been downwards, though not nearly so sharply; but the rates of interest at which local authorities could borrow

[1] This was confirmed as a final measure by the Housing (Financial Provisions) Act of 1933.

[2] E. D. Simon, *The Anti-Slum Campaign* (1933), p. 168. These figures are not easily reconciled with the quarterly figures published in the Ministry of Health Reports.

fell only a little from 1926 until the great break in interest rates in 1932 and 1933.

In interpreting the movements of expenditure we have thus to take account both of the direct effects of movements of costs, and of the reaction of local authorities' building programmes to the movements of costs and to the alterations of grants. The most important force was certainly alteration of the rates of grant. The great rise from the levels of 1923 was clearly due to the passage of the two Acts (especially of the Wheatley Act), and the notification of the reductions of grant which were to come into force in September 1927 produced a sharp final peak, followed by precipitate decline both in the rate of expenditure and in the numbers of houses completed. The slight increase in the numbers of houses completed in 1931–2 also appears to have been the result of a desire to anticipate the complete termination of the Wheatley subsidy, though the device of fixing the termination by reference to the date of submission of proposals rather than to that of completion of the houses made the reaction of expenditure to the change of financial policy much less pronounced.

But it must also be noticed that the fall in building costs after 1927 more than outweighed the reduction of grants. A local authority building with the reduced grant in 1930 was financially certainly no worse off than one building with the full grant in 1927. This suggests that some of the reduction of expenditure and performance in local house-building after 1927 was due, not so much to the direct financial effects of the reduction of grants, as to the attitude of local authorities to their housing programmes. The initial stimulus of the Chamberlain and Wheatley Acts tended to wear off. The cumulative effect of heavy housing expenditure on the rate-burden in some places became apparent. Many local authorities proved themselves to be unwilling either to take advantage of lower building costs to let at lower rents or to start inroads into the market for houses for unskilled workers of the lowest income grades. The final termination of the Wheatley Act subsidy in December 1932 was indeed accompanied by an administrative veto on further straightforward building programmes, besides increasing their net cost to the authority. But in general,

before that date, the trouble seems to have been an unwillingness to face the change in the needs of the housing problem, from that of making good a general deficiency of houses, to placing decent houses within the reach of the lower strata of wage-earners. It is possible, though not certain, that a carefully planned increase of grants would have done more to assist this change of view-point than the actually realized fall of building costs.

The third main phase in post-war housing was opened by the 'Greenwood' Housing and Slum-clearance Act of 1930. As its name suggests, this was a deliberate attempt to alter the direction of housing policy and to open up a wide new field for expenditure; for, though the earlier Housing Acts had contained some special provisions for slum-clearance and rehousing, little had been accomplished under them. By the Greenwood Act, the basis of grant was altered to that of the number of *persons* displaced from slums and rehoused, the annual amount being fixed at £2. 5*s*. per person for forty years. In the case of a household of five persons, this represented a capital sum of about £190 per house. A sum of £3. 15*s*. per person displaced was also to be contributed from the rates. The Greenwood Act, however, had the misfortune to come into force just before the economy campaign of the autumn of 1931. The figures of completed houses show that little serious attempt was made to execute it before the year 1934–5, in spite of the launching by the Minister of Health of a great national anti-slum campaign in April 1933. In 1935 it was reinforced by another Act, designed to secure both the redevelopment of slum areas and general building for the abatement of overcrowding. This offered grants of not less than £6 per flat for forty years, and a possible grant of £5 for twenty years for ordinary dwelling houses. In 1938 the grant payable in respect of each new approved house built after the beginning of 1939 for the purpose of either slum-clearance or the abatement of overcrowding was fixed, in normal cases, at £5. 10*s*. for forty years. These measures caused the third great burst of housing activity. There was a rise in the numbers of houses built by local authorities in England and Wales from 35,500 in 1934–5 to nearly 80,000 in 1937–8, and a rise

of expenditure from £19 millions to between £35 and £40 millions. But on this occasion the rise was both more moderate in absolute amount and less rapid than in the previous phases of expansion.

For maintenance expenditure on local authorities' housing we have no detailed information before 1930. After that date, expenditure on repairs was naturally rising rapidly, as work became necessary on houses built under the earlier post-War Housing Acts. Our sample inquiry suggests that in England and Wales alone it rose from £1,766,000 in 1930–1 to £3,635,000 in 1936–7. There may have been some tendency to postpone work on repairs and redecorations during the depression until 1933–4 and 1934–5, when the rate of growth became much more rapid; but on the whole there is no very clear evidence of cyclical sensitivity. This may perhaps be explained by the fact that under certain of the Housing Acts local authorities were compelled from the first to make annual allocations to a Repairs Fund, and in other cases did so of their own volition: since 1935, they have been obliged to do so in the case of all State-aided houses. Where this had been originally done, money was regularly available for repairs without the need for additional strain on the rates, and the most potent of the direct motives for 'economy' during the depression was absent.

This summary of housing development since the War makes somewhat depressing reading. Two of the three great programmes of expansion were initiated in years of prosperity, with unnecessary haste and with recklessness of their disturbing consequences for the building industry and the economy as a whole. In 1921 and, to a lesser degree in 1931, the policy of expansion was abruptly reversed at a time of general unemployment when it could most easily and cheaply have been carried out. Even in the last period of expansion, since 1934, the purpose of the central government seems to have been to achieve large results in the shortest period of time, rather than to insist upon a regular programme spread over a number of years. Certainly there was no attempt to plan a reserve of building which could be undertaken in a future period of unemployment in the building trade or in industry as a whole.

## IV. The Trading Services

The trading services, taken as a group, are easily the second largest object of expenditure on capital account. The course of expenditure on them, shown in Tables 30 and 31, is less fluctuating than that of any other of the main groups. Apart from the fact that the peak year in the second part of the period was 1927–8, it shows a clear cyclical pattern, with low points in 1923–4 and 1933–4 and fairly sharp recovery thereafter in each case. In general, the trading services are interesting because they form the group of local authority activities in which purely economic considerations of costs and profitability have the greatest importance, and in which direct control by the central government is at a minimum.

The group as a whole has come to be more and more dominated by expenditure on electricity supply. This accounted for about two-fifths of the total capital expenditure in 1920–1, and well over one-half in 1934–5. Although, apart from differences of trend, the general course of expenditure in this and each of the other trading services is not dissimilar, the peculiarities are sufficient to make separate discussion necessary. In interpreting the figures for each service, it must be remembered that the costs of purchase of existing private electricity, transport, and water undertakings are included. These are seldom a significant part of the total expenditure on any service, but they do occasionally distort the magnitude of changes from year to year.

For electricity supply we have for most of the period two separate sources of information—the Local Taxation Returns for England and Wales and for Scotland, and the Annual Reports of the Electricity Commissioners. When the figures given by these two sources are on a comparable basis, they are not always in exact agreement, but the discrepancies are small. The information given by the Electricity Commissioners, for expenditure both on capital and on revenue account, is much the more detailed, and has been generally used for the account which follows [see Tables 51 to 57].

Capital expenditure shows a strong upward trend since

the War, but also violent fluctuations which are clearly partly cyclical in character. There were high points in 1925–6 and in 1927–8 to 1930–1; and low points in 1923–4 and 1932–3 and 1933–4. The variations were large: from £10·2 millions in 1923–4 to £13·9 millions in the first cycle, and from over £16 millions to £12·5 millions in the second; and there was a recovery to a level of £21·4 millions in 1937–8. The Electricity Commissioners Reports allow us to examine the distribution of this total between expenditure on generation, and on distribution, apparatus on consumers' premises, and miscellaneous. Expenditure under the latter heading shows considerable fluctuations, but much smaller than the former: there was a fall of 23 points from 1930–1 to 1933–4, and a rise of 56 points thence to 1936–7. The decline seems to have been a purely cyclical movement, though induced more by uncertainty or panic than by any experienced slackening of the rate of growth of consumption. The cyclical element in the recovery was certainly reinforced by the response of consumers to the cheapening of electric current which the completion of the 'Grid' made possible. The explanation of the movements of expenditure on generation is more complicated. The peak year was 1927–8 —90 points above the level of 1930–1. There was thence a nearly continuous fall, only slightly interrupted in 1930–1, of 180 points to 1932–3, with some further decline in the next two years. In 1934–5 expenditure on generation was almost nil. Thence there was an enormous rise of over 200 points to 1936–7. It seems that the peak of 1927–8 resulted from a general attempt of local authority undertakings to expand their individual generating plants to provide for the steadily rising consumption. After that date the plans for the pooling of generating capacity by the construction of a national transmission system—the Grid—became public property, and electricity undertakers consequently sought to avoid expenditure on their plant until the situation should become clearer. When the Grid came into effective operation, great economies in the use of generating plant were realized, and the amount of reserve capacity (expressed as a proportion of the aggregate of station demands) had fallen from 42 per cent. in 1926–7 to 20 per cent. in 1937–8. But

the simultaneous cheapening of electricity led to a rapid rise in the rate of growth of demand, and consequently to a need for a great increase of generating plant (now controlled, though not owned, by the same authority as the Grid itself), as soon as the 'slack' occasioned by the Grid had been taken up. The construction of the Grid coincided most fortunately with the worst years of the depression. But its stabilizing effects were certainly somewhat offset by the reduction of expenditure upon generating plant which it caused. And the very rapid expansion since 1934 suggests that the previous reduction was rather greater than would have been necessary or desirable had the effects of the Grid on consumption been fully foreseen.

Expenditure on maintenance and repairs can be split into expenditure on generating plant, transmission and distribution equipment, and work for consumers. The total rose steadily from £4·5 millions in 1925–6 to £8·3 millions in 1936–7. There was some slackening of the rate of growth in 1932 and 1933, which may have been partly, though not wholly, attributable to the effects of the Grid, and there was a considerable steepening of the curve in 1935 and 1936.

Capital expenditure upon water-supply shows high points in 1920–1, 1924–5, and 1931–2, and low points in 1923–4, 1928–9, and 1933–4; the contraction from 1931–2 to 1933–4 was very pronounced.[1] There is also a distinct secular trend downwards, in spite of a very large increase in the consumption of water, and of the serious deficiencies in the arrangements for water collection which were revealed in many parts of the country by the droughts of 1921, 1935, and 1937. Much of the later expenditure has been for the provision of rural and sub-urban supplies, in which there is still very much to be done. The course of expenditure upon working costs (other than loan charges), repairs and maintenance, and capital expenditure for local authorities in England and Wales is summarized in Fig. 6(c). Total working costs showed only very slight reduction during the depression, and steady increase from 1933–4. Maintenance and repairs fell by over 20 per cent. from the level of 1929–30 to that of 1932–3, and recovered by 14 per cent. to

[1] See Table 31.

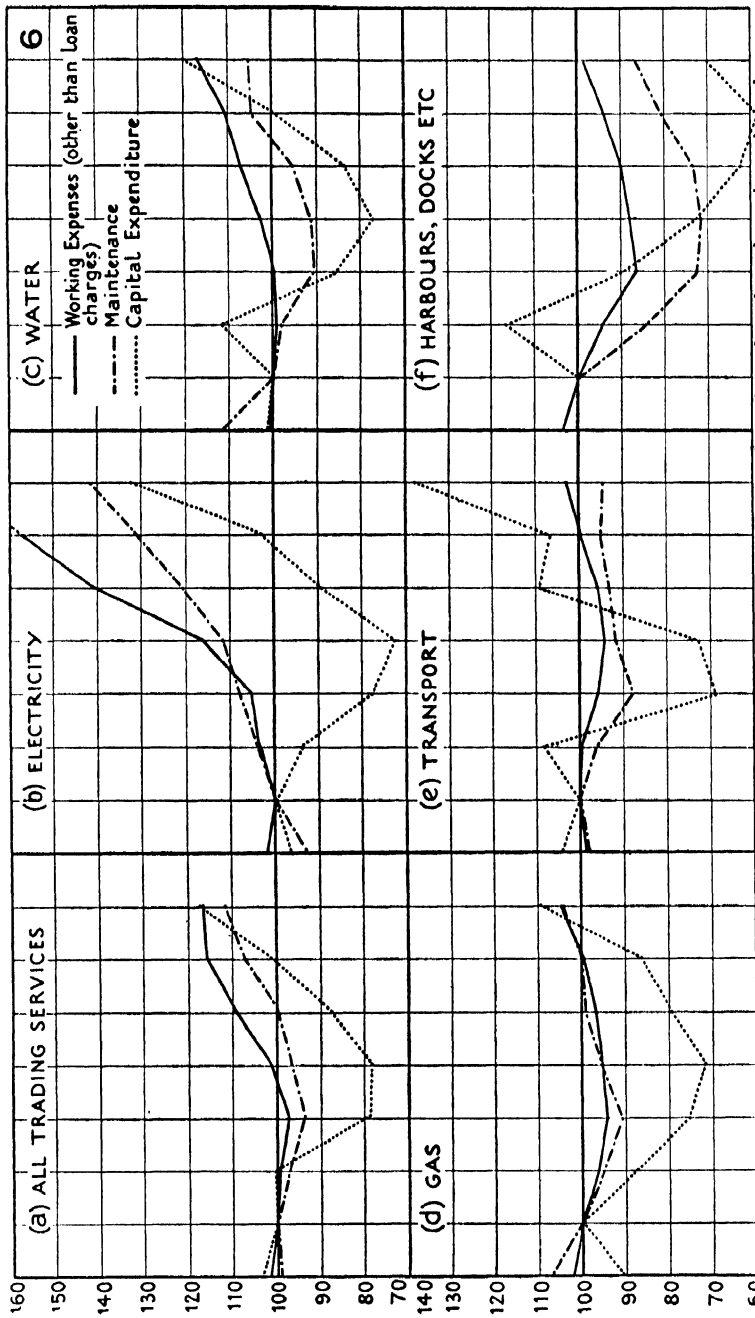



FIG. 6. Trading Services of Local Authorities in England and Wales. Working Expenses, Maintenance and Capital Expenditure. Indices 1930-1 = 100.

1936–7. Capital expenditure showed a sharp peak in 1931–2, a fall of 34 points to 1933–4, and a recovery of 43 points to 1936–7. Both capital and repairs expenditure were stimulated during the early years of the depression by grants from the Unemployment Grants Committee, which between December 1920 and January 1932 approved for grant water-supply schemes to the value of £20,377,000. For the last three years the figures were as follows:

| | £ |
|---|---|
| 1929–30 | 2,887,000 |
| 1930–1 | 4,518,000 |
| 1931–2 | 1,862,000 |

The sharp reduction in expenditure after 1931 was doubtless due to the cessation of such grants, as well as to the general drive for economy. A government grant of £1,000,000 was made available for rural water-supplies by the Rural Water Supplies Act, 1934, and by the end of March 1937 this had been allocated in aid of schemes estimated to cost £7,200,000. This must account in part for the sharp rise in expenditure during 1935 and 1936.

The figures of expenditure on transport show, like those for water, a declining trend, with very marked sensitivity to depression.[1] During the later years a rapid transition was taking place from electric trams to motor and trolley bus services, which has involved a considerable initial outlay on the purchase of vehicles, building of garages, removal of tramways, and reinstatement of roads. This has been to a considerable extent financed from reserve and renewals funds. Its ultimate effect seems to be to reduce maintenance charges, by removing the necessity for keeping up the permanent way of the tramways. A study of the figures summarized in Fig. 6 (c) and of local accounts, shows that the work of transition was to a large extent suspended or postponed as a result of the impact of the depression, and was then rapidly completed during the earlier stages of

[1] They must, however, be corrected to allow for the elimination from the field of local authority enterprise of tram and bus services in the Metropolitan area, as a result of the formation of the London Passenger Transport Board in July 1933. Allowance must also be made for the sale of one or two other municipal systems to private companies. Such corrections have been made, so far as is possible, in the tables presented.

recovery. The curve of capital expenditure fell by 39 points from 1931–2 to 1932–3, recovered slightly in 1933–4, and rose, with an unexplained hesitation in 1935, by 69 points to 1936–7. Maintenance and repairs showed a smaller fall of 12 points from the level of 1930–1, and a recovery of only 7 points to 1935–6, with a slight fall in the succeeding year. Total working expenses fell by 6 points, but had recovered above the level of 1930–1 by 1936–7. It is probable, however, that heavy expenditure will be necessary later on for replacement of motor and trolley buses bought in 1934–5. The transport services were not much affected by the grant policy of the central government. The total of tramway schemes approved for grant by the Unemployment Grants Committee amounted to only £5,330,000, only £82,000 of which were in the last three years of its life.

Expenditure on gas supply also shows a distinct downward trend, with irregular fluctuations—a sharp fall from 1926–7 to 1929–30, as well as the normal cyclical 'lows' of 1923–4 and 1933–4. It has clearly not been an expanding service, though it has held its own against the competition of electricity better than might perhaps be expected, in spite of the absence of large-scale rationalization on national lines. Working expenses showed a fall of 8 points from 1929–30 to 1932–3, and a recovery of 10 points to 1936–7; repairs, maintenance, and renewals were rather more variable, showing a decline of 17 points to 1932–3 and a rise of 13 to 1936–7; capital expenditure fell by 28 points from the peak of 1930–1 to 1933–4, had recovered half of this by 1935–6, and in the succeeding year rose much above the 1931 level.

Expenditure upon docks and harbours shows a curve not unlike that of gas, but with more pronounced fluctuations, and with no recovery until 1936–7. This was doubtless due to the continued depression in international trade. Unlike the other trading services it was very much influenced by grant policy, for schemes to a total cost of £20,756,000 were approved by the Unemployment Grants Committee, of which £4,865,000 were approved in 1929–30, £771,000 in 1930–1, and £507,000 in 1931–2. In depression and recovery, total working expenses fell 17 points from 1929–30 to 1932–3, and recovered by only 12 points to 1936–7;

repairs and maintenance fell 28 points from its peak in 1930–1 to 1933–4, and recovered 15 points to 1936–7; capital expenditure showed a continuous fall of 58 points from a peak in 1931–2 to 1935–6, 15 of which occurred in the last two years. This is clearly a service whose financial history has been much more affected by international than by domestic events.

The remaining trading services—markets, cemeteries, corporation estates, and miscellaneous enterprises—have been responsible for an expenditure too small to justify separate analysis.

Our general conclusion about the trading services must be that, as compared with most of the other activities of local authorities, they have exercised a stabilizing influence. But none the less the elimination of cyclical variations has not been as great as might have been desired, either in capital expenditure or in maintenance. It must be noticed that certain definite difficulties stand in the way of this, other than those of a psychological and financial kind. Much capital expenditure, particularly on electricity and water supply, consists simply of the extensions of mains and the provision of equipment for new houses, shops, and factories. It is therefore inevitably connected with the course of building by private enterprise and local authorities. On the other hand, very large schemes of public utility 'rationalization' on a national scale may, as we have seen in the case of the 'Grid', cause disturbing rather than stabilizing effects on local expenditure. It is rather in the intermediate field of the provision of new or modernized power stations and reservoirs, or of the extension of supplies to rural districts, and also in the field of maintenance and renewal of existing equipment, that there may be scope for greater stabilization or even for an attempt at offsetting cyclical fluctuations. It is certainly very important that the trading services should play a considerable part in any general plan of this kind. Capital expenditure upon them is generally self-liquidating, and expenditure on renewals is usually capable of being financed from accumulated reserve funds. Moreover, especially in the case of electricity supply and transport, the objects of expenditure consist of the products of the engineering

trades and of manufacture in much larger part than is the case with other local government services. The stimulating effects of expenditure on the trading services will therefore be usually less concentrated in the area of the spending authority and will have a more direct effect on some industries which suffer most from a decline of industrial investment. A programme of expansion of expenditure on trading services would therefore be particularly appropriate as a trade-cycle measure for local authorities in parts of the country least affected by a depression.

## V. Roads

Capital expenditure on roads had a rapidly rising trend for the first seven years of the inter-war period, and the depression of 1921 showed its effects, delayed as usual, only in a slight slackening of the rate of growth in 1923. The first peak was, however, reached in 1925 at £17 millions, after which there was a steady decline to less than £14 millions in 1928. There was then a sharp rise to nearly £22 millions in 1931, followed by the steepest fall of all services in the next year, and no recovery until 1935. Even in 1937 capital expenditure was probably still below £13 millions, which is very much less than the average figure for the twenties. In view of the enormous expansion of traffic, and of the growth of public demand for an improved road system since that time, this is a very striking fact.

For expenditure on the maintenance of roads approximate figures may be obtained from the Local Taxation Returns by deducting expenditure on scavenging and watering from the total working expenses.[1] Between 1929 and 1936 this series reached its highest point at nearly £38 millions in 1930, and its lowest at £31 millions in 1933 (a fall of 18·4 per cent.), whence it had recovered to over £34 millions in 1935. The movements of maintenance expenditure were thus very considerable; but they were proportionately only about one-third as great as those of capital expenditure.

Rather more detailed information about expenditure on roads is provided by the Annual Reports of the Road Fund,

[1] The total so obtained relates only to England and Wales. It contains an item of non-constructional expenditure, namely, administration costs; according to the Road Fund Reports, these varied between £2,682,000 (1931) and £3,367,000 (1936).

which refer to the whole of Great Britain. Since 1930 these have classified expenditure into three main categories of 'Maintenance, Repair, and Minor Improvements', 'Major Improvements', and 'New Construction', besides some minor headings.[1] This information is summarized in Table 32. It shows annual totals of expenditure on roads which differ slightly and irregularly from those obtainable from the Local Taxation Returns; but the general impression is much the same. The relative movements of the various categories are of some interest, and will be discussed later.

The main explanation of these very large fluctuations in expenditure on roads is undoubtedly to be found in the changing policy of the central government. Throughout the period local authorities were becoming more dependent on grants from the central government, especially for the improvement and new construction of roads, and local initiative and control over policy was steadily diminishing. Central grants were paid throughout the whole period from the Road Fund, and administered by the Ministry of Transport. From 1920 to 1926 further grants, mostly for work on unclassified roads, were forthcoming from the Unemployment Grants Committee. At the beginning of the period the Road Fund had an autonomous source of revenue in the receipts from the horse-power duties on motor vehicles, which tended to grow *pari passu* with the volume of road traffic. But from 1926 onwards one-third of these receipts was appropriated to general budgetary uses, together with a varying proportion of any unspent balances the fund might possess, and in 1937 the 'autonomous' system was completely abolished and an annual parliamentary grant substituted for it. At the same time the Ministry of Transport took over direct responsibility for some 4,500 miles of trunk roads.

Grants were made from the Road Fund mainly under three headings: towards the maintenance of classified roads, towards the capital cost of improvements and new construction which had been accelerated in order to relieve unemployment,

[1] 'Minor improvements' are those which involve no increase in the area of the highway. Their cost appears to be sometimes, but not always, treated as capital expenditure by local authorities.

and towards other improvements. The maintenance grants were at the rate of 25 per cent. and 50 per cent. of approved expenditure on Class I and II roads at the beginning of the period, but they were raised to 60 per cent. and 50 per cent. by 1929, at which level they remained at the outbreak of war. The grants in aid of unemployment relief schemes began at the end of 1920.[1] The central government was at that time strenuously discouraging expenditure in most directions. But it apparently regarded the 'autonomous' revenues of the Road Fund as a convenient means of 'doing something for the unemployed' in what was, after all, a traditional type of relief work. In the five years 1920–1 to 1924–5 it accepted liabilities roughly as follows:

| | (£ *millions*) | |
|---|---|---|
| | *Road Fund liability* | *Exchequer liability* |
| 1920–1 programme . . . | 2·9 | 0·8 |
| 1921–2 ,, . . . | 4·1 | 0·6 |
| 1922–3 ,, . . . | 5·4 | .. |
| 1923–4 ,, . . . | 7·8 | 4·19 |
| 1924–5 ,, . . . | 13·6 | .. |

The final cost of these schemes, some of which were not completed until after 1930, was £57 millions, £5 millions of which was spent directly by the Ministry of Transport on arterial roads in the Metropolitan area. The percentage of grant to total cost was a subject for individual bargaining, but in general ranged from 50 to 75 per cent. It was a capital grant, not an annual payment in aid of loan charges. In addition to these expenditures, which were confined to classified roads, the Unemployment Grants Committee approved schemes for minor road and path works amounting to £39·3 millions between 1920 and 1926. The Road Fund grants were nominally paid towards work which was antedated in order to relieve unemployment. But grants from it for other capital works were small in these years, and in fact at that time the name 'Unemployment Works' seems to have been a convenient disguise for the expenditure of an

[1] The grants made by the U.G.C. were mostly annual payments in aid of loan charges, and, at this time, seldom reached 50 per cent. of these.

ever-increasing revenue on work for which there was, on general traffic grounds, a pressing need—though this is less true of the activities of the Unemployment Grants Committee. Whatever their true nature may have been, it is clear that these grants were the main cause of the rapid growth of capital expenditure on roads up to 1925–6.

At that date, however, there was a change in the policy of the central government. No fresh programme for unemployment relief works was entertained by the Ministry of Transport during 1925. On 1 April 1926 the first 'raid on the Road Fund' took place, which deprived it of a third of its revenue and all of its balances. From that date the Unemployment Grants Committee was forbidden to approve fresh road schemes, and its annual liabilities in respect of past schemes were transferred to the Road Fund, and became a further drain on its resources.[1] The Road Fund was thus pretty effectively hamstrung; and for the next three years, though total expenditure on roads was fairly constant, expenditure on capital account fell sharply.

The second brief period of expansion, from 1929 to 1931, was even more clearly the result of a change of central government policy. Some additional incentive to local authorities had been offered early in 1929, when the maintenance grants on classified roads were raised to 50 per cent. and 60 per cent. But the main change was caused by the Labour Government which came into power in June. The Unemployment Grants Committee was given power again to encourage road work, and new Unemployment Relief schemes were initiated through the Road Fund. These consisted of a programme for the reconstruction of trunk roads, envisaged to cost £21 millions, of which the fund was to contribute three-quarters, and a Five Years Programme for other roads at an estimated cost of £27·5 millions. To these was added, in 1930, authorization for other schemes to provide relief of over £4 millions. The Labour Government had, however, come into power at a moment of fair general prosperity, when the unemployment problem was mainly localized in the depressed areas, and its road programme was designed accordingly. Special attempts were

[1] Of just under £1 million at its greatest in 1927–8.

made to encourage work in those areas; and elsewhere, additional grants were offered to local authorities who would undertake to employ men transferred from those areas. But unfortunately the situation changed rapidly from one of fair general prosperity to one of acute general depression, and by the time the road programmes materialized they were very unsuited to the circumstances. The strain on the financial resources of local authorities was much increased, and delay and resentment were caused by the introduction of 'transferred' men into areas which now had heavy unemployment of their own. The road programme had not, in fact, been designed as a cyclical instrument at all, and it proved impossible to make it one at short notice. In particular, it laid great emphasis on construction of new roads, in which the preparatory work of survey and land acquisition was bound to be very lengthy, and it did little to prevent reduction of expenditure on ordinary maintenance and repairs as soon as local authorities encountered the financial strain of the depression. As a result, the total annual expenditure on roads had only been raised by some £10 millions before the policy of expansion was abruptly reversed in the autumn of 1931.[1]

Road expenditure felt, this time, the full brunt of the measures of economy, as recommended by the May Committee and the Committee on Local Expenditure. The Minister of Transport was given statutory authority to terminate all existing agreements between local authorities and contractors, subject to compensation. An immediate review was undertaken of the position of all the improvement schemes which had been authorized and of the possibilities of securing economy in maintenance costs. Generally, where work had not commenced the schemes were wholly postponed, though survey work was to be completed, and wherever possible works in progress were stopped at the most economical point. The Unemployment Grants Committee was wound up. Of the trunk roads programme only some £9 millions, and of the five-year programme some £15 millions, was left to be spent, so that economies of at least

[1] The expenditure for the whole year 1931–2 would, of course, have been somewhat greater if 'economy' had not begun in September.

£35 millions in estimated total expenditure were effected. Detailed injunctions were also given to local authorities to spend as little as possible out of their own resources. In the next year, 1932–3, grants were confined to selected and very urgent schemes of major improvement.

The contraction of expenditure on roads initiated by the economy campaign was thus probably as drastic as anything which could be achieved in Great Britain in peace time with the present administrative arrangements. It is therefore very interesting that the total economy effected was only of the order of £18 millions, about 30 per cent. of the maximum expenditure, and that the full effects of the change of policy took some time to work themselves out. Expenditure on maintenance and minor improvements fell quickly, and reached a minimum in 1933–4. But the fall had already begun before the economy campaign began, and this, together with greater technical possibilities of rapid contraction in this field, no doubt accounts for the fact that the expenditure for the whole year 1931–2 (which contained seven months of central government 'economy') was appreciably below that for 1930–1. For major improvements the total for 1931–2 was slightly above that for 1930–1, but the fall in the next year was catastrophic, and the minimum was reached in 1933–4. For new construction the expenditure for 1931–2 was 45 per cent. above that for 1930–1, and contraction was relatively more gradual, and was prolonged until 1935–6. Since the 'economy' policy was an undiscriminating attempt to reduce expenditure all round, these figures are an approximate guide to the effect of the varying technical conditions in spreading out the financial results of a sudden change of policy.

The third period of expansion, which began in 1934 (1935 in the case of capital expenditure), was rather more gently heralded than either of the others. It took place in a period of rapidly growing general prosperity and was not officially related to unemployment policy, whether national or local. As early as the end of 1933 the Ministry of Transport had begun to urge the completion of some of the schemes suspended in 1931 and had allocated grants of nearly £1½ millions for that purpose. In February 1935 it

circulated a request to local authorities to prepare a second five-year programme of road development, under which, by the beginning of 1938, a total expenditure of £130 millions had been suggested and £89 millions authorized for grants of between 60 and 85 per cent. In 1935 it began to offer special grants for the improvement of trunk roads in county areas, and for the making of dual carriage-ways and cycle tracks, and it took over the whole cost of reconstruction of main roads in the north of Scotland. Finally, on 1 April 1937, the Ministry of Transport took over direct responsibility for trunk roads and embarked on an extensive policy of improvement and new construction on them. The figures show that the effects on expenditure of this new policy of expansion have been, as in the past, slow to materialize. But it seemed likely as the programme gathered way that it might have carried expenditure up to or beyond the level of 1931, had it not been abruptly terminated by the outbreak of war.

The history of expenditure on roads has been examined in some detail because it is often supposed to be the part of public expenditure which is easiest to manipulate as part of an unemployment and trade-cycle policy. And, as we have seen, it was officially used to create employment throughout a considerable part of the inter-war period. But it cannot be said that very conspicuous results were achieved, even though neither policy nor execution deserve the wholesale contempt which has been vented upon them in certain quarters. To what was this relative failure due?

First, it must be emphasized that neither the central government nor local authorities clearly appreciated the distinction between road works as a means of relieving localized long-term unemployment in the depressed areas and road works as a means of maintaining employment and spending power in a cyclical depression. When the policy was begun, at the end of 1920 and in 1921, it was cyclical, and even seasonal, in its objects. There was an attempt to secure that most of the work should be done in the winter. But after the general trade recovery in 1922 and 1923 it was continued for three years in order to remedy much more specialized unemployment, and was then sharply reduced in

1926. In the second phase, from 1929 to 1931, the process was reversed. Programmes originally designed for unemployment in the Special Areas had to be rapidly adjusted to the circumstances of general depression, and were stopped short before much of the adjustment had been obtained. But the two objectives do in fact require quite different types of road policy. If 'special' unemployment is the object, fairly continuous and lengthy schemes are desirable, backed by special financial inducements to impoverished local authorities in depressed areas or, if the schemes are to be carried out elsewhere, by special arrangements for the employment and absorption of 'transferred' labour. Speed and quantity of expenditure can be subordinated to regularity and special fitness, and, since the expenditure is necessarily long term, the central government's contribution at least can be suitably financed from the proceeds of current taxation. But the cyclical object requires large and rapid expansion, evenly spread over the country, and freed from rigid and hampering restrictions on the type and source of labour employed, and, since one of its chief objects is to increase general spending, it ought to be financed as far as possible from loans.

From the point of view of 'special' unemployment, only moderate results were achieved apparently mainly because the programmes designed in the cyclical crisis of 1921 and in the general need for road improvement afterwards did not offer sufficient financial inducements to impoverished local authorities in the depressed areas. Elsewhere they did not yet do much to encourage immigration, but rather earned themselves a bad name by draining off local labour from agriculture. The Unemployment Grants Committee was better equipped than the Road Fund to deal with such difficulties; but its activities were restricted to minor road works. And the relief programmes were reduced in 1925, just when the real character of the problem was coming to be realized. The second programme, of 1929, was carefully designed for the 'special' purpose. But because of the general depression which immediately followed its inception, it had little chance to show its worth.

From a cyclical point of view, the great failure was clearly

in not developing the necessary large and rapid expansion of expenditure. In 1920 there had been no time for preparation, and the general depression was anyhow short-lived, so that the failure is excusable enough. In 1930 the trouble was that preparations had been begun for long-term programmes, but not for a cyclical emergency. Rapid expansion can only take place if both the Ministry of Transport and local authorities have detailed plans ready, if the necessary land has been already bought, if local administrative staffs are capable of rapid expansion, and if local authorities in general are ready and anxious to carry out their schemes without thinking too much about additional financial burdens. None of these conditions was generally present in 1930. An increased expenditure of £50 millions within eighteen months might have been appropriate to the situation. The actual increase of £10 millions was almost negligible—though the figure for 1932 would certainly have been substantially greater than that if the policy of expansion had not been abandoned.

Since 1931 the idea of using road expenditure as a remedy for unemployment of either kind has been officially dropped, and expenditure has been allowed to grow with prosperity without, apparently, any direct provision for its maintenance or further increase in depression. But the degree of forward planning on the part of local authorities has certainly very much increased. The progress of town and country planning has met in advance some of the difficulties which used to occur in settling the lines of new roads and of major improvements and in acquiring land; effective control by the Ministry of Transport has also grown. It seems almost certain that a programme of rapid expansion, if it had been decided on, could have been much more easily carried out under the administrative conditions of 1939 than under those of 1930.

## VI. Public Health, Education, and other Services

The public health services form a somewhat miscellaneous group. They were the object of capital expenditure which was until 1931 rather less, and since that rather greater, than capital expenditure on roads. Sewerage works are for our

purposes the most important item in the group, usually accounting for about half of the capital expenditure and some £5 millions a year of maintenance and repairs. The sums spent on the building and repair of hospitals, asylums, and baths make a rather different and quite important demand on the constructional trades. Considerable sums go for the purchase and layout of parks and recreation grounds, of which, however, a large part is spent on land.

The curve of capital expenditure for the whole group some what resembles that for roads. There was no actual fall in 1923–4, but a slight decline from 1925 to 1928, followed by a rapid rise to the peak expenditure of £17 millions in 1931. The subsequent reduction was, however, only moderate, and expenditure rose again steadily after 1933. Normally the public health services do not receive large specific grants from the central government, and are not much controlled by it. But between 1929 and 1931 the Unemployment Grants Committee promised considerable sums for sewerage works and for the layout of parks. These grants were partly responsible for the rise of expenditure in these years, and their discontinuance for the subsequent decline. Again, in 1937 another special grant-disbursing body, the Physical Fitness Grants Committee, was established, whose activities began to have considerable effect on the level of expenditure on baths, recreation grounds, and gymnasia. Maintenance expenditure on the health services seems to have been fairly stable. That on sewerage has a slight cyclical pattern, but expenditure on hospitals and asylums was apparently not clearly affected, and only shows a considerable upward trend.[1]

The course of capital expenditure on schools and libraries is interesting, because it combines a very strong upward trend with extreme cyclical sensitivity. Both local authorities and the central government have been very ready to economize on education services in bad times, but also very

[1] Maintenance expenditure on hospitals cannot easily be distinguished from that on Poor Law Institutions, as the 'break up of the Poor Law' by the Local Government Act, 1929, caused the transfer of many poor law hospitals to general public health purposes.

anxious to expand them as soon as things become better. This tendency applies as much to maintenance expenditure on furniture and equipment as to capital expenditure. In greater detail, the secular upward trend seems to have been caused partly by the rising standards of school buildings insisted on by the Board of Education and by public opinion, partly by the dispersion of urban populations into the suburbs, which has necessitated the building of a great many new schools, and partly, at the end of the period, to the decision to raise the school-leaving age for primary pupils. It is remarkable that these forces should have so completely offset the effects of the fall, both realized and prospective, in the total number of children in the community. This suggests that caution is advisable in speculations about the detailed effects on expenditure of prospective population changes.

The five main groups of services so far discussed accounted for about 80 per cent. of total capital expenditure in 1935–6, and an even larger proportion of the maintenance. The miscellaneous residuum is not worth detailed analysis; but a few words may be said about some of its components.

Expenditure on small dwellings acquisition has in some years been of considerable amount. This consists almost entirely of advances to private persons to enable them to purchase their houses. Under the inter-war conditions of housing shortage these advances presumably had some net effect in stimulating the building of houses. This effect is not statistically measurable, but was almost certainly much less than that of direct construction by the local authorities. The building trades have also been affected by expenditure on construction and repair of poor law institutions, police stations, town halls, and general administrative offices, which accounted in 1935–6 for an expenditure on capital account of £3·7 millions, and of about the same amount on maintenance and repairs. Both capital expenditure and maintenance (as far as it could be accurately investigated) have shown a highly cyclical behaviour, which, in these services in particular, cannot have any technical excuse.

A growing expenditure on land drainage and river and

sea defences has had effects which more closely resemble those of road works. In 1936 this amounted to about £1 million on capital account and a little more for maintenance. There has also been expenditure, which was large only for a few years after 1920, on the purchase and equipment of allotments and small-holdings, and on maintenance and repairs thereof; but a high proportion of this is accounted for by the purchase of land. Finally, it must be noticed that the most recent function of local authorities, Air Raid Precautions, caused very heavy expenditure on construction in the last two years of the period. But it had of course no effect before the end of 1935–6, and very little information is at present available about what has been spent since that time.

## VII. The Regional and Local Distribution of Capital Expenditure

We have seen that the capital expenditure of British local authorities as a whole was very unevenly spread in time over the inter-war period. It remains to investigate its geographical distribution, and also to inquire whether variations in the timing of the total expenditure have been evenly reflected in different parts of the country and in individual local authorities. Has constructional work been largely undertaken in those parts of the country where the incidence of unemployment has been heavy, or elsewhere? Is there any indication that any individual authorities have attempted to secure greater regularity and continuity in their programmes than has been secured in the country as a whole? Has the making of especially heavy capital expenditure been connected locally with a rapid growth of population? These are all questions to which an answer is desirable if the causes and consequences of local expenditure are to be fully understood.

Unfortunately, the materials on which to base such a study are neither readily available nor easy to handle. No returns of capital expenditure on a county or regional basis are at present published;[1] and figures for individual authorities are only available for county and metropolitan boroughs and

[1] The county summaries which have been shown since 1933–4 in the Local Taxation Returns relate only to expenditure out of revenue.

for county councils,[1] and the changes introduced by the Local Government Act of 1929 make the figures for county councils (other than the L.C.C.) before 1930–1 not comparable with those after that date.[2] For the years 1930–1 to 1934–5 the Ministry of Health have courteously permitted us to extract from their files the statistics of capital expenditure by the councils of municipal boroughs and urban districts which contained a population of more than 30,000 in 1931. In the discussion which follows, the figures of regional capital expenditure refer to county boroughs from 1925–6 to 1935–6, and to county boroughs, county councils, and municipal boroughs and urban districts of more than 30,000 population from 1930–1 to 1934–5. For the London district the expenditure for the longer period is that of the London County Council, the Metropolitan Boroughs, the Metropolitan Water Board, and the Port of London Authority.

For the study of the regional distribution of expenditure Great Britain has been divided into some thirteen regions, on the basis of the character of their economic activities and of their varying economic fortunes in the post-War period, as reflected by the percentages of unemployment from which they have suffered. These regions are as follows:

| | *Number of county boroughs* | *Number of municipal boroughs to urban districts of over 30,000 population* |
|---|---|---|
| I. Westmorland and Cumberland ('The North-West Coast') . . . | 1 | .. |
| II. Northumberland, Durham, Yorks. N.R. ('The North-East Coast') . . | 8 | 7 |
| III. Lancashire and Cheshire . . . | 21 | 15 |
| IV. Yorks. W.R. and Derbyshire . . | 11 | 7 |

[1] In 1930–1 capital expenditure by county boroughs, the L.C.C., the Metropolitan Boroughs, the Metropolitan Water Board and Police, and the Port of London Authority amounted to £38 millions, or 54 per cent. of the total for England and Wales. Municipal boroughs and urban districts with populations of over 30,000 accounted for a further £12 millions on the average between 1930 and 1934.

[2] Even the county boroughs were slightly affected by the Local Government Act, since they took over poor law functions from the Boards of Guardians in 1930. But capital expenditure on poor law institutions is not large enough seriously to affect the comparability of figures of capital expenditure by county boroughs before and after that date.

| | *Number of county boroughs* | *Number of municipal boroughs to urban districts of over 30,000 population* |
|---|---|---|
| V. Staffs., Worcestershire, and Warwickshire ('The West Midlands') . . | 10 | 10* |
| VI. Notts., Northants., Leicestershire ('The East Midlands') . . . . . | 3 | 2 |
| VII. Yorks. E.R., York City, Lindsey ('Humber') . . . . . | 3 | 1 |
| VIII. Rest of Lincolnshire, Norfolk, Suffolk, Hunts., Cambs., Isle of Ely, Soke of Peterborough ('East Anglia') . . | 4 | 3 |
| IX. Berks., Bucks., Bedfordshire, Essex, Herts., Middlesex, Kent, Surrey, Sussex ('The Home Counties') . | 9 | 58† |
| IX*a*. County of London . . . . . | .. | .. |
| X. The rest of England . . . . . | 9 | 8‡ |
| XI. Monmouth and Glamorgan ('South Wales') . . . . . | 4 | [12]§ |
| XII. Rest of Wales . . . . . | .. | [1]§ |
| XIII. Scotland . . . . . | .. | .. |

* Includes 2 under 30,000 in 1931.
† Includes 4 under 30,000 in 1931.
‡ Includes 1 under 30,000 in 1931.
§ Expenditure of municipal boroughs and urban districts in Wales has not been included.

The basis of these divisions is obvious in the case of regions II, III, IV, V, and XI. Each of them is mainly dependent upon a single industry—coal or cotton—or, as in the case of the West Midlands, upon a closely related group of industries. In region VI, the East Midlands, the three county boroughs are industrial towns engaged in light manufacturing trades with a very fair record of prosperity, and the counties which they dominate have all had a similar unemployment history since 1931. Regions VII and VIII, the Humber and East Anglia, need more explanation. The East Riding and York City are economically distinct from the rest of the country and, together with Grimsby, depend largely on the trade of the Humber for their livelihood. East Anglia is in general an agricultural region, with three of its county boroughs, Lincoln, Norwich, and Ipswich, engaged in making agricultural machinery: the fourth, Great Yarmouth, is a fishing port. In region IX, the Home Counties, the unemployment histories of the various counties has been similar, and there is everywhere the orientation

towards London. It is the region of the greatest population growth, though, unfortunately for our purposes, the larger

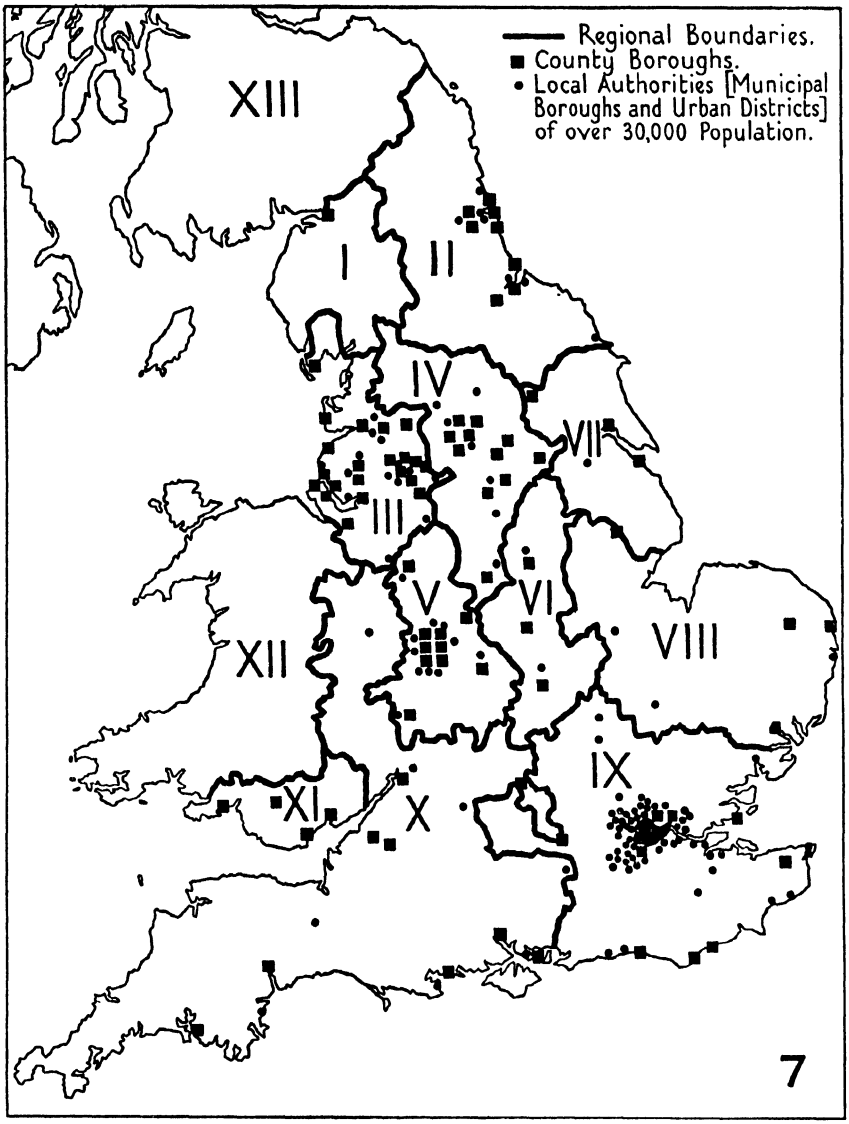



FIG. 7

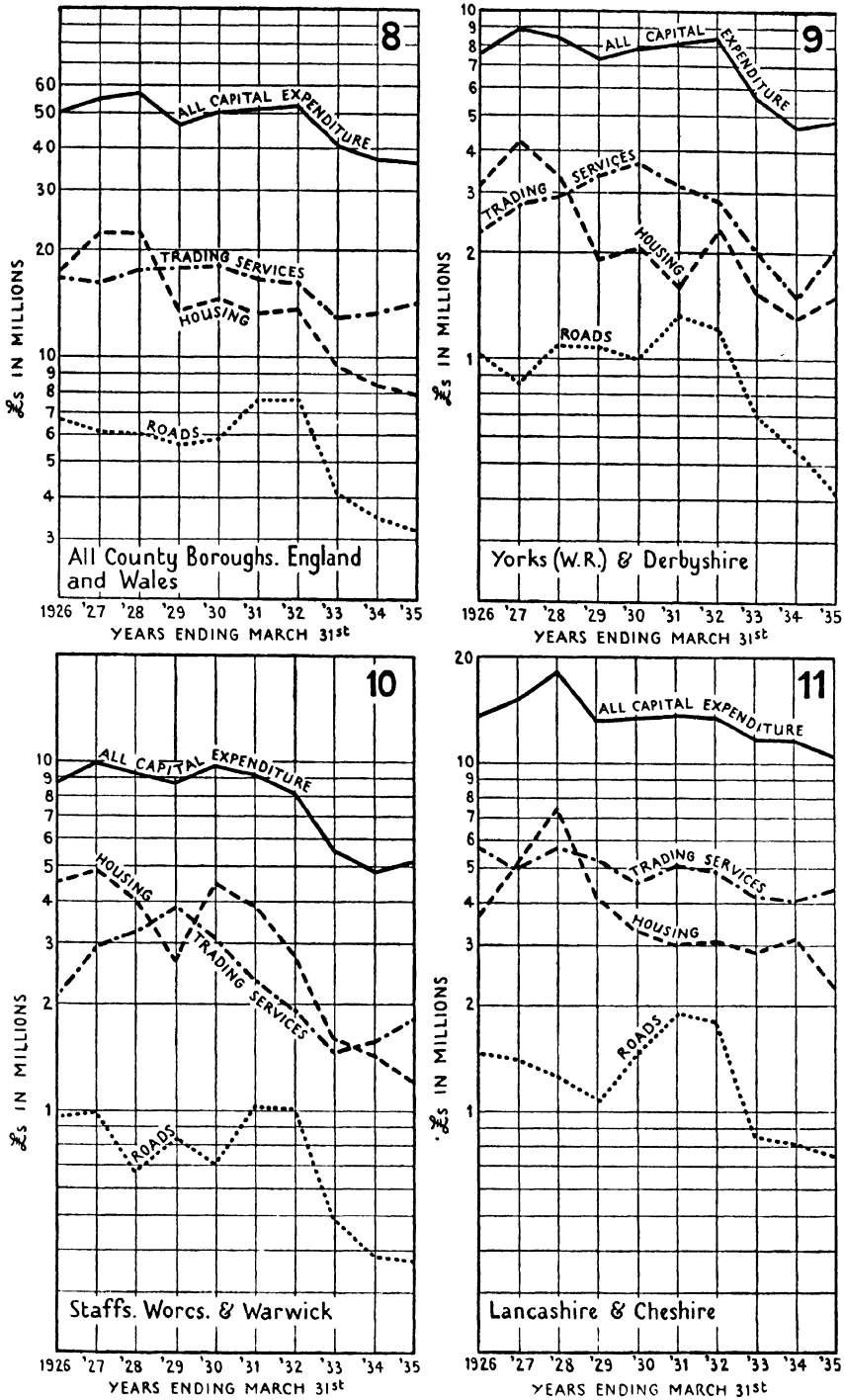
part of the population lives outside the county boroughs. Region X, the rest of England, is unavoidably a mixture. Its county boroughs consist of four ports, Southampton, Portsmouth, Plymouth, and Bristol, the latter being also a

large industrial centre; two residential and holiday resorts, Bath and Bournemouth; Oxford, with its mixture of new industry and old university life; and Exeter and Gloucester, which are county towns with some manufacturing. None of the counties in it is highly urbanized; and the unemployment histories of those which contain county boroughs are not seriously dissimilar. In region I the only county borough is Carlisle, which is not representative of the West Cumberland Special Area, in which most of the population of the region lives.

We may first examine the general distribution of capital expenditure among these regions, taking as a test the expenditure per head of the population recorded at the Census of 1931. The relevant information is summarized in Table 33. The totals in the last column bring out the dominant importance of regions III (Lancashire and Cheshire) and of IX and IX*a* (the Home Counties and the Metropolitan area), which, in the last five years, accounted for nearly half of the total capital expenditure made by larger local authorities in the whole of Great Britain. Lancashire is of course highly urbanized, and has an old-standing tradition of lavish expenditure upon local services, especially upon trading enterprises which are more usually in public hands there than in other parts of the country. Around London the local authorities, particularly the large municipal boroughs and urban districts, have been compelled to make provision for the great growth and movement of the population. It does not appear, however, that capital expenditure per head of population has been highest in these areas. In the period 1930–4 the highest figures per head for county boroughs are shown by regions VI and VII (East Midlands and the Humber), while the built-up area of the County of London shows actually the lowest figures of all regions. For other urban authorities the list is headed by the West Midlands and the East Midlands. Of the areas which have had conspicuously bad unemployment records, II, the North-East Coast, comes practically at the bottom of the list in both periods. But in South Wales the county boroughs, at least, have succeeded in maintaining quite a moderate level of expenditure. The prosperous East Midland region shows

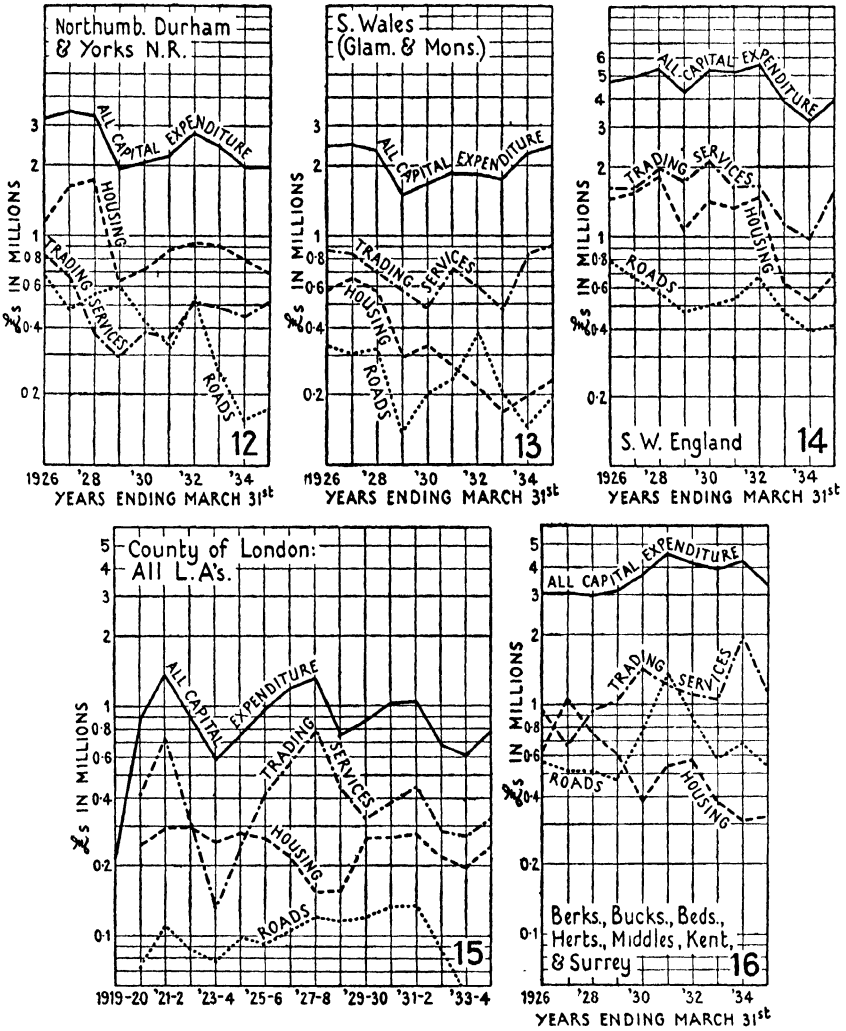
well in both periods, while the West Midlands spent heavily until 1930, but make only a moderate showing thereafter. Taking the regions as a whole, there does seem to be some correlation between prosperity and heavy expenditure per head, but it is not very clear or pronounced.

Rather clearer and more significant contrasts are found if attention is concentrated upon the annual variations in capital expenditure in the different regions, and if the chief components of the total, expenditure upon housing, trading services, and roads, are separately distinguished. Diagrams of such an analysis for the more important regions are given on pp. 163, 164, 165. For the county boroughs as a whole the curve shows two peaks, in 1927 and 1931, with low points in 1928 and in 1934. The first peak is largely ascribable to housing expenditure and the second mainly to roads, while the trading services are in general very much more stable, reaching a maximum in 1929 and a minimum in 1932. We must for the moment neglect those regions (I, VI, VII, and VIII) in which the number of county boroughs is so small as to make generalization difficult. Of the others, regions IV (Yorkshire W.R. and Derbyshire) and V (West Midlands) follow the national pattern pretty closely both in total and in detail, though with a tendency to move rather ahead of it. Region III (Lancashire and Cheshire) has a very different history. The expansion from 1925 to 1927 was much steeper, and so was the recession from it in 1928. This was due to greater variations in housing expenditure. But after that date there was a singular stability. There is no clearly defined peak in 1930 or 1931, and no sharp contraction during the economy campaign—merely a slow decline. This feature appears to be directly due to the relative unimportance of expenditure on roads, and to the failure to develop any effective housing programme in the thirties. But one is tempted to connect it more remotely with the steady decline in the fortunes of the cotton industry after 1928. Regions II and XI (the North-East Coast and South Wales) were regions of acute economic depression throughout the period, but their expenditure curves are very different. Region II fluctuates in time according to the national pattern, but much more wildly, and with a steep downward trend, so that




FIGS. 8–11. Capital Expenditure of Local Authorities by Regions.

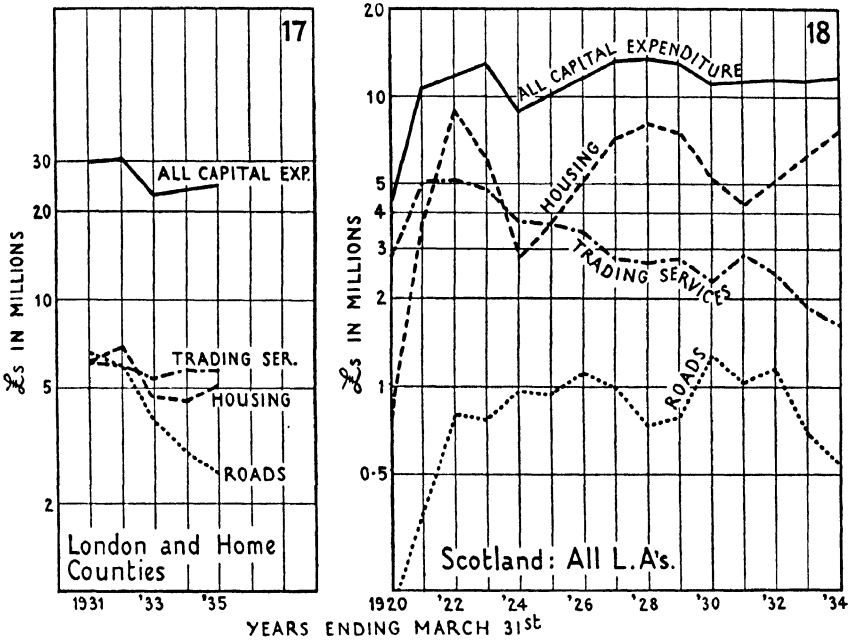
in 1934 expenditure is not much more than half that at the beginning of the period. South Wales, on the other hand, shows its lowest point in 1928, has very little response to




FIGS. 12–16. Capital Expenditure of Local Authorities by Regions.

'economy' after 1931, and has a sharp rise in the last two years. But, as we should expect in an area economically depressed and rapidly declining in population, expenditure on housing is relatively unimportant and generally declining. Region X (South-West England) follows an erratic course,

in general not unlike the national pattern, as does the County of London. Region IX (the Home Counties) has an entirely individual history: practical stability for the first four years, a peak in 1930, and a moderate, but continuous, decline thereafter. Scotland shows peaks, not very pronounced, in 1927 and 1931. Its chief characteristic is




FIGS. 17–18. Capital Expenditure of Local Authorities by Regions.

insensitivity to 'economy' after that date. This was due to a belated but very vigorous housing campaign, which more than offset the reductions of expenditure on roads and trading services. The total for the region was in fact almost stable from 1930 to 1933, and offered a sharp contrast to the fall during this period which took place in every other part of the country except South Wales.

The figures so far discussed have related, except in the case of Scotland and the County of London, to county boroughs only. For the five years 1930–1 to 1934–5 we were able to compile more comprehensive regional totals, which included expenditure by county councils and by councils of all the larger urban areas. In most cases these do

not present a very different picture, though there is in most regions a greater range of fluctuation. This is due to the instability of expenditure on roads, which was relatively very important in the case of county councils. But in the Home Counties the importance of expenditure by authorities other than county boroughs is so great as to merit some examination. Fig. 17 shows expenditure by all the larger authorities in London and the Home Counties together: that is, in an area which was, as a whole, prosperous and growing in population, but which was especially characterized by internal movements of population. There was a slight peak of expenditure in 1931, a sharp drop in the following year, and immediate recovery as early as 1933. This appears to have been mainly the result of the buoyancy of expenditure on miscellaneous services, which were unusually important in this region; for, although the trading services were very steady, housing did not recover to the level of 1931, and expenditure on roads showed a rapid and continuous decline from first to last, and had become by 1934 relatively insignificant.

This analysis shows that there has been very considerable variety in the timing and in the magnitude of the changes of capital expenditure by local authorities in different parts of the country. In a broad way, there is a distinction between the prosperous areas of the Midlands and South England, and the much less prosperous areas of South Wales, Lancashire and Cheshire, and the North-East Coast. The prosperous areas moved fairly closely together, and on the whole showed bigger fluctuations both upwards and downwards; the less prosperous areas moved on varied paths, but were characterized (especially Lancashire and Cheshire, and Scotland) by relative stability. Regional peculiarities show themselves most clearly in trading services, rather less clearly in housing, and least of all in roads. This is what we should expect in view of the differing degrees of control exercised by the central government. For the trading services there has been very little financial assistance from the centre. For housing the assistance has taken the form of complicated systems of annual grants-in-aid of loan charges, the amounts of which were fixed uniformly for the whole country in any

particular Housing Act. Grants towards road construction or major improvement have been capital grants negotiated at rates which varied within wide limits for different pieces of work.

A more detailed investigation of the histories of individual county boroughs shows that there has been extreme diversity, both in the amount of capital expenditure and in its timing and regularity. National and even regional patterns of expenditure cover up a bewildering mass of local peculiarities.

As far as the amount of expenditure is concerned, there seems, at any rate at first sight, to be a fairly close connexion with the rate of growth or decline of population in individual boroughs. Relevant figures are summarized in Table 34. In the nine county boroughs whose population increased most rapidly between 1921 and 1931, total capital expenditure per head of population was a little above the national average for all county boroughs in the period 1925 to 1929, and more considerably above it in the period 1930 to 1934. But in the nine county boroughs whose population declined most rapidly, expenditure per head was much lower—in the second period it was actually less than half that in the growing boroughs. Moreover, if we compare the two periods, it appears that expenditure in the declining boroughs fell off much more in the second period than did the national total, while in the growing boroughs the absolute reduction was very small indeed. But examination of the main objects of expenditure shows that the proportionate reduction in housing expenditure was actually somewhat greater in the growing than in the declining boroughs. The superiority of the former came in trading services, roads, and, to a lesser extent, in the miscellaneous other services, expenditure on which was everywhere greater in the second period than in the first. There is no sign that growth of population caused especially heavy or increasing public expenditure on housing, or that a declining population had the reverse effects. This appears to be rather surprising. But it must be remembered that in the first period municipal building under the Chamberlain and Wheatley Housing Acts was mainly designed to make good war-time deficiencies, which existed almost

everywhere. In the second period the Greenwood Act of 1930 provided mainly for slum-clearance, which was often more urgent in the older towns, even though their population might be declining, than in growing towns such as Bournemouth and Croydon. Moreover, it must be noticed that practically all of the growing towns have enjoyed conspicuous prosperity in the post-war period. The possible exceptions, Wakefield and Wolverhampton, did in fact make a smaller total capital expenditure after 1929 than before. But all the declining boroughs have suffered from exceptionally heavy unemployment and poverty. It seems probable, indeed, that a low and declining level of capital expenditure and a declining population are simply the results of a common cause—poverty, which reduces the means wherewith to engage in capital works, without removing the social need for them. This conclusion is strengthened by the fact that the contrast between the growing and declining boroughs is strongest in the case of the trading services, where strictly economic reasons for expansion are usually most powerful. But, if we are considering municipal expenditure on capital works as a means of creating employment, the broad conclusion does appear, that there has been least of it in those boroughs where unemployment has been heavy, and at the times, after 1930, when it was heaviest.

Other issues are raised by an inquiry into the degree of regularity with which expenditure has been carried on from year to year in individual boroughs. We find at once that the great irregularity noticeable in the behaviour of total capital expenditure for the whole country becomes still more exaggerated when we deal with individual boroughs. An attempt has been made in Fig. 19 to portray something of this irregularity of individual behaviour by indicating for each pair of years in the period the number of county boroughs which expanded or diminished their expenditure, and the approximate proportionate size of the changes: the percentage change in total capital expenditure by all county boroughs is also shown. It will be observed, first, that even in those pairs of years in which the national movement is sharply upward or downward, there is always a considerable number of boroughs whose expenditure moves in the

opposite direction or remains stationary. This is very marked in the years of expansion, 1926 and 1929, when nearly one-third of the boroughs reduced their expenditure, and in the

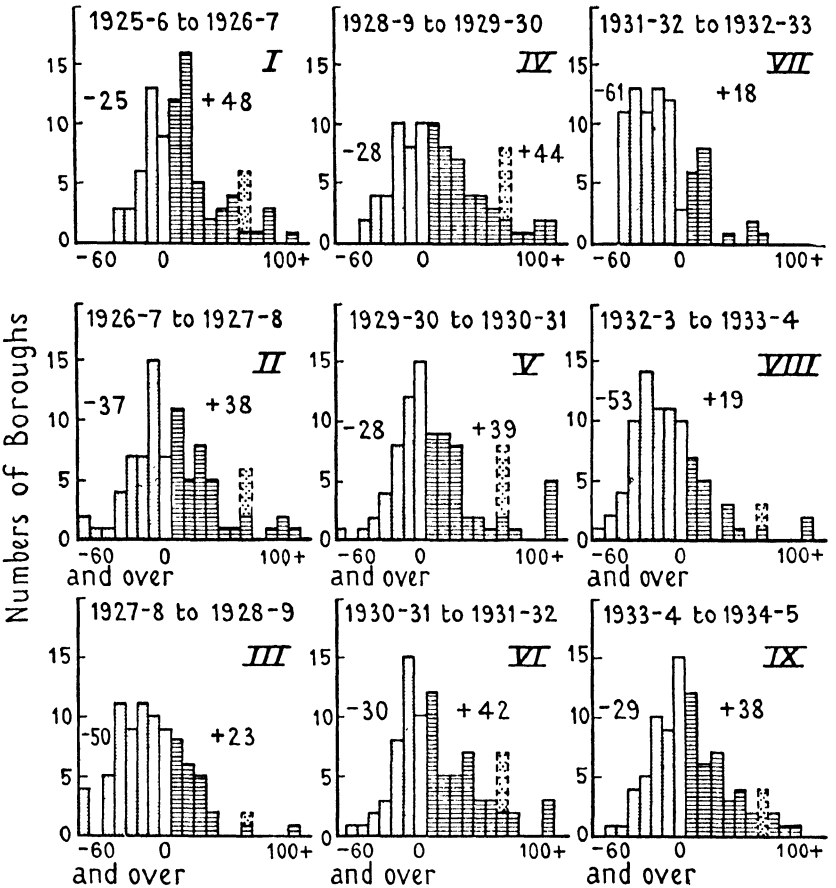



FIG. 19. County Boro's. All Capital Expenditure.

All Capital Expenditure of County Boro's. England and Wales, 82 boroughs only. Annual % changes 1925–6 to 1934–5.

Scale. Nos. of boro's = $\frac{1}{10}$″ to 1 boro'.
% change = $\frac{1}{10}$″ to 10 % change. (−5 to +5 taken = 0.)

first year of contraction, when a slightly smaller proportion expanded. Even in 1932, eighteen boroughs dared to defy the central government's plea for 'economy' by spending more —four of them very considerably more—than in the preceding year. At no time was there anything like unanimity

of behaviour. The 'division of opinion' seems to have been most evenly balanced in 1927 and 1934 and, to a rather less extent, in 1930 and 1931. The first year was one in which local authorities were completing, at uneven rates, the second instalment of the post-war housing programme. The year 1934 saw the 'economy scare' just giving place to the confidence engendered by general trade recovery. Of interest too are the years 1930 and 1931 in which the expansionary tendencies of the Labour Government's public works appeal and the depressing effects of general business conditions were pulling in opposite directions. The result was, in total, almost a deadlock.

The chart also illustrates the extreme instability in time of expenditure by individual boroughs. In only two years—1930 and 1934—did more than ten boroughs maintain their capital expenditure approximately unchanged as compared with the preceding year, and in the whole period there are only 88 cases of such unchanged expenditure out of a possible of 738. Of extreme changes—more than 45 per cent. in one year—there are 40 cases in a downward direction and 79 in an upward direction; the most frequent kind of change of all, of which there were 105, was a decrease of between 5 and 15 per cent.

Further investigation of this phenomenon of instability in time shows that housing was in this, as in so many other ways, the villain of the piece. Annual increases of over 95 per cent. and decreases of more than 45 per cent. were commoner there than any other type of change. The commonest sequence was one year of expansion followed by one year of contraction. Housing expenditure has, in fact, proceeded in most places in a series of biennial jerks, though the timing of these has been far from uniform. The trading services, on the other hand, were considerably more stable. The number of extreme changes was much smaller, and the normal period for expansion or contraction was two or three years. Even roads, though less stable than the trading services, were locally much less erratic than housing. The explanation of these differences appears to be fairly clear. Local housing *policy* has been dominated, as we have already seen, by the need for response to rapidly varying

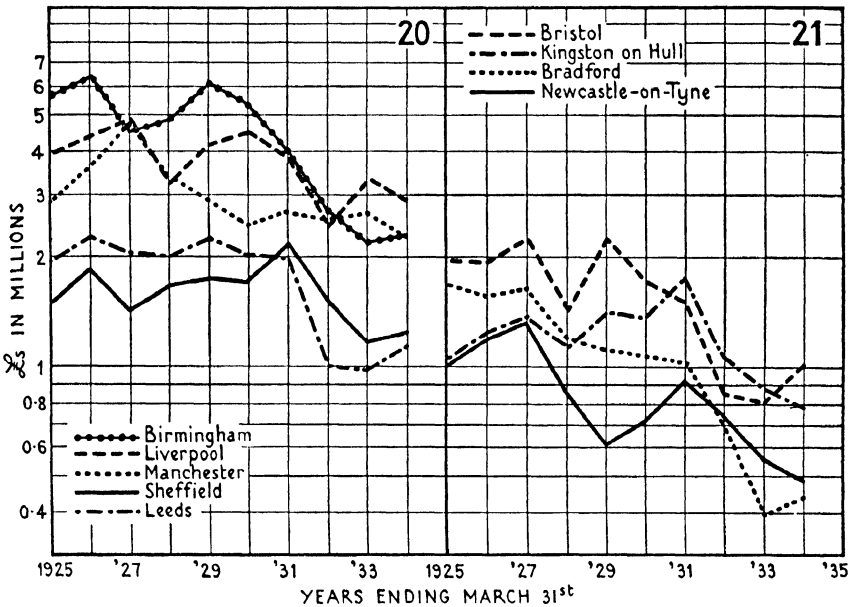
stimuli from the central government. Rapid changes in *performance* have probably been easier than in other services because house building is most usually carried out wholly by contractors rather than by staff recruited by the local authority itself. This makes for greater speed in execution, and also removes from the local authority any sense of responsibility for securing more continuous employment for the men engaged. Capital expenditure on the trading services, on the other hand, is usually spread over several different enterprises and possesses what is necessarily a fairly regular substratum in the need for extending water-mains and electricity cables, replacing obsolete trams and buses, and the like; while large enterprises, such as the construction of new reservoirs and power-stations, by their very nature usually take more than one year to complete. Expenditure on the roads has, like housing, been subject to erratic stimuli from the centre. But there again a large part of the activity consists of major improvements and construction of new roads, which normally take more than a year and are very often carried out mainly by direct labour.

But apart from this distinction between the main groups of services, it seems that much depends upon the size of the borough with which we are concerned. It was found in the case of housing expenditure that, if the boroughs were grouped according to the numbers of their population, the proportion of 'extreme' changes to possible changes was 40 per cent. in the class of boroughs with less than 100,000 people, as against only 20 per cent. in the five boroughs with more than 450,000 people. In the case of expenditure on trading services the percentages were 21 per cent. and 2 per cent. respectively, frequent extreme changes taking place usually in small boroughs where only one or two of the trading services were in public hands. The point applies even more strongly to total capital expenditure. In the five great cities there were no changes of more than 45 per cent. in one year, and in 16 per cent. of the cases expenditure was substantially unchanged; whereas in the forty small boroughs one-fifth of the changes were of more than 45 per cent., and in only 12 per cent. of the cases did expenditure remain unchanged. This fact, that extreme instability from

year to year was much commoner in small than in large towns, must apparently be explained mainly in terms of the greater number of separate capital projects in a large town, which causes a more even averaging out of the results. There is also some evidence, in the case of roads and housing, that it is from an administrative point of view easier to double or to halve a small programme than a large one, though this appears to require some qualification in the case of small towns which had had no experience of housing work at all at the beginning of the period and were consequently very slow in beginning expenditure on a considerable scale. But there is no evidence in the figures to indicate that the greater year-to-year stability of the large towns—or, for that matter, stability in any town—was due to deliberate planning of capital expenditure, either in order to maintain an even rate of expansion from year to year, or to steady employment in times of bad trade. There are only nine cases in our period in which continuous expansion or contraction of total capital expenditure was maintained for as much as four years, and even in these sequences the amount of the change from year to year was often very considerable.

The course of total capital expenditure in the nine largest county boroughs is shown on Figures 20 and 21. None of them, with the possible exception of Manchester since 1928, show any degree of long-term stability, though Bradford shows a fairly regular rapid decline over the period. It is interesting to see that only three of them, Sheffield, Hull, and Newcastle, secured any considerable expansion in 1931 in response to the central government's appeal for increased expenditure on public works. Manchester appears to have been unmoved alike by the appeal for expansion and by the subsequent economy campaign, and Bradford was reducing expenditure throughout. In the other four, Birmingham, Liverpool, Leeds, and Bristol, contraction started in 1929 or 1930, and was merely accelerated during the economy campaign. This failure of the largest local authorities in the country to expand expenditure during depression must have been one of the main causes of the failure of the Labour Government's efforts to achieve significant results. It is perhaps worth noticing that none of the contracting boroughs

had Labour majorities on their councils; while of the three which did expand, Hull had a Labour majority until November 1930, and Sheffield until November 1932. In any case, whether the reasons were political or not, it appears that there was an acute difference of policy between the majority of the great cities and the central government,




FIGS. 20, 21. Total Capital Expenditure of each of the Larger County Boroughs.

which made decisive action impossible for the country as a whole.

The course of capital expenditure by the six most important county councils, over the limited period for which comparable figures are available, is also shown on Figure 22. The curves show an even greater instability than those of the county boroughs, though there was more uniformity of behaviour. Both these features are due to the fact that, except in the case of Middlesex and London, expenditure on roads is of greater relative importance for them, and this expenditure was more effectively influenced by the central government from 1930 onwards. Middlesex, with its rapid suburban development, stands out as an exception to the general rule of precipitate contraction after 1931.

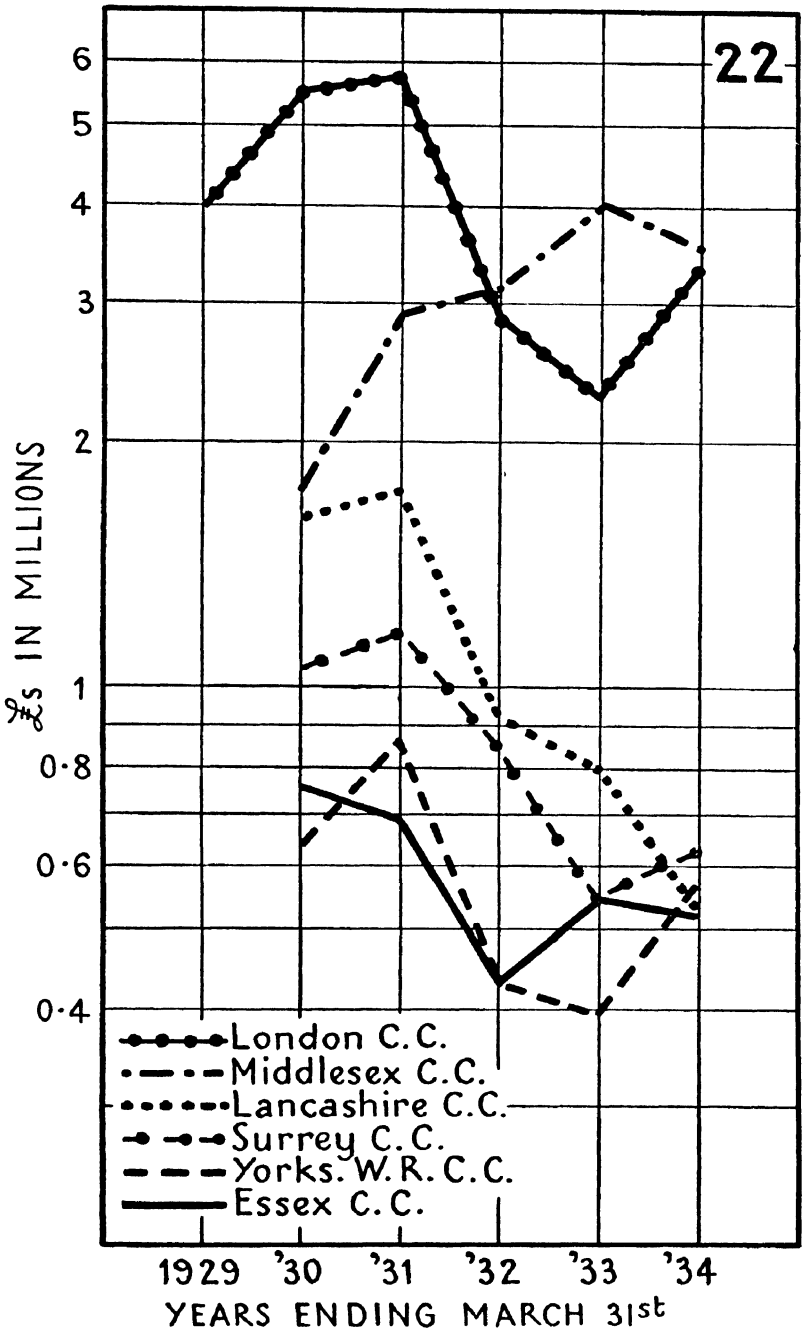



FIG. 22. Total Capital Expenditure of each of the Larger County Councils.

This survey of local peculiarities of behaviour brings out several points which must be seriously considered in relation to any attempt to use the capital expenditure of local authorities either as a remedy for localized unemployment in a 'depressed area' or as a general means of control over trade fluctuations.

In the first place, we have found that the general level of capital expenditure was usually low in the regions, and particularly in individual towns where unemployment has been high over the whole period. This result occurred, it must be remembered, in spite of serious efforts by the Unemployment Grants Committee to direct their subsidies towards public works in those areas. There were, it is true, some exceptions, notably the South Wales county boroughs, but on the whole the tendency was pronounced. This suggests that successful use of public works to remedy unemployment in economically declining areas would require either that they should be almost wholly financed by the central government or that they should be coupled with other measures designed to restore the general economic prosperity of the area.

Second, we have found that, to judge by the results, none of the important boroughs have in the past made any attempt to secure reasonable stability of their capital programmes over time, and that extreme instability even from one year to another has characterized especially the smaller authorities. This feature cannot be neglected. For a large part of the employment given by most forms of public constructional work is usually caused locally, and only a small part is caused by a demand for materials and equipment coming from outside. The men engaged in any particular locality are certainly not easily moved elsewhere, or even to other occupations in the same place, when expenditure there is suddenly reduced. It therefore seems likely that, even in years of normal prosperity, these great fluctuations in the expenditure of individual towns must have a very disturbing effect on the labour market. An attempt to secure greater stability from year to year would be well worth while.

Third, it appears that the response of local authorities to

stimuli from the central government is highly irregular and uneven. In a separate investigation of the course of expenditure on housing it was found that the degree of response to the uniform subsidies introduced by the Chamberlain Act of 1923 and the Wheatley Act of 1924 varied very much according to the prosperity of the towns concerned and other local circumstances. To secure an even expansion, especially in depressed areas, a subsidy graded according to some index of local 'capacity to pay' would probably be necessary. Moreover, there was great variety in the speed and duration of the response to the Housing Acts. On the whole, the small boroughs were slower off the mark than the larger, though this applies less to the Greenwood Slum-clearance Act of 1930 than to earlier legislation. There was also a fairly marked tendency for the effects of any particular subsidy to wear off after the earlier building had added to the local rate-burden, though the announcement of a forthcoming date for termination or reduction of subsidy often produced a later spurt of building. Thus it appears that, if it were desired to stabilize the rate of building expenditure over a number of years, considerable advance planning, combined with the fixing by the central authority of maximum and minimum annual programmes, would be necessary. To produce large expansions at short notice to meet a trade depression would be extremely difficult, even if high rates of subsidy were granted; and to produce rapid and even contraction it would be necessary to set a definite limit to the number of houses to be completed before eligibility for subsidy was suspended. Expenditure on roads is better adapted to control by present methods of grant. But, even here, local response, especially to expansionary stimuli, has been very uneven and belated. For the rest, we must point to the unwillingness or inability of many of the largest authorities to respond to the expansionary lead which was given by the central government in 1930 as significant of difficulties which might occur again in similar circumstances. The practical conclusion which appears very strongly is that the necessary prerequisites for any successful use of local capital expenditure as a general instrument of economic control are, first, to secure greater stability and regularity in the capital programmes of indivi-

dual authorities, and second, to improve the means by which the central government can influence their actions.

## VIII. Local Investment and Private Industry

The outstanding characteristic of expenditure on constructional work by local authorities in the past twenty years has been its instability. The amount of the variations involved has been large enough to exercise a considerable influence on the fortunes of the constructional trades. Has that influence been in the direction of stabilization, or has it created or exaggerated disturbances and irregularities?

No simple answer appears to be possible. We have already seen that, in spite of the variety of influences which have affected expenditure on the various services, there has been an underlying cyclical pattern which is visible over most of the period. Local authorities have on the whole been influenced by the trade cycle in the same way as private business: they have sought to spend in prosperity and to economize in depression. But the record shows that, whatever their intentions may have been, the actual movements of their capital expenditure have consistently lagged behind the indices of general business, by about two years in the case of capital expenditure, and usually by rather less in the case of expenditure on maintenance and repairs. In the post-War depression, which, though very acute, was short-lived, the effect of this lag was to produce a peak of public expenditure in the year 1921–2, when the level of general industrial production was at its lowest; and the lowest point of public expenditure was only reached in 1923–4, when industrial recovery was well advanced. This result was clearly stabilizing. In the depression after 1929 public expenditure continued to increase, though not very much, until 1931, and certainly did something to support employment in the constructional trades. But the depression was too prolonged for the lag in the movements of public expenditure to produce a stabilizing effect throughout. The very sharp contraction which followed the beginning of the 'economy campaign' in the autumn of 1931 coincided with a further deterioration in industry generally, for another nine or twelve months. Again, however, the lowest level of public expenditure was

only reached in 1933–4, when business recovery was already well started. And the subsequent expansion of local activity was so slow that it had not reached its zenith when the business indices once more turned downwards in the summer of 1937. To some extent, therefore, this lag of local expenditure has caused its fluctuations to be compensatory to those of private business.

The causes of this lag therefore deserve some special analysis. Three elements in it require consideration. First, there is what may be called the natural economic reaction of local authorities to bad trade. This is certainly to cut down capital expenditure and to avoid the annual loan charges which result from it. As far as the rate-fund services are concerned, the incentive to economy comes mainly from the prospect of rising expenditure on public assistance and other relief services, which must involve an increase of rate poundage unless savings can be effected elsewhere. But most local authorities work on the basis of annual estimates and annual rates, and business conditions may therefore deteriorate for at least a year before this has much effect on local policy. In the case of the trading services, and perhaps also of sewerage works and private improvements, there is indeed a more direct connexion between private constructional activity and local capital expenditure, since the two are technically to a large extent complementary. But even here there is likely to be considerable time-lag, since the 'public' portion of the expenditure usually comes last. For example, when the building of houses by private enterprise falls off, the provision of public services for the houses already built may well not be completed for some time. Even on the assumption that local authorities do not attempt to maintain capital expenditure in order to relieve unemployment, they may still be expected to spend on the scale appropriate to prosperity for about a year after prosperity has begun to decline. For rather similar reasons, an even longer period might usually elapse between recovery in private business and the appearance of a wish by local authorities to expand investment.

Second, it is clear that in the depressions of 1921–3 and of 1929–33 the situation was complicated by partial and some-

what half-hearted attempts to devise a public works policy, both on the part of the local authorities and of the central government. We have seen that the behaviour of local authorities in this matter was far from uniform, as local circumstances made them more or less willing to respond to the stimulus from the centre, though this stimulus was itself a general one. It took the form of improvements in the terms of unemployment assistance grants, of greater willingness to sanction loans, and of exhortatory circulars issued by the Ministry of Health. But during the depression of 1921–3 the State's interpretation of a 'public works policy' was very narrow. It consisted of an attempt to encourage direct work-relief schemes with one hand, while discouraging ordinary capital expenditure with the other. This attitude was well summarized in an official report:[1]

'In a circular letter issued by the Department in February 1921 the need for curtailment of schemes involving capital expenditure was strongly emphasised, and it is satisfactory to note that the number of applications in respect of schemes of a "luxury" and non-essential character was appreciably smaller. Had there not been the need to put in hand public works in order to provide additional employment, the capital expenditure of Local Authorities would have shown a large reduction.'

As a result of this combination of restriction and stimulus, total capital expenditure fell heavily, even though the Unemployment Grants Committee approved schemes to an estimated cost of £21·4 millions in 1921–2 and of £15·9 millions in 1922–3. It is probable that total expenditure would have been steadier had the local authorities been left entirely to their own devices.

In 1930 the policy was more rational, and central encouragement was not restricted to 'make-work' schemes, particularly after a conference between the Prime Minister and local authorities which was held at the Guildhall in June. But the degree of co-operation given by local authorities was very uneven, and the depression proved to be much more prolonged than that of 1921–3. Even before the complete reversal of the policy of encouragement in September 1931, there seems to have been some diminution in the volume of

[1] *Report of the Ministry of Health, 1921–2*, p. 52.

applications for loans sanctions received by the Ministry of Health. With the initiation of the 'economy campaign' the Unemployment Grants Committee was rapidly wound up, a general circular advising drastic reduction of capital expenditure was dispatched by the Minister of Health, and it was made known that sanction would not be given to any loans which were not either completely revenue-producing or extremely urgent. The total effect of this 'public works' programme, thus drastically cut short, was probably not very great. It probably maintained the level of local capital expenditure as a whole for nine months to a year; but the reaction from it caused a very much more precipitate and disturbing contraction than would otherwise have occurred.

A third element in the lag between the movements of general business indices and those of local capital expenditure is the interval between the taking of decisions which involve expenditure and the making of the expenditure itself. Some light is thrown on this by the figures of loans sanctioned and of capital expenditure which are shown in Fig. 23,[1] though it must be remembered that a decision must have been taken by a local authority to embark on a particular project some months before a loan sanction was applied for, and still longer before it was actually given. Throughout the period there was a lag of almost exactly one year between the movements of the curve of loans sanctioned and that of actual capital expenditure. In periods of contraction this interval arises from the practical impossibility of instantly abandoning work which is already in progress. Usually, buildings, roads, and other works will be finished off, even though no fresh projects are being initiated, and the rate of expenditure will thus fall off gradually over some months, or even, in the case of large schemes of road building whose period of construction is long, over a year or more. In the autumn of 1931 an attempt was made to produce more drastic reduction by abandoning or curtailing works in progress, even at some cost of com-

[1] Loans sanctioned by the Minister of Health and by the Electricity Commissioners for purposes other than housing and small dwellings acquisition. Loans sanctioned for housing are only available after 1930, and the fact that they are not always separately distinguished from loans sanctioned for small dwellings makes comparison with figures of capital expenditure difficult.

pensation to contractors and of damage by the weather. This was applied particularly to expenditure on roads. But, even then, the full results of the change of policy were slow to appear. It is significant that for all the main groups of services except electricity and harbours, the year 1931–2, containing seven months of drastic 'economy', marked the peak of capital expenditure, and that for all except housing

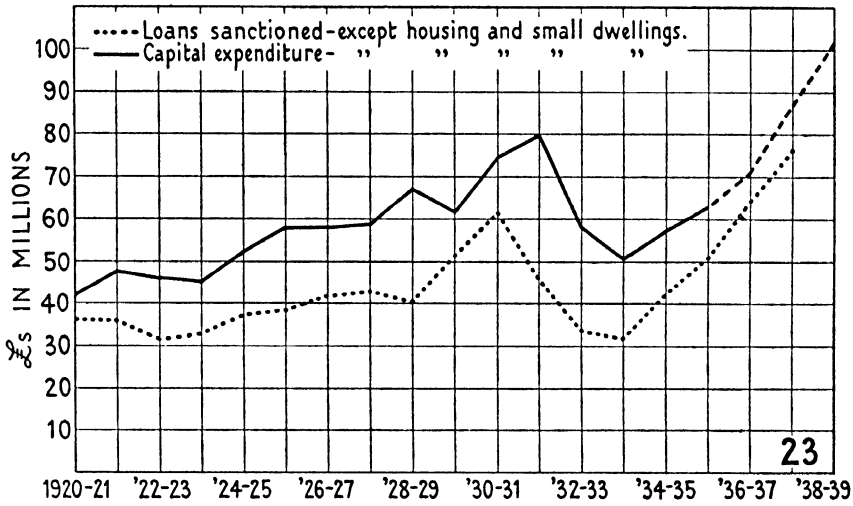



FIG. 23. Loans sanctioned and Capital Expenditure: All Services except Housing and Small Dwellings. England and Wales.

the bottom was not reached until 1933–4, after the central government's ban of expenditure had been much relaxed.

In the phase of expansion the length of the period between a decision to expand and the effect of this decision upon the level of expenditure is likely to be even greater, at least while the existing administrative machinery remains unaltered. Even after the desirability of any given project has been decided in principle by the local authority concerned, there must usually follow some considerable period while plans are being prepared, negotiations for sites commenced and completed, and tenders from contractors asked and received, before an application can be made to the appropriate government department for a loan sanction. Consideration of the proposal by the department, involving in many cases a local inquiry, usually consumes anything up to six months even

if no special complications are involved. Moreover, investigation of the course of expenditure on selected schemes (especially road schemes) shows that, even after work has been commenced, some considerable time usually elapses before the maximum weekly or monthly rate of expenditure is reached, and also that a very large proportion of the total expenditure in the early stages usually goes to the purchase of land, legal charges, surveyors' and architects' fees, and other oddments which are, from a point of view of causing employment, largely non-effective. On the other hand, some of these delays—notably those necessary for the preparation of plans and bills of quantities, and for consideration by the departments—may well be less in the early stages of expansion, when the time of the necessary staff is not fully occupied and arrears of work have not accumulated.

It is, of course, obvious that many of these administrative delays between a decision to spend and the making of the expenditure could be much reduced if land were acquired and preliminary plans prepared well in advance. But it is only since 1935 in the case of roads, and since 1938 over a wider field, that any serious attempt has been made by the central government to encourage local authorities to undertake any such advance planning, and no evidence is yet available as to its effects. In any case, much depends on the character of the particular project involved: if it is of a familiar kind, of which local officials already have experience, and for dealing with which a regular staff already exists, initial delays are likely to be less than otherwise. The relative slowness of smaller local authorities to start housing schemes under the earlier post-War Acts provides a case in point. On the whole, the conclusion is that it has been much easier in the past to bring about a rapid contraction than a rapid expansion of capital expenditure. This is confirmed by the greater steepness of the curves of expenditure on the various services during the downswing than in subsequent recovery.

This experience is, however, derived from the history of a past in which public works have *not* been consistently envisaged an instrument of trade-cycle control. We cannot, of course, legitimately conclude from it that the lags would be

equally great if a deliberate policy of long-term stabilization or inverse variation were being attempted by the central government.

It therefore appears that, even in the absence of any deliberate public works policy, capital expenditure by local authorities may be expected to exercise some supporting influence on the level of total investment during the early stages of a depression. In 1930 and 1931 this natural tendency was reinforced for a time by central government action, but the subsequent change of policy came too soon and too abruptly. None the less, it is clear that this natural slowness of response of local expenditure to the trade cycle may provide a 'breathing space', in which the necessarily slow and cumbrous process of devising and approving detailed plans for special public works expenditure might take place.

In assessing the effects of a fluctuating public works expenditure on the stability of the constructional trades, it is not necessarily sufficient to examine the movements of total public expenditure. We must also consider to some extent the movements of separate categories of it. The equipment of power-stations, the improvement of roads, the building of houses affect different branches of the constructional trades, and involve the employment of labour of differing types of skill, which is far from being perfectly mobile between them. They also make to some extent different demands on the constructional trades from those made by private investment. It is quite possible that movements of public investment which were perfectly inverse in total to those of private investment should none the less have a destabilizing effect on employment, if they caused the attraction to one branch of the constructional trades in time of general depression of labour which, later on, could neither find work there nor move easily elsewhere. This is still more likely to happen if the movements of public expenditure are not inverse to the trade cycle.

There is some evidence that, at least in the earlier part of the period, such 'sectional' difficulties were caused by the wild fluctuations of total expenditure on housing, especially since these were complicated by even greater instability in

the expenditure made by individual towns and regions. In Fig. 24 the figures of capital expenditure on housing by local authorities are set alongside the statistics of employment and total insured workers in the building trade. Until 1933 there is clearly a pretty close connexion between the curve of housing capital expenditure and that of insured workers in employment. But the curve of the total number

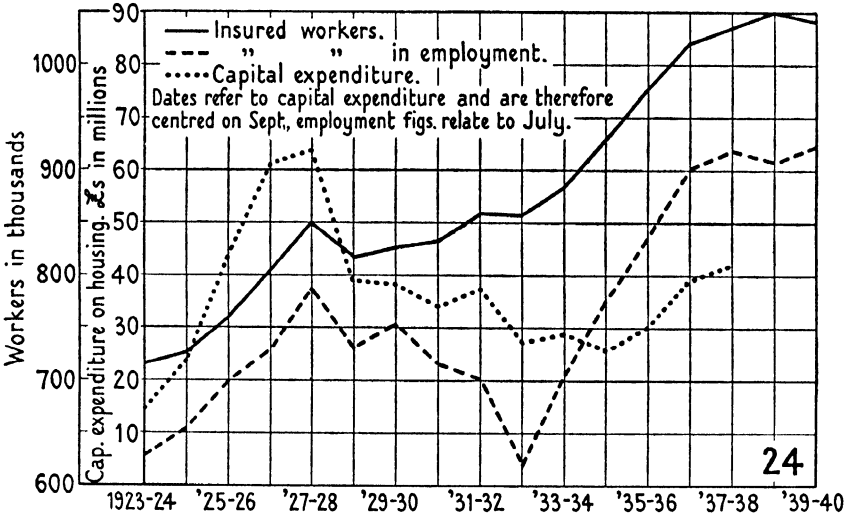



FIG. 24. The Building Industry and Housing Expenditure. Great Britain.

of workers attached to the industry is related to the others only in a more complicated manner. The explanation seems to be as follows.

At the beginning of the period there was a minimum of from 5 to 10 per cent. of unemployment in the building industry, which was probably of a casual or frictional nature. Thus the numbers both of total insured workers and of those in employment rose in response to the rapid increase of public expenditure on housing. There was apparently little absorption of unemployed labour, but rather an attraction of new men into the industry. Between July 1923 and 1925 employment increased by some 71,000: unemployment had been only reduced by some 28,000 (out of 87,000): and there had been 43,000 additional registrations in the industry. When public housing expenditure reached its peak in 1927,

new employment had increased over 1923 by 159,000: of this, only 29,000 was in reduction of unemployment, and there had been 130,000 new entrants.

The decline in employment in the next year, 1928, of 56,000 is clearly connected with the £25 millions drop in public housing expenditure.[1] Of this 56,000, 31,000 were able to leave the industry, and 25,000 were added to the unemployed. So large an exodus is probably to be explained by the boom conditions still ruling in other industries which demand unskilled labourers. In 1929 the expansions of private building, less affected by subsidy policy and legislation, apparently explains the recovery in both numbers employed and numbers insured: 7,000 (out of 85,000) unemployed were reabsorbed.

After 1929 employment fell off rapidly, but the number of insured workers rose steadily though slowly. The unemployment percentage consequently grew rapidly to 27·6 in July 1932. This may perhaps be explained thus. Though the unemployment percentage in building was rising rapidly, it remained at first lower than that for industry as a whole. This fact, combined with the casual methods of engaging workers prevalent in building, meant that there remained in it a greater chance of employment for an unskilled labourer than elsewhere, and the industry consequently continued to attract workers. From the peak of public expenditure in 1927 to the bottom in 1932 there were the following changes:

| | |
|---|---|
| Insured workers | plus 11,000 |
| Unemployment | plus 179,000 |
| Unemployment per cent. | plus 20·5 |
| Employment | minus 168,000 |

The conclusion very strongly suggested is that the great public expenditure on housing in 1926 and 1927 attracted into the industry an excess of labour, which was only in part absorbed by private building or transferred to other industries when that programme ended, and which served to

[1] This corresponds closely with our estimates, given elsewhere, of the amount of direct primary employment given by the spending of £1 million: on that basis £25 millions would employ 52,000 to 58,000 men.

add considerably to the unemployment figures both before and during the general depression.

Since 1932 there have been the following changes:

| *July* | *Increase in nos. insured* | *Change in nos. unemployed* | *Change in nos. employed* |
|---|---|---|---|
| | *on the previous year* | | |
| 33 | 27 | −58 | +85 |
| 34 | 44 | −26 | +72 |
| 35 | 49 | −11 | +60 |
| 36 | 43 | −23 | +66 |
| 37 | 15 | − 1 | +16 |
| 38 | 15 | +26 | −11 |
| 39 | −9 | −12 | + 3 |

We have here all the characteristics of the earlier boom, except that the cause is now private, rather than public, house building. Save during the first year of recovery, the increased demand was met by the attraction of new labour far more than by the absorption of the reservoir of unemployed. There was, indeed, a fall in the level of the reservoir up to 1937; but in that year only 1,000 were drawn from the pool. This suggests that a new equilibrium was being established with the minimum unemployment proportion at 11 per cent. instead of the 5–10 per cent. of the early years. Any further expansions would then be entirely met from fresh entrants; any serious contraction, such as actually occurred in 1938, must leave a heavy and probably prolonged legacy of unemployment. And a growth of public expenditure upon housing clearly contributed a good deal to the later stages of the expansion in 1936 and 1937.

It does not appear possible to test in the same way the effects of variations in local capital expenditure on other kinds on particular branches of the constructional trades, either because of their relatively small magnitude, or because of difficulties in the classification of the employment statistics. But it is often said that public expenditure upon road works has had in some districts similar effects in attracting an excess of labour which found it difficult to find other employment when public expenditure was diminished. It scarcely needs demonstration that these difficulties will be

less if the programme is carried out in depression and discontinued in boom, than in the reverse circumstances.

## IX. The Future of Local Expenditure

It is at no time possible to forecast the trend of local capital expenditure with very much confidence; and at the present time the outbreak of war has introduced an element of uncertainty about the future so large that any discussion must be of a speculative character. There are, none the less, some general issues which may be profitably considered. Something can also be said of the objects of expenditure which seemed to be desirable and necessary in the summer of 1939, and which may again come into view, possibly with even increased urgency, after the end of hostilities.

First it must be noticed that the average level of expenditure on capital account in the twenty years after 1919 was enormously heavier than that which ruled in the later part of the nineteenth century and in the first decade of the twentieth. Are we to regard this great importance of local investment as the result of abnormal and temporary causes, or rather as the consequence of fundamental changes in the functions of local authorities and in the public demand for the services which they administer?

The answer is not altogether obvious. On the one side, it is clear that much of the expenditure has been due to an extension of the scope of local activities, which is due to a very fundamental growth of interest in the 'social services'. But reflection suggests that some of this great rise in capital expenditure was the result of the impact of this sudden extension of function, and need not be maintained in future unless new fields of activity are opened up.

We have seen, for instance, the dominant importance of local expenditure upon housing. This was practically a new service for local authorities. Its creation, and the heavy expenditure on it, was certainly originally due to a combination of special circumstances. There was the cessation of house building from 1914 to 1918, and the high costs of building in the succeeding years which made it impossible for private enterprise to provide homes for the masses of wage-earners at rents which they could afford to pay. There

was the large increase in the numbers of young married persons, which resulted from the rising numbers of births in the first decade of the century. There was the rapid movement of population associated with the impact of a new form of transport and with the decline of the older export industries. Finally, there were the belated stirrings of public conscience in matters of slum-clearance and overcrowding. But there is reason to believe that by the summer of 1939 these forces had exhausted their initial impetus. The number of families, at least in the biological sense, has about reached its maximum and will soon decline to an unknown extent. Building costs and interest rates had fallen, and the need for public action to house the better-paid wage-earners had become less pressing. Much headway had been made with slum-clearance. The five-year programme, initiated in 1933 and later extended, envisaged the demolition and replacement of 472,000 houses in England and Wales, and more than one-half of it had been carried out by April 1939.[1] With the abatement of overcrowding much less progress had been made. But the field had been defined and, but for the outbreak of war, the consequent expenditure would have belonged to the near rather than the distant future. The end of the war will presumably see these programmes still uncompleted and, if we may judge from previous experience, there will also be arrears of other building to make good. It is, of course, also quite possible that the standards of sanitation and room-space on which public opinion and the central and local authorities are prepared to insist will once more be considerably raised. If they were, the field for public house building would remain very large, for recent inquiries in many towns have shown that only a very slight alteration in the recognized standard of overcrowding suffices to double or treble the number of 'overcrowded' houses. And slum-clearance programmes might well be widened to include the deliberate clearance and replanning of residential areas in the centres of the great cities, even where these cannot be technically described as 'slums'. Again, there is the possibility that the war-time evacuation of London may be the prelude to another great shift in the

[1] *Ministry of Health Report, 1938–9*, p. 82.

distribution of industry and population. But on the whole it seems likely that, if some of these rather radical changes in the present situation should not materialize, the general level of expenditure on municipal housing might show a tendency to decline.

Rather similar considerations apply to some other branches of local activity which have been important objects of capital expenditure in the past. It has been noticed that in education the dominant facts have been a rapid rise in the standards of school accommodation, combined with regional and local shifts of population and, most recently, with the raising of the school-leaving age. But the background of the future must be a continued decline in the numbers of the school population, which may make it possible to provide considerably better accommodation per head without much expenditure on new construction. None the less, it must be emphasized that plans for the reorganization of education which have been approved in principle by public opinion and the central government are still far from being fully carried out. Their completion would require heavy expenditure for a number of years. In elementary education the reorganization suggested by the Hadow Report of 1926 is not yet complete, and the standards of school buildings and equipment there set out are far from final. In secondary education the growing consciousness that our secondary education is more academic than is wise for many children is only just beginning to result in the building and equipment of 'technical' schools and in the provision of gymnasia and other facilities for physical training. Moreover, the recommendations of the Hadow Report about nursery schools have so far been mostly neglected: those in operation in 1937 provided for only 7,000 out of a total child population of appropriate age in England and Wales of 1,721,000. Nursery schools are expensive: it has been estimated[1] that the cost of building and equipping a nursery school for 80 children is about £3,000—so that a total capital outlay of at least £60 millions might be required to secure full provision! Further, the presence in the general class-room

[1] *P.E.P. Report on the Public Health Services* (December 1937), p. 117: the estimate (£35 per place) is certainly a minimum.

of mentally deficient or sub-normal children has long been recognized as undesirable. The Wood Committee (1928) recommended the establishment of special schools for this type of child. No exact figures of the cost are available, but it would certainly be large. It therefore seems probable that, though expenditure on educational buildings and equipment may not show such startling increase as in the past, it could none the less easily be maintained at a high level for many years to come.

In the case of roads, it is the impact of a great technical revolution, rather than the awakening of the social conscience, which has made necessary the great development of expenditure during the last twenty years; and amount and direction of expenditure is, or at any rate ought to be, governed much more closely and directly by the balance of cost and economic advantage. In Great Britain, where distances are small and the localization of population and industry particularly complex, the economic advantages to be gained from the development of an efficient road system are probably greater than anywhere else in the world. From an economic point of view efficiency means the possibility of high *average* speeds and unobstructed running both for commercial and passenger vehicles on the through routes, together with easy access from them to particular centres of population and industry. It also means the maintenance of road surfaces sufficiently good to reduce wear and tear to a minimum. From a point of view of safety, efficiency means the provision of such road conditions for the various types of traffic as will allow the economic desiderata to be realized with a minimum of personal risk—an efficiency which was so pre-eminently achieved by our grandfathers in the case of the railways. From a point of view of amenity, efficiency means construction and improvement on such lines as will preserve natural and architectural beauty and will reduce traffic noise to a minimum.

But though over £250 millions of capital expenditure alone has been made on British roads since the Armistice, the achievement of road efficiency is certainly no nearer than it was then. Most people would say that it is farther off than ever. Partly, no doubt, this is because much of the

money has not been spent to the best advantage. But the main explanation is undoubtedly a growth of traffic so rapid and continuous that even in the periods of most rapidly expanding road expenditure, road improvement failed to keep pace. Nor, until the outbreak of war, was there any sign whatever that the growth of road traffic was slowing down. Public opinion has so far been mostly focused on the failure to achieve safety and amenity. But there can be little doubt that the economic wastage is at least as serious, in everything except, perhaps, the matter of the actual road surfaces. No attempt has been made as yet to assess the economic loss resulting from narrowness and overcrowding of main roads, from stoppages in traffic jams, from slowness and obstruction of access to centres of population,[1] but it is easy to quote specific examples. In 1927 the delays from traffic congestion in London cost the London General Omnibus Company £1,000,000; Messrs. J. Lyons & Co., the caterers, find that congestion doubles the cost of delivery services; the Ministry of Transport estimates the cost of delay at Iron Bridge, Canning Town, to be £1,000 a day, and so on.[2] There is no doubt that there is room for strictly economic expenditure on roads on a greatly increased scale for many years.

Nor is there any want of specific proposals. The Road Fund Reports for 1938 show that, of the 4,500 miles of trunk roads for which they have assumed responsibility, 750 have an overall width of less than 30 feet, and another 3,000 of less than 60 feet; while dual carriage-ways exist on only 27 miles, and cycle tracks on only 14. And trunk roads form only a small part—about one-sixth—of the Class I roads of the country. The local authorities' proposals under the five-year programme and under long-term schemes had reached a total of £144 millions by 31 March 1938, and very little of this money had yet been spent. Nobody has attempted a close estimate of the expenditure which would be involved by execution of the recommendations of the

[1] For some suggestions on the measurement of economic urgency of road improvements, see U. K. Hicks, *The Finance of British Government*, pp. 135–6.

[2] Quoted from W. R. Robson, *The Government and Misgovernment of London* (1938).

Bressey-Lutyens Highway Development Survey for Greater London, which was published in 1937. Indeed, it is clear that an attack on the London traffic problem involves clearance and redevelopment on a great scale, as well as actual road construction and improvement, of which the total gross cost cannot be less than £250 millions, and might well be much greater. And it is certain that similar surveys of the great provincial towns would also demonstrate an economic need for very large expenditure. An official of one of the great motoring organizations has given his opinion[1] that an expenditure of £600 millions, spread over ten years, would be necessary in order to bring the British road system up to the standard which is desirable from the point of view of economics and of safety. Even if all allowance be made for differences of opinion as to exactly what standard is desirable or economically justifiable, it is clear that there would have been no difficulty in envisaging a rate of capital expenditure on British roads over the average of the next ten years at least twice as great as that which was achieved in the last ten. Stabilization of expenditure of such magnitude, or, still more, anti-cyclical timing of some of it, would not be a negligible factor in trade-cycle policy.

In the public health services the dominant item in capital expenditure in the past has been sewerage. Here considerable expansions can be foreseen for some time into the future in order to provide for the wide fringe of 'sub-urban' population which motor transport has induced, and which is still growing rapidly. This is often sufficiently dense to be in serious need of main drainage facilities which it does not at present possess, and yet so thinly spread as to make its provision a much more costly business, per house served, than has usually been the case with truly 'urban' areas. The main difficulties have indeed been financial and administrative. But the latter, at least, can be gradually overcome by co-operation between county and rural district councils with each other and with adjoining urban authorities, and a very considerable field of expenditure is coming into view. The amount of loans sanctioned for rural sewerage and sewage disposal schemes rose from £480,800 in 1933–4 to £1,124,000

[1] In a personal interview.

in 1936–7. This kind of work, though very necessary, is frequently not extremely urgent. It therefore seems to be specially suitable for variations of timing as part of a public works policy.

Expenditure upon hospitals might also easily be increased in future. A large proportion of the beds available are in voluntary hospitals. In the past, these have had to depend mainly upon charity for the extension of their buildings and apparatus, and their financial position has in consequence been insecure. Under the Public Health Act, 1936, local authorities have powers to make capital contributions to voluntary hospitals for the provision of accommodation, and the Sankey Commission (April 1937) made far-reaching proposals for public subsidization. The effect of such changes in financial responsibility would certainly be both to lead to considerable expansion of capital expenditure upon hospitals, and to make the timing of it more controllable. With the present system, most of the expenditure has taken place at times when appeals to charity could be successfully launched, that is, only in times of general prosperity. In addition, the work of re-equipping the former poor law hospitals and appropriating them for general public health purposes is still far from complete. At the end of 1937 there were 64,000 beds in public assistance hospitals and 60,000 in public health hospitals, as compared with 85,000 and 36,000 in 1931.

There was also likely to be steadily rising expenditure for some considerable time for the provision of baths, gymnasia, and other facilities for physical education. In the last two years before the outbreak of war, such expenditure was being encouraged by the distribution of capital grants by the Physical Training Grants Committee; but it is essentially of the 'non-urgent' category, suitable for controlled variation of timing.

In the trading services as a whole, it did not seem probable that the average level of capital expenditure since 1919 was likely to be surpassed, if indeed it could be maintained. In transport and electricity supply, the sphere of local authorities is at present largely confined to the urban areas, and does not seem likely to be extended outside them. In

electricity supply, expenditure on generating stations, owned by local authorities but controlled by the Central Electricity Board, had risen to a very high level in 1938. But in the matter of mains and services, the urban areas are by now well supplied, and their much needed extension to the rural and sub-urban population is likely to fall, under the present arrangements, mainly to the private companies. In local transport, some further expenditure may be necessary upon the transformation of tramways into trolley or motor-bus services. But, though the tram is far from extinct, the rate of change-over was declining, because the tram remains a cheaper method of transport in the more densely populated centres. Water-supply undoubtedly still provided the largest field. Here there were two problems with which only small progress had yet been made—the more effective co-ordination and storage of water-supplies for large regions of the country, and the extension of water services in the rural and sub-urban districts.

Immediately before the outbreak of war, therefore, a survey of the main objects of capital expenditure by local authorities appeared to suggest varying prospects for the future. In the case of roads and of the public health services generally there was a strong probability that the natural trend of capital expenditure would have been upwards for a considerable period of time. For the trading services, large changes in either direction seemed rather unlikely. For education and housing, when existing programmes should have been completed, there was perhaps a prospect of a considerable reduction in the level of expenditure. But in a general way there was no sign that the willingness of local authorities to undertake fresh duties, or of the central government to press fresh duties upon them, was likely to be less in the near future than it had been in the past. There was every possibility that services previously non-existent or unimportant might be developed—as Air Raid Precautions were developed in 1938 and 1939—and might help to maintain or to swell the level of expenditure. The outbreak of war has brought almost all the usual capital expenditure of local authorities to a sudden stop, and it is useless to speculate in detail about the conditions in which it will be

resumed. We may, however, be fairly safe in assuming that the cessation of expenditure during hostilities will leave a heavy legacy of arrears of necessary work, which will claim urgent attention even if financial or political conditions make it impossible to continue at once the general extension and improvement of the social services. It is entirely reasonable to suppose that for many years local expenditure on capital account will be large enough to deserve much attention in any national attempt to control the level of public investment in the trade cycle. And the resumption of local expenditure at the end of the war will certainly provide a powerful instrument for easing the economic change-over from war to peace.

These conclusions are equally true of local expenditure on repair and renewal work. Even if capital expenditure were to cease to expand at all, the rapid growth of public capital in the immediate past must make necessary very heavy annual expenditure on repairs and renewals of houses, roads, sewers, motor vehicles, water and electricity mains, pumping and generating machinery, and so on. This need has not yet shown itself at all fully, because so large a part of this fixed capital is still less than ten years old; and because in some instances, notably roads and electricity supply, the immediate effect of fresh capital expenditure has been to effect an actual reduction of maintenance and repairs.[1] The figures of expenditure on maintenance, repairs, and renewals collected in Table 28, imperfect though they are, suggest that in the past decade there has been an annual average expenditure for these purposes of about £70 millions; and it seems likely that five or ten years hence the expenditure needed may be half as big again. Now it may be admitted that a considerable part of the repair and renewal work cannot for technical reasons be delayed or accelerated at will in order to create employment; machines break down, buildings develop defects, and the remedy must be applied at once. There is another part which is easily susceptible only of careful seasonal timing to offset seasonal fluctuations of private demand or to provide additional employment in winter. This has been several times urged in central government

[1] This has been given to us as a reason for the small increase in maintenance expenditure on roads during the past four years.

circulars and, though statistical evidence is lacking, this course appears to be fairly widely followed by local authorities in the case of painting and decorating work. There remains, however, a great deal of repairs and renewals work which is technically capable of variation within the limits of two or three years—as is, indeed, illustrated by the extent to which it was reduced in 1932 and 1933. At present it is well known that local finance committees practise economy at the expense of such works in times of stringency, because their cost is an immediate burden on the rate-fund. But an extension of the practice of accumulating reserve and renewals funds, which is already common in housing and the trading services, would make it possible to stabilize the amount of such work, or even to expand it in times of depression without incurring either an increased burden on the rates or increased debt. The amount of work which is technically capable of variation in timing certainly varies very much from service to service; but where variation in timing is possible, it has a decided advantage over capital expenditure as a trade-cycle instrument, in that it can be carried out rapidly without complicated planning and preparatory work. Acceleration of repair and maintenance work might prove to be especially useful in the early stages of a depression, before large schemes of capital expenditure could be set going. Or again, retardation might be used in the later stages of a boom, if the difficulty of suddenly discontinuing capital works already in progress was preventing an appropriate contraction of public expenditure. Certainly, in view of the inevitable absolute increase in the amount of public maintenance and repair work in the future, and of its possibly greater relative importance, these possibilities seem to deserve more consideration than they have so far received either from local authorities or from the central government.

It remains to discuss the practical possibilities of using local expenditure on construction as an instrument of trade-cycle policy. There appear to be three possible objectives. First, it is clearly very desirable on general grounds that an attempt should be made to eliminate the largely random fluctuations which have been so prevalent in the total expenditure of all authorities taken together, and particularly in the expendi-

ture of individual towns and districts. When these fluctuations coincide with movements of private investment, they are actively de-stabilizing in their effects. Even when, as in 1927 and 1928, they occur in years of relatively normal general business conditions, they must cause disturbance to particular trades and in particular districts. Stabilization would serve to raise the 'minimum' level of activity in the constructional trades in time of depression and would reduce the amount of over-expansion in time of prosperity. In view of the relative importance of local capital expenditure, this would be well worth attempting.

Second, there is the more ambitious objective of securing anti-cyclical variations in the timing of expenditure on objects which fall within the normal programme of local authorities. And third, there is a possibility of so widening or deepening the field of their activity in time of depression as to cause them to embark on public works which they would not otherwise undertake at any time. Broadly speaking, the activities of the Unemployment Grants Committee in 1921 and the wider policy of the central government in 1930 were directed to the second objective. They aimed rather at the acceleration of work which would have been done later, rather than at any large scheme of public works to be created expressly for trade-cycle purposes, such as has since been seen in the United States and in Germany.

These three objectives are not necessarily contradictory, but they certainly present varying degrees of difficulty and would require rather different methods of preparation and of finance. They have, however, at least one fundamental thing in common, namely, the need for a much greater degree of advance planning of capital programmes than has been achieved hitherto either by individual local authorities or by the central government. We have already remarked that something had been done in this direction in the case of roads, notably as a result of the request of the Ministry of Transport in 1934 for a definite five years' programme of expenditure from each highway authority. A further step was taken in May 1938, when the Ministry of Health requested all local authorities in England and Wales to draw up and to submit within nine months a statement of the

amount and objects of proposed capital expenditure during the five years 1938–9 to 1942–3, and its proposed annual distribution.[1] In the accompanying circular stress was explicitly laid on the need for determining, by the local finance committee or by a special committee established for the purpose, the relative degrees of urgency of the proposed works, and for the making of preparations, by early acquisition of land and by early production of detailed plans, for possible variations in the tempo of expenditure. This step was certainly a great advance on anything which had been done before. There is reason to believe that it caused many local authorities to draw up long-term programmes who had never dreamed of doing so before. Some even went rather beyond the express terms of the circular and gave some serious thought to the question of works which fell outside their normal programme, but which they might be willing to undertake in an emergency if sufficient financial inducement were forthcoming from the central government.

The drawing up of long-term programmes of this kind should do a good deal to promote greater regularity and stability in the capital expenditure of individual local authorities. But if it is desired to secure controlled variations of timing, it is only the beginning of planning. For a rapid expansion to be possible, it is necessary, as the circular pointed out, that land should be acquired and detailed plans prepared well in advance. It is here that the difficulties really begin. Both land and detailed plans are expensive, and both are liable to 'get out of date' unless the work is proceeded with fairly soon after their acquisition. Moreover, in some kinds of local expenditure, such as much of that on sewerage works and water-mains, advance planning means anticipating the appearance of housing estates and factories which these works are intended to serve. The existence of town-planning schemes makes this easier than it used to be. But there is always a considerable risk that such plans will have to be abandoned altogether, or at least radically altered. In larger works there may be even more serious difficulties. The scheme for a road-bridge over the Severn, for instance, caused a very heavy expenditure on plans by the county

[1] Ministry of Health Circular 1687.

councils concerned, and was then disapproved by Parliament. It is not suggested that advance planning cannot reduce many delays and obstructions to rapid action which would otherwise occur; but it seems unlikely that it can so eliminate them as to make possible really large accelerations of local capital expenditure in less than a year. This point is, of course, extremely important in relation to general trade-cycle policy. The maintenance of a steady level of constructional work by local authorities, which would be assisted by the 'natural lag' already discussed, would diminish the rapidity with which a cumulative depression could develop. If plans for securing a considerable increase of expenditure were put into execution as soon as it became evident that a serious depression was developing, the resultant expenditure would materialize in the later stages; it would have the effect of 'holding up the bottom' or promoting an earlier recovery, rather than of preventing a depression from taking place at all.

Apart from the difficulties involved in planning, some obstacles to stabilization and still more to anti-cyclical timing of expenditure arise from the close technical and economic connexion between some types of public works and the volume of private constructional activity. As has been already noticed, if there is a falling off of private or industrial building, this is bound to be followed by some reduction in public expenditure on directly ancillary services—though not, in all probability, as much as has actually been experienced in the past. On the other hand, it is extremely difficult in prosperity to hold back expenditure on services which are intimately connected with the growth of private investment. This cannot be avoided; and it follows that some anti-cyclical movement of expenditure on other services would be necessary if stabilization of total expenditure were to be obtained. A reduction of private investment also has the effect of making it more difficult to envisage the future utility of other types of large works, such as new waterworks, generating stations, and even schools and public buildings in previously growing areas, which would otherwise have seemed entirely justifiable objects of expenditure.

Finally, from the point of view of the local authority, there are the financial difficulties, which are discussed in

detail in a later chapter. These need not be a serious obstacle to a policy of stabilization of capital expenditure, except perhaps in areas especially subject to the impact of cyclical movements of trade. But they become progressively more serious if local authorities are asked to accelerate expenditure at times when their finances are strained, or, still more, to undertake at such times works which they would even in normal times regard as not worth the cost. It is clear that little can be achieved in these directions without very radical alteration of the present arrangements about grants-in-aid and, in the latter case, a considerable increase in the proportion of the cost which is borne by the central government.

But our previous survey has made it clear that in the past the instability of local capital expenditure has been at least as much due to the actions of Parliament and of the central departments as to lack of planning and foresight on the part of local authorities. Here also there is clearly urgent need of reform. No one suggests, of course, that Parliament should cease to impose upon local authorities fresh duties involving heavy capital expenditure. But it is essential that in future this should be done in such a way as to make possible the incorporation of the necessary work in the long-term programmes of local authorities, without that insistence on the maximum results in the minimum time, which has produced such disastrous effects on programmes of housing and school-building. It must be said that there is little sign even in recent legislation about housing, education, or provision for physical fitness that this principle has been appreciated by the legislature. Further, it is clear that effective stabilization —or any other objectives—would require a greater centralization of control in the Ministry of Health or some other single central department. At present the Ministry is the formal sanctioning authority for local loans for most purposes. But the effective decision appears to be taken rather by the Ministry of Transport, the Board of Education, the Home Office, the Electricity Commissioners, and so on.[1] It is

[1] The Ministry of Health is, of course, the technical as well as the formal sanctioning authority for loans for housing and most public health purposes. It does not have even formal control over electricity loans, loans raised under local Acts of Parliament, or loans raised by the London County Council.

clearly desirable that a more comprehensive control should be exercised by a single body, which should be able, for example, to postpone sanction to proposals which would make the total capital expenditure of any particular authority randomly irregular, whatever their technical merits might be.

On the whole, it appears that the most hopeful objective is the securing of a greater measure of stability in the total of local capital expenditure on all services, which would itself involve some measure of anti-cyclical timing in some services in order to offset inevitably cyclical timing in others. The degree of local and central planning, which the achievement of this objective would imply, would prepare the way for more ambitious attempts to secure large anti-cyclical movements of total expenditure and would, in so far as it tended to delay expenditure in times of prosperity, do something actively to assist them. But these should probably be limited to works falling within the normal capital programmes; it does not appear that, within the existing framework of local government and finance, local authorities are very well fitted either to originate or to administer large plans of public works whose local utility is so low as to exclude them from the normal programmes.

# V

# INVESTMENT BY SEMI-PUBLIC ENTERPRISE

## I. The Railways

### 1. *The Trend of Railway Business*

RAILWAYS in this country are not owned or operated by the State. Special regulations restrict their economic freedom more than that of ordinary commercial enterprises, but in essence they are conducted as private businesses, working for profit. Their investment activity in particular is outside public control and there is no reason to expect that railways will not react in a similar way to the impact of the trade cycle as any other private industry: they will tend to reduce capital works in bad times and to expand in good times. If the State wants to induce railway companies to alter the size and timing of their investment according to the demands of a public works policy, it must evidently bear some of the risks involved by a departure from what the railways believe to serve their own interests best. Unless sufficient State assistance is given, the companies will hardly be willing or able to adjust their constructional activity in the desired way. Now, actually the State has assisted railway investment in various ways, and that is one of the main reasons why we are investigating the trade-cycle behaviour of railway works. But State help in the past was not motivated by trade-cycle considerations, and it may be well, therefore, to ask whether the double-edged weapon of 'subsidies' should be used in the case of railways.

At first sight State assistance to railway works seems defensible on the ground that for some time road transport was subsidized against rail transport and that the restrictions on tariff policy imposed on railways represent—in the companies' own view—a serious handicap in maintaining their competitive position. But it is surely not the best policy to counterbalance subsidies given unintentionally to one industry by subsidies to another industry, and it would clearly have been preferable to co-ordinate the transport

system as a whole and thus to diminish the danger of causing misinvestment. But even if the desired equilibrium between the various transport services were attained, State assistance to railway works might be justifiable in order to enable railways to adapt themselves quicker and better to changing conditions, or for the general reason that employment of otherwise idle productive resources costs the society as a whole virtually nothing and the government saves at least something by way of unemployment benefit and gains something by way of increased revenue.

Moreover, the large-scale organization of the railway industry in four big groups, the absence of competition between them, and their obligation to submit detailed financial and statistical returns to the Ministry of Transport makes it easier from an administrative point of view to apply a policy of inducements.

Finally, railways seem to be in a position to plan in advance their capital works and to shift some of them from one period to another. The 'common carrier' obligation compels them to carry a certain amount of reserve capacity in order to meet the peak load of a boom. This excess capacity can be allowed to diminish or to increase to a certain extent and might be made to vary inversely to the trade cycle. Further, their annual work programmes—whether of new investments or replacements—are often part of larger constructional schemes, the completion of which is spread over several years. When circumstances require it the programmes can be slowed down or speeded up. As will be shown later, they are usually curtailed in bad times and accelerated in good times, but railways might be induced to reverse this policy—at least in part. There are other works of less urgent nature which form no part of current investment programmes but could usefully be undertaken with some State assistance and might prove to be profitable capital outlays, or, if not, may still be desirable for political and social reasons and possess a higher social utility than some of the public works envisaged by public authorities to combat a depression.

The possibility of planning public works in advance depends largely on the certainty with which the demand for the products or services of an industry can be predicted. In

the case of public utilities such a forecast of future demand can often be made with a sufficient degree of accuracy to enable them to do pioneer work in the field of investment planning. For long periods railways could expect that the upward trend in national output would be reflected in a similar increase in rail traffic and could, therefore, like public utilities plan ahead extensions and replacements without danger of serious disappointments. Since 1918, however, the prospects of rail transport have become far more uncertain and have made it advisable for railway companies to pursue a rather cautious investment policy.

When the policy of government control came to an end after the war of 1914–18, heavy arrears in improvements and replacements had accumulated. Although £60 millions were distributed between the pre-War companies to cover losses suffered during the period of government control, the arrears had not yet been overcome when the provisions of the Railway Act of 1921 with regard to amalgamations came into force in 1923. Evidently, the Amalgamation Act itself—aiming at a higher degree of standardization—introduced an element of uncertainty and led railway companies to postpone expenditure on rolling-stock and other capital works before 1923 and for some time after, since it took probably some time for the four big groups to survey their systems and to plan improvement schemes. Work on these programmes was just on the way when the railways were hit by the coal strike and the general strike in 1926. New construction was delayed and repair shops had partly to be closed down owing to lack of supplies. Dwindling revenues and exceptional fuel costs caused a financial strain demanding strict economy of expenditure in all directions of railway activity. The after-effects of the strike were still felt by the railways in 1927 when industrial activity increased rapidly. Their operating costs were far above normal, because the long stoppage had resulted in a congestion of empty wagons on all sidings and in a bad average state of repair of engines and rolling stock, while coal supplies were still of an unsuitable quality.

It is clear, however, that the railways would have overcome these temporary disturbances within a rather short period

but for other more permanent changes with adverse affects on their business. Many forces tended to reduce the volume of rail traffic. The growing competition of motor transport by road was in the foreground of public discussion. But to some extent industrial and technical development aggravated the situation. The economies achieved in the use of raw materials, the declining importance of coal brought about by technical improvements in the coal consuming industries and by the substitution of oil and electricity for coal, the relative decline of the heavy industries using large quantities of bulky materials accompanied by the growth of the new light industries requiring little raw material per unit value of output, the establishment of these new industries near the main consumers' centres which was partly made possible through the progress of electrification, the shrinkage of exports which hit rail traffic directly as well as the railway-owned docks and harbours—all these developments taken together slowed down the growth of rail traffic considerably and explain partly why it lagged behind the increase in national output.

So much has been written in recent years about the competition of road and rail that we need not enlarge here upon this theme. The facts are still controversial; but in the railway companies' opinion road competition reduced appreciably the goods traffic which would otherwise have reached the railways and, what was worse, skimmed the cream of the traffic in the higher tariff groups, leaving the railways to carry goods chargeable at less remunerative rates.

The volume of traffic as a whole was roughly 20 per cent. smaller in 1937 than in 1929 in spite of an increase in the volume of national output of about 25 per cent. Even the traffic in heavy and bulky materials which was sometimes regarded as the proper domain of rail traffic declined. It is interesting that less building materials were carried by rail in 1936, the year of the building boom, than in 1929; the traffic in bricks and tiles, gravel and sand, lime and cement taken together was actually 20 per cent. lower. Timber and iron and steel traffic show similar movements. That road competition was at least a significant factor in this development can be demonstrated by the general advance of road

transport during this period. The number of commercial motor vehicles in use increased by over 45 per cent. between 1929 and 1937, and it can safely be assumed that their speed and capacity increased too.

The differential railway tariff system which remained substantially unaltered throughout the period was, obviously, very exposed to unrestricted and partly even subsidized competition in the higher tariff classes; and road transport, besides other factors, succeeded in diverting from the railways a substantial part of their light goods traffic. The main result for the railways was to reduce the average receipts per ton mile of goods carried without an increase in volume of traffic to compensate for lower values. Receipts per ton mile declined by about 8 per cent. between 1929 and 1936, thus adding considerably to the effect of the fall in the quantity of goods carried.

Railways were more successful in retaining their passenger traffic. As passenger traffic could be expected to show a greater response to variations in fares than goods traffic, they adopted a policy of reducing fares for certain journeys below standard rates, and gradually extending the reductions to a wider field of traffic, so that only about 12 per cent. of total passenger receipts came from passengers carried at standard fares. The result was that the number of passengers carried increased, after a sharp drop during the 1932 depression, steadily up to 1937, and in that year slightly exceeded the 1929 level. But this increase in volume, accompanied in the last three years by a rise in the average receipt per passenger journey, was not quite sufficient to offset the reductions in fares. Total passenger revenue in 1937 was slightly less than in 1929.

The declining trend of railway receipts confronted the railways with the serious problem of adapting their expenditure immediately to the shrinkage in revenue. In an industry where over 60 per cent. of the expenditure represents fixed costs which do not vary with the traffic, it was a difficult task to cut the coat according to the cloth. Reduction of train services was barred partly by statutory restrictions, partly by the risk of losing further ground to road transport, as the experience of the general strike had shown. Some, though

not much, relief could be expected from a reduction of money costs, particularly as far as cyclical variations were concerned. Wage reductions from 1928 to 1934 certainly helped to bridge the gap during this crucial period of transition and so did slow promotion of the staff and small increments in salary with advancing age groups; but during the last recovery the deductions agreed in 1931 gradually ceased to apply, annual holidays with pay were introduced, and although a further rise in railway wage rates was not very likely at the outbreak of war further reductions—apart from cyclical adjustments—were unlikely too.

Almost the same applies to costs of fuel and materials used, which are anyhow outside the control of the railways. The prices of the main products bought by the railways, coal and steel, seem to be slightly more variable during the cycle than money wage rates but, being cartellized prices, vary much less than receipts. Moreover, there is no indication that they will fall in the long run and thus enable railways to adapt their costs to what appears to be a trend decline in receipts.

In view of this rigidity of wages and prices the railways succeeded fairly well in reducing their costs. It is well known that they achieved this mainly by technical improvements, organized reforms, standardization and economy campaigns, measures which resulted in lowering the costs per unit of output, in reducing the size of the rolling-stock and of the technical and operating staff, in savings in the consumption of coal and materials, and the like. These rationalization drives relieved the expenditure side gradually, but being naturally a slow process in a going concern with huge fixed investments, offset the effects of lower revenue only in part.

The net result of the various factors affecting railway revenue and expenditure is shown in Table 35. The data are not quite continuous for the whole period since 1923, but the relevant facts come out quite clearly. If we disregard the impact of the 1926 stoppage, total receipts and expenses were fairly steady between 1923 and 1927 and net receipts were also approximately maintained. Both receipts and expenditure were about 2 per cent. lower in 1927 than in the good railway year 1923. Since during the same period the

index of the volume of production rose by about 20 per cent. it was not encouraging that railways hardly held their own. But a more difficult period was to come. From 1928 to 1932 railway revenue declined by about 20 per cent., while expenditure could only be curtailed by about 16 per cent. This discrepancy reduced net receipts by about 35 per cent. This drastic fall was, of course, largely cyclical, but even in 1936, after a strong recovery and after road competition had been regulated and restricted, net receipts were still 19 per cent. below the 1929 level, gross receipts about 12 per cent. lower, while expenses were down about 11 per cent. Moreover, recent developments indicate that the declining trend has not yet been arrested and railways have not yet found a new equilibrium.

This brief description of the development after the war of 1914–18 makes it sufficiently plain that the railway directors were presented with an extremely difficult and swiftly changing task, which made it almost impossible for them to pursue a steady long-range policy of investment and, still less, an anti-cyclical policy. Evidently, an upward trend of demand offers far greater opportunities for advance planning of investment, because it requires (changes in technique apart) proportionate extensions of the capital equipment. In bad times the expected trend-rise makes it still possible to proceed with new investments and to anticipate future requirements. When this 'natural growth' is absent new investment becomes largely dependent on technical improvements which might be less amenable to advance planning in general and to cyclical planning in particular. Yet planning obstacles would not be insuperable in this case either, if only the trend of demand could be tolerably predicted. The uncertainties about the future traffic development put a second serious obstacle in the way of investment planning by making it difficult to take a long view independent of and against the short-term variations.

### 2. *Variations in Capital Expenditure*

The railway companies of Great Britain spent about £60 millions a year on constructional works and thus accounted for about 8 to 10 per cent. of the nation's gross investment

in fixed capital. By far the greatest part of these railway works serves to maintain the existing equipment in good working order. The net capital liability of the railway system[1] amounts to over £1,200 millions and involves an annual maintenance expenditure of the order of £50 millions. But compared with the enormous capital sunk in the railways during the past, or compared with the yearly reinvestment, the rate of expansion since the War was rather modest; for capital expenditure on new works may be estimated to have been on the average £5 millions to £10 millions a year. Railways were thus adding less per year to their equipment than, for instance, the Post Office, and only a third as much as the electricity supply industry. But telephone and electrical development were still in a phase of expansion which the railways have passed some thirty years ago. The railways seem to have entered a period of stagnating or even declining traffic and could not expect to benefit proportionately from the uninterrupted trend-rise in national output. There was consequently little cause for extensions and additions to the railway system as a whole; on the contrary one might expect a tendency to withdraw capital from a declining industry. Partial withdrawals have undoubtedly occurred; but they were more than compensated by new investments which the railways had to undertake in order to meet changing demands and to maintain their competitive power. The dislocations of trade and industry have entailed shifts in rail traffic, making parts of the past investment unremunerative but requiring new capital equipment where traffic tended to increase. Qualitative changes in the demand for rail services, rationalization and electrification schemes, and the adaptation of higher technical standards have called likewise for additional investment. These improvements to the existing system, rather than extensions, account for the major part of railway capital expenditure; and viewed from this angle their capital expansion is quite impressive. In conjunction with the plannable part of maintenance expenditure it constitutes an important potential field for public works policy. Moreover, trade-cycle policy is not so much concerned with the average volume of investment as with its variations and its timing in

[1] Including the railways of L.P.T.B.

relation to the fluctuations in business activity. Our first task will be to analyse the movements of railway investment in the past and to discover the main factors which have influenced its course.

An attempt to determine the variations in capital expenditure encounters, however, serious statistical difficulties. The published accounts of the railway companies and the financial returns which they submit in a standardized form to the Ministry of Transport[1] reveal only the net additions to capital, that is, gross expenditure less credits for displacements of stocks and property. These net figures are not without significance for our analysis because the balance of withdrawals of and additions to capital indicates the amount of fresh capital the railways had to find for their expansion. But they are not a measure of the constructional activity of railway companies. In order to determine this capital expenditure on new works the credited amounts should be added back to the net figures; and purchases of existing assets such as land and buildings, transfers of assets from one part of the capital account to another, and subscriptions to other companies, should then be deducted. Yet the published accounts do not disclose the amounts of write-offs, sales and inter-account transfers, which are known to be considerable[2] and to vary greatly from one year to another, and make it thus impossible to ascertain the gross expenditure on capital works.[3] Fortunately we are in a position to fill this gap, at least in part.

Through the good offices of the Association of the Four Group Companies we have obtained a statement showing their expenditure on new works for the fifteen years since the amalgamation and distinguishing between revenue

[1] Ministry of Transport Railway Returns.

[2] In a letter to the *Economist* in March 1938 Sir Jos. Stamp stated that 'since amalgamation capital assets displaced and not replaced have resulted in credits to capital expenditure amounting to £15 millions including £3 millions for sale of land' in the case of the L.M.S. alone.

[3] Gross expenditure on new works can be assumed generally to exceed the returned net expenditure (after deduction of subscriptions to other companies) because 'credits' for displacements which we have to add back in order to arrive at the gross figure are likely to be greater in any one year than 'debits' for purchases of existing assets which we have to deduct. The net figures may, therefore, be taken as an estimate of the minimum expenditure on works.

works and works charged to capital account (*see* Tables 38 and 39). The two totals are further subdivided into a number of subheadings which roughly agree with those of the official Railway Returns. We propose to confine our analysis of the capital expenditure to this set of figures[1] but have given the net expenditure figures of all the railway companies in Table 37.

The aggregate capital expenditure of the four companies over the fifteen years amounted to about £80 millions. About a quarter of this was devoted to ancillary businesses and almost £60 millions to the railway business proper. Since the investment curve shows no distinct trend, the average expenditure of slightly less than £4 millions on railways and £1½ millions on ancillary businesses can be taken as the 'normal' level. The range of variation is large—from just over £3 millions to almost £8 millions. But, surprisingly, expenditure moved for the most part inversely to the general business cycle, showing peaks in 1925, 1932, and 1937, and low points in 1923, 1927, and 1934. Average expenditure in the three depression years, 1930 to 1932, exceeded that in the preceding three prosperous years by over 30 per cent., and in the three revival years, 1933 to 1935, it was subnormal. Very few public works series have such an anticyclical pattern.

It is pretty clear that the railway companies did not achieve this result by their own initiative, for advance planning was particularly difficult for them in this period of growing road

[1] The four group companies do over 95 per cent. of the business of all the railway companies now making returns to the Ministry of Transport, and the non-group companies do not add greatly to the investment totals given. Timing and variations of their investment may, however, differ considerably from that of the main line companies, partly because they are likely to be more affected by local developments and partly because they did not share in the State help granted to the four big companies. The omission of the London electric railways taken over by the London Passenger Transport Board in 1933, and since then excluded from the Ministry's Returns, is a more serious gap. To judge from the net figures they had invested considerable amounts in the period before 1933, and to that extent our figures understate the railways capital expenditure on new works. On the other hand, the timing of much of their investment was probably similar to that of the main line companies because they benefited equally from the State assistance in 1929 and 1935. A description of the L.P.T.B.'s capital expenditure for the period after 1933 will be found in a later section of this chapter.

competition and changing industrial trends. It was in fact mainly the result of State interference and assistance. It is therefore indispensable to give a brief account of the forms and timing of this State interference.

To begin with, the amalgamation act itself was bound to affect the investment of the group companies in the initial period. They had to make up for postponements, dating back partly to the War period, partly to the period when the

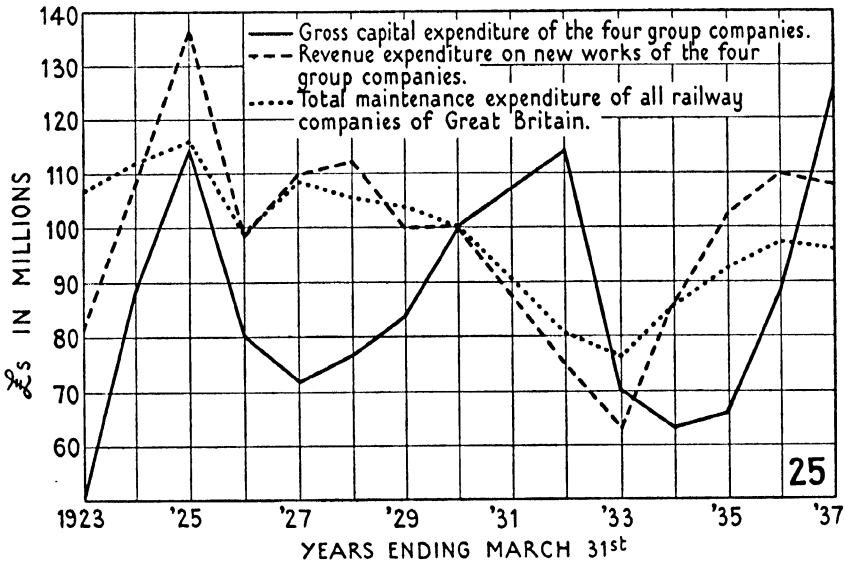



FIG. 25. Capital Expenditure and Maintenance Expenditure of Railway Companies of Great Britain, 1923–37.

1930 = 100

amalgamation was under consideration, and individual companies refrained from embarking on new investment schemes. Further, they had to consolidate and co-ordinate their hitherto separate powers, to standardize equipment and so forth, in order to reap some of the advantages of unified working. On the other hand, some time naturally elapsed before the unified groups could decide on improvements or extensions; hence capital expenditure was kept low in the first year (1923) but then rose steeply.[1]

[1] The formation of the L.P.T.B. and of the Central Electricity Board had very similar effects in causing temporary postponements and subsequent accelerations of capital expenditure.

Moreover, financial assistance to capital works was granted at various times. It took mostly the form of loan guarantees and interest grants; capital grants and cash subsidies were not given. The various forms of State assistance to railway works were in chronological order as follows:

A Treasury guarantee was given for £12½ millions redeemable debenture stocks issued under the Trade Facilities Act, 1921 and 1922, by the London electrical railways. The loan was raised in the midst of the severe post-War depression in order to carry out improvements and extensions of the passenger services in the London area and relates mainly to companies outside the four group companies. In 1929, at the upper turning-point of the boom, railway works were assisted in two ways: (1) The Railway Passenger Duty was abolished on the condition that railways were to spend the capitalized value of the tax relief on new works which would not have been undertaken otherwise. The capital value of the relief was estimated at about £6½ millions: it was spent over the next three to five years. (2) Grants towards interest for a number of years were made under the Development Act, 1929, to various railway works and railway-owned docks. The total cost of these works on improvements of docks and stations, extensions and widening of lines, electrification and so forth, amounted to slightly over £30 millions (of which £7·75 millions were on docks): the capitalized present value of the annual interest grants was estimated to cover about 22 to 23 per cent. or £6½ to 7 millions. This twofold State support given to railway works in 1929, though not motivated by trade-cycle considerations, showed the greater part of its effects in the depression years, just as it ought to have done, according to the postulates of trade-cycle policy.

In 1935 two further loans were guaranteed by the Treasury. Under the London Passenger Transport Agreement Act, 1935, the London Electric Transport Finance Corporation, Ltd.—a semi-public corporation—issued £41,650,000 2½ per cent. Debenture Stock guaranteed by the Treasury which yielded in cash £39,966,250. The North Eastern Railway and the Great Western Railway Company have undertaken to borrow up to 30 per cent. or £12½ millions of this amount, and L.P.T.B. is to borrow the

remaining 70 per cent. The loans are to meet capital expenditure on a large five years programme of works in the London area, drawn up by the Board in co-operation with the main line railway companies and the Government.

Under the Railways (Agreement) Act, 1935, the main line railway companies obtained a loan on a similar basis. In this case the Railway Finance Corporation, Ltd., issued £27 millions 2½ per cent. guaranteed Debenture Stock, repayable, which yielded in cash £26,190,000. In order to repay the sums borrowed from the Railway Corporation the railway companies will have later to raise capital, a corresponding part of their borrowing power having been earmarked. The works programme decided upon by the railway companies, in conjunction with the Government, provides for a wide range of detailed schemes for electrification, widening of lines, improvements of stations, purchases of rolling stock, &c., to be spread, eventually, over ten years.

These guarantees involve a financial burden on the Treasury only when the companies fail to earn their debenture interest. For the railways, they make it possible to borrow at interest rates lower than those which would have applied if they had raised the loan on their own credit, and enable them to carry out works which they could not have afforded otherwise. It was, therefore, agreed between the Government and the companies that the assisted schemes must be additional works that would not have been carried out at the rate of interest at which the railways could borrow unaided. In no case have stipulations been made to secure an acceleration or declaration of works in an inverse sense to the trade cycle.

Direct State assistance to railway works is confined to these three periods. But it should be remembered that the Government can—and does—influence the capital and maintenance expenditure of railways indirectly by its transport and general economic policy. Government policy towards road transport and road taxation, towards the heavy industries, the export trades, and so on may affect the willingness of railway boards to invest, and may thus support or counteract the direct inducements offered by the State. There is no need, however, to discuss these—by no means unimportant—indirect measures here, because they

are, for the most part, unadaptable to the purposes of trade-cycle policy.

The exogenous stimuli explain the three periods of high or rising constructional activity, while the two intermediate periods of low activity show partly a reaction from the preceding phases, and indicate what railways were prepared to invest on their own initiative.

The rationalization programme after the amalgamation, culminating in 1925, was interrupted by the general strike in 1926, which hit the railways severely in their financial strength as well as in their competitive position and made them slow down the rate of capital expansion despite rising receipts in the three good years 1927 to 1929. From 1930 to 1932 the stimulating effects of the double help granted in 1929 were apparent. But it is noteworthy that the effects increased throughout the depression and produced an expenditure peak in 1932, although unassisted investment presumably declined as the depression deepened. This public works expansion right through a long depression is, we believe, a unique instance in this country, and it is rather surprising to find it in the case of railways. It must be admitted, however, that the timing in this case was particularly fortunate and that, as a rule, large five-year schemes produce their maximum effects in the third year. We might have seen, therefore, the same phenomenon in the case of the 'Grid', had its construction begun a year later.

When the assisted schemes were nearing completion, capital expenditure tapered off rapidly and continued at a low level until 1935, in spite of rising traffic, legislative restrictions of road competition, and more favourable prospects in general. The lack of response may have been due partly to anticipations in the preceding period or partly to the buffer-effects of the reserve capacity which the railway system carries. There is, however, little doubt that the continued recovery in 1936 and 1937 would have induced the companies to increase their capital expenditure on improvements and extensions. The timing of government assistance in this case was less fortunate than in 1929 and accelerated the pace of railway expansion just during the boom years. It is very likely, however, that the later part of

the programme (for which figures of expenditure are not yet available) sufficed to keep railway investment at a high level during the recession of 1937–8, when unassisted work would probably have been reduced in view of the sharp decline in receipts.

We have no detailed information about the allocation of State assistance to various kinds of railway works for each year; but we know in a general way what kind of schemes were assisted, and can conclude from the details of capital expenditure which sections benefited most. It is evident that in the railway section the rationalization period after 1923 led to increased expenditure, both on rolling-stock and on Way and Works; but the 1929 schemes were mainly confined to works on the permanent way and its equipment, which were almost doubled between 1929 and 1932, and did not affect rolling-stock construction. Expenditure on rolling-stock fell continuously from 1925 to 1933–4, to about 40 per cent. of its 1925 level in 1928–30, and to only 4 to 5 per cent. in 1933–4. In the 1935 assisted schemes rolling-stock purchases had a larger share, though the rapid expansion was partly also a reaction against the prolonged policy of caution and of deliberate rolling-stock reduction, and in response to the rising volume of traffic. In the ancillary section it is equally clear that the 1929 State assistance affected mainly work on docks, which moved on an unusual high level throughout the six years 1929 to 1934. The minor branches of the ancillary business show rather erratic movements and neither a clear cyclical pattern nor agreement with the total of railway investment. Moreover, it is clear that hotels and power-stations were not included in assisted schemes. Thus it is work on docks and on permanent way, mainly affecting civil engineering work, which accounts for the whole expansion during the 1930–2 depression.

What the railway investment would have been without State help is difficult to say. But some idea may be obtained by comparing capital expenditure with revenue expenditure on new works,[1] which was mainly unassisted.[2] The difference

[1] See Table 39 on p. 430. (Appendix.)

[2] Some of the revenue works may have been undertaken in joint supply or demand with assisted capital works.

in the cyclical pattern is striking (see Fig. 25). Revenue works declined from 1929 to 1933 by about 45 per cent. and re-expanded to about the 1928 level in 1936–7, clearly reflecting the cycle in railway receipts and the volume of traffic. New works on the permanent way were reduced by about 30 per cent. from 1928 to 1933, and work on docks, after an increase from 1929 to 1931, fell off in 1932 and 1933. It is generally assumed that capital expenditure tends to fluctuate more than revenue expenditure on works and it is, therefore, likely that this underestimates the decline in capital expenditure which would have taken place had State assistance not been granted. In that case a 48 or 50 per cent. reduction of capital expenditure would presumably have occurred, instead of the actual expansion of 30 per cent.

We may sum up this section by underlining the special features of this case of State assistance. First, considerable investment effects were obtained with a negligible burden to the taxpayers and without, we suggest, serious offsetting effects in other fields. Second, the timing of the assistance was not determined by trade-cycle considerations and was, from the aspect of trade-cycle policy, by chance fortunate in 1929 and not too bad in 1935. But provisions could perhaps be made in similar schemes of assisted work for accelerating or retarding works according to the phase of the cycle. Third, it was remarkable that investment was not only maintained but actually raised during the depression.

### 3. *Variations in Maintenance Expenditure*

As a first approximation it can be assumed that actual wear and tear moves roughly in proportion to the volume of traffic. The expenditure on replacements and repairs may, of course, exceed or lag behind current depreciation according as higher or lower requirements are expected in future. For reinvestment, like new investment, is determined by the expectations entrepreneurs hold about the future demand. The past development of current demand usually serves as a guide for estimating the future and thus enters into the considerations as one fundamental factor. But its effects on investment may be accentuated or mitigated or even reversed by changing expectations. This psychological factor finds

a clearer expression in the movements of railway maintenance expenditure than in the variations of capital expenditure, because it was not directly affected by State assistance.

The revenue expenditure on capital works of all the railways of Great Britain (including the L.P.T.B. Railways), as shown in Fig. 25 and Table 37, follows broadly the movements of general business activity (see Fig. 2, page 39). But there are some marked deviations. First of all, the turning-points of maintenance expenditure did not coincide either with those of business and investment activity or with those of railway receipts. After rising from 1923 to 1925, maintenance expenditure reached an absolute maximum for the post-amalgamation period in 1925, and—making allowances for the general strike in 1926—declined steadily until 1933. The average level of maintenance expenditure of the three years period, beginning with 1923, considerably exceeded that of the boom period 1927 to 1929. That can be explained partly by the fact that arrears dating from the war period and, to some extent, caused later on by the standardization provisions of the Amalgamation Act, which had to be made good at the same time as the first improvement programmes were carried out, partly by the high average level of prices and wages in the earlier period.

Maintenance expenditure, while preceding the general boom by several years, followed the depression by one year. This delayed recovery was due largely to the growth of road competition during the depression. Only when the regulations and restrictions of the Road and Rail Traffic Act of 1933 came into force, and the revival was well on the way, did the railways feel confident enough to increase their replacements.

It is further noticeable that, contrary to the general rule, expenditure on replacements and repairs fluctuated severely. After a decline of about 12 per cent. from 1925 to 1929, it fell another 25 per cent. from 1929 to 1933, and then rose again by nearly 30 per cent. up to 1937. These variations are far greater than those of maintenance expenditure for the national economy as a whole and of the same order of magnitude as those of total fixed investment, although the latter includes the highly variable element of new investment. This

comparison may be regarded as not particularly significant because of the diverging trends of national investment and railway investment. But if one relates the maintenance expenditure to other representative railway data the result is very similar. Thus railway maintenance expenditure varied more than railway gross receipts and, therefore, *a fortiori* more than the volume of traffic. But since three-fifths of total railway expenditure are supposed to be fixed costs, it is perhaps not surprising that fluctuations in the more elastic part, including replacements, should exceed those of total receipts and total expenditure. It might, therefore, be preferable to relate variations in maintenance expenditure to variations in net receipts rather than gross receipts, since as it can be presumed that rising net receipts increase the willingness of railway companies to reinvest their funds. But taking the period as a whole the two series are only poorly correlated.

Some of these factors seem to be affected by trend forces. For although the railways have added throughout the period to their capital stock, which might be expected to lead to a gradual increase in maintenance costs, actual expenditure seems to decline. There are some general reasons which may explain this downward trend. Prices and wages were falling from 1923 to 1933. The real work of replacements and repairs done, therefore, diminished less than the figures indicate.[1] But even after correction for price changes, maintenance works show still quite considerable fluctuations.

There is, however, a second factor which likewise tended to reduce maintenance costs: the economies, effected through standardization, better organization, and technical improvements. It is difficult to measure the effects of these; but there is plenty of evidence to show that maintenance costs per capital asset have been reduced considerably since the

[1] Wages during the ten years period fell by about 7 per cent. Prices of raw materials declined still more, the Board of Trade's index for non-food items by more than 35 per cent. Thus, it can be assumed that the costs of reinvestment dropped by at least 10 to 15 per cent., and may have risen again from the lowest point by, say, 6 to 10 per cent. between 1933 and 1937. Using Colin Clark's Index of Capital Goods Prices for the period after 1929 and expressing the maintenance work done in 1930 prices, this would make 'real' maintenance fall by about 17 per cent between 1929 and 1933 (instead of a 25 per cent. drop reckoned at current prices) and rise by about 31 per cent. (instead of 27 per cent.) up to 1936.

amalgamation. That is broadly reflected in the increase of output per head and in the reduction of maintenance work per service unit. The significance of these economies in maintenance costs for a public works policy will be discussed later. Here it is only necessary to point out that falling prices and rationalization in conjunction with the effects of road competition and of structural changes in industry go far to explain the trend decline and the particular movements of the total of maintenance expenditure of railway companies.

To discuss aggregate maintenance expenditure in general terms may obscure many significant movements in the detail of the replacement and repair work done.

More than half but less than three-fifths of the total maintenance expenditure is devoted in each year to the maintenance of the rolling-stock, the remainder being expended on the permanent way, the signal system, buildings, bridges, manufacturing shops, and similar works. These two great divisions of expenditure were in complete agreement in the timing, but differed in the degree, of their fluctuations (Table 40). Expenditure on Way and Works was more stable than expenditure on rolling-stock. The former declined by about 21 per cent. from 1929 to 1933 (28 per cent. from 1925 to 1933), the latter by about 31 per cent. (42 per cent. from the earlier year). The increments up to 1936 were 13 per cent. and 40 per cent. respectively. Incidentally, maintenance of Way and Works represented a fairly constant proportion of gross receipts and gross expenditure throughout the cycle; while the ratio of rolling-stock maintenance to total expenditure and receipts showed marked cyclical variations.

The greater instability of the engineering work done on the rolling-stock as opposed to the civil engineering and building work which make up the greater part of Way and Works maintenance is obviously significant for a trade-cycle policy. The reasons for the disparity in the movements of the two categories of maintenance expenditure will become clearer when the component parts of the two divisions, given in Tables 41 to 43, are examined more closely.[1]

[1] As has already been mentioned, we can carry through this analysis only for the

The largest single item in the Way and Work Account was the maintenance of the permanent way, amounting to £10 to £13 millions annually, i.e. to just over a half of the account. Its movements were, therefore, of considerable importance for the variations of this sub-group as a whole. In fact, timing and degree of the fluctuations of the whole and of the sub-group were in good conformity with one another. A severe decline by 21 per cent. was followed by a very moderate rise after 1933 (of less than 7 per cent.). Expenditure on the permanent way was kept at a high average level during the period before 1929; so apparently the railways could curtail their expenditure on permanent-way maintenance considerably during the downswing without having to make up for it during the following upswing. Whether maintenance work can be kept at a subnormal level for half a dozen of years appears to be rather doubtful, as long as the total length of the lines is not diminished. The fact that expenditure was hardly increased when good times followed the slump tends to show that economies and improvements as well as lower prices and lower wages per unit of output enabled the railway companies to keep their permanent way in a state of good repair at lower costs.

A second group of maintenance works, those on roads and fences, bridges and tunnels, earthworks, &c., shows very similar features: an even greater fall from 1929 to 1933 and an insignificant rise up to 1936. Cost reductions through technical and organizational improvements were probably less important for this type of works than for others, and the change in the price level cannot explain the drop in expenditure by more than 20 per cent. (close on £1 million) between 1928–9 and 1935–6. But apparently railway companies have parted with some of these liabilities. For example, where road bridges over railways are widened or road improvements take place the liability is often handed over to the Highway Authority in return for a capital payment by the company.

railways now included in the Ministry of Transport's Returns and only for the period after 1927, owing to the statistical break caused by the establishment of the London Passenger Transport Board. The main result will, however, be hardly affected by the exclusion of the London Passenger Transport Board figures.

A third sub-group may be formed by aggregating the maintenance expenditure on workshops, sheds, depots, offices, and other buildings. The total expenditure for this group of works amounted like that of the second group to about £2 to 3½ millions. The cyclical pattern differs from that of the first two groups, having a more violent decline (minus 36 per cent.) during the depression, followed by a steep rise (plus 49 per cent.) during the recovery. After allowance for price changes, the 1936 figure reached the 1928 and 1929 level. The presumption in this case is that maintenance work has been postponed in bad times and accelerated in good times. There is little reason to assume that the wear and tear of these buildings varies with the volume of traffic—an assumption which could reasonably be made to a certain extent for the permanent way. On the other hand, it is widely agreed that repairs of buildings can be postponed for several years without impairing the current services.

Fourthly, maintenance expenditure on the signal system, on telephone and telegraph lines, and on electrical track equipment has been placed in one class. Expenditure on this account was again of the same order of magnitude, i.e. £2·3 to £3·4 millions per year. Variations were clearly cyclical, but their amplitude was rather smaller than that of other expenditure groups. Expenses declined by about 18 per cent. from 1929 to 1933; but the sharpest fall of about 13 per cent. occurred between 1929 and 1930 owing to a drastic reduction in expenditure on the electric track, which was abnormally high in 1928 and 1929. The further fall from 1930 to 1933 was more than made up for by the decline in wages and prices. This relative stability during the depression years 1930 to 1932 was largely the result of heavy expenditure on the signal system. This was overhauled and improved and thus required a good deal of replacements, partly perhaps in connexion with capital works carried out simultaneously. When expenditure on signals was low in 1933 and 1934, expenditure on telephone and electrical lines was already rising and had thus a smoothing effect on the aggregate. All three series were rising in 1935 and 1936, and in the latter year were about 17 per cent. higher than at the lowest point.

The remainder consists of expenditure on superintendence of all the work done on Way and Works. These overhead costs are naturally rather rigid. The small cyclical variations which can be seen reflect almost entirely changes in salary rates.

Thus nearly all the different series which constitute the Way and Works maintenance account show a decline which in most cases had already begun in 1929 and was reversed only in 1934. There can be no doubt that the decline was a cyclical one in the sense that it was induced by the fall of traffic and receipts during the downswing. Railways seem to have succeeded in curtailing maintenance expenditure in three ways: through savings in money costs resulting from the fall of prices and wages amounting to 5 to 7 per cent.; by postponing works during the depression and making up for the depression deficits by accelerating work in times of rising receipts; and through economy drives and rationalization measures initiated during the crisis, but in some cases having permanent effects. The increase in output per head can perhaps be regarded as a general symptom of increased efficiency. At the same time superior qualities of the materials used and technical improvements seem to have reduced the absolute amount of maintenance work necessary to keep the equipment in good condition. Economy and rationalization were apparently most important in the case of work on the permanent way, while it is likely that some postponement took place of works on roads, bridges, tunnels, and the like. Cyclical postponement and acceleration seems to apply to work on buildings and shops and to a lesser extent to work on telephone lines and the electrical track. Expenditure on the signal system was sufficiently stable during the years of the general depression, and after a moderate fall in the beginning of the general revival again reached its pre-depression level.

It is evident that these various developments have some bearing on public works policy. Assuming, for a moment, the State to exercise full control over railway maintenance expenditure, it would clearly not be desirable that trade-cycle policy should prevent rationalization or the introduction of capital and labour-saving devices. But State

subsidies might well have had the effect of slowing down the rationalization process considerably by relieving the railways from the acute pressure which they actually had to bear. If our assumption is correct that in spite of reduced expenditure the permanent way was kept in a state of full repair, there is no reason from the point of view of trade-cycle policy to increase the amount of expenditure artificially by State interference, unless railways can be induced to anticipate in bad years some of the works due in later years. In spite of the outwardly different course of the curves it is quite possible that expenditure on the signal system, which was well maintained through the depression, and expenditure on the permanent way, which was falling sharply, were rather alike in one respect: public subsidies or stimuli aiming at stabilizing investment over the trade cycle could not have usefully modified the actual expenditure appreciably. Trade-cycle policy could, however, have played some part in smoothing out fluctuations, where maintenance expenditure was first postponed and later accelerated. Under our assumptions, this would apply to not more than about 40 per cent. of the total maintenance expenditure on Way and Works, fluctuating by about £1 to £2 millions between peak and trough. But if one takes into consideration the possibilities of anticipating works and makes allowances for postponements in other parts of the amount, the latent stabilization reserves which could perhaps be mobilized by a public works policy are by no means insignificant.

We turn now to the Rolling-Stock Account summarized in Tables 42 and 43. Railways spent between £18 and £28 millions annually on the maintenance of rolling-stock, representing between 50 and 60 per cent. of the aggregate maintenance expenditure. More than two-fifths of this amount was spent on locomotives and tenders, roughly one-quarter each on passenger and goods vehicles, the rest, about 5 to 7 per cent., on rail motor vehicles and superintendence.

The cyclical movements of the three main expenditure items are closely correlated. As in the case of Way and Works, maintenance, the rolling-stock series began to decline in 1929 and reached a minimum in 1933. The downswing

was thus lengthened to five years, compared with three years of the general trade cycle. All three curves rose steeply after 1933 and reached or exceeded the pre-depression level in 1936. The timing of the fluctuations thus presents no new problem.

The amplitude of the variations is, however, unusually large for maintenance works and requires some explanation. The percentage decrease from 1929 to 1934 and the increase from 1935 to 1936 is given in the table below.

*Variations in Maintenance Expenditure on Rolling-Stock*

| | *Locomotives* | *Coach veh.* | *Merch. veh.* | *Total* |
|---|---|---|---|---|
| Percentage decrease 1929 to 1933 | −28 | −31 | −38 | −30 |
| Percentage increase 1933 to 1936 | +28 | +48 | +73 | +47·5 |

Contraction and expansion are largest for goods wagons and smallest for locomotives, passenger carriages holding an intermediary position.

What were the reasons for these severe variations in rolling-stock maintenance? An obvious answer would be that the actual wear and tear of the rolling-stock depends necessarily more on the volume of traffic carried than that of Way and Works, and that therefore greater fluctuations must be expected. There may be something in this argument, but its importance must not be overestimated. It would mean that maintenance expenditure should vary approximately with the volume of traffic. But if various types of traffic indices are related to maintenance expenditure on appropriate kinds of rolling-stock, it appears that the ratio is not at all constant but shows distinct and severe fluctuations.[1] Thus, the ratio rolling-stock maintenance per gross receipts (the latter overstating the variation in the volume of traffic) declined by 12 per cent. from 1929 to 1936. The result is very similar if one relates particular parts of the maintenance expenditure to appropriate volume figures. Taking the total engine-miles run as an index of the use made of the locomotives, we find that maintenance expenditure on locomotives per million engine-miles shows a clear cyclical pattern. The ratio declined by about 26 per cent. and rose

[1] See Tables 35, 36, and 42.

by about 17 per cent. during the two standard periods. Similarly, the ratio of goods vehicles maintenance to net ton miles—though perhaps not quite representative because of the privately owned vehicles—showed a fall of about 20 per cent. and a subsequent rise of about 25 per cent. These calculations seem to indicate that a part of the fluctuations may be due to variations in traffic and hence in wear and tear. But the excess fluctuations are still very substantial.

Moreover, it will be shown later that light and heavy repairs varied rather less than gross receipts, while complete renewals fluctuated violently. Since ordinary repair work is carried out currently and is not likely to be postponed even under adverse conditions, it may be taken as a representative index of the movements of wear and tear during the cycle. The pattern of the repair curve indicates again that maintenance expenditure on the rolling-stock fluctuates far more than actual depreciation.

Now, it is evident that some of the excess fluctuations—at least as far as the decline is concerned—can be explained by the operation of trend factors which were alluded to when we discussed Way and Works maintenance. First of all the railways reduced the number of engines and vehicles in use step by step without, however, diminishing their productive capacities proportionately. For instance, the number of engines fell by roughly 15 per cent. from 1928 to 1936 but increased engine power and improved organization made it possible to raise the engine-miles worked per engine at the same time by about 20 per cent. Incidentally, the number of passenger coaches declined 12 per cent., while the seating capacity was reduced by only 6 per cent. Further, the service time between repair and overhaul periods has been extended for all kinds of rolling-stock, and at the same time better workshop organization reduced the average period during which vehicles are out of service and undergoing repairs. Add to this the general increase in labour and workshop efficiency and the fall of the price level, and it becomes clear that considerable savings must have resulted for the railway companies in maintaining their rolling-stock.

All these various factors may well explain a gradual reduction of maintenance costs in the long run. Rationalization

may have proceeded at a quicker pace during the depression; but it was, according to all evidence, going on steadily. It is the more surprising that after the drop to a low level in 1933 maintenance costs rose sharply again and touched—reckoned at current prices—the pre-depression figures, i.e. exceeded them in 'real' terms.

This sudden rise suggests that the railway companies delayed maintenance work during the downswing and were eager to compensate the under-investment by accelerating work in times of improved business activity. There can be no doubt that railways cut down their replacement expenses to a level which would not have been maintained even if the traffic had fallen permanently below the minimum volume of 1932. Railway companies may have had good reasons for taking a rather cautious view about their investment policy during the unsettled period 1930 to 1933, because of the growing intensity of road competition and the doubt about the future of industrial activity. Viewed *ex ante*—and investment decisions have to be taken *ex ante*—their reluctance to proceed even with normal replacements was quite intelligible. Viewed *ex post*—i.e. from the period 1933 to 1937, which includes the Road and Rail Traffic Act of 1933 with its mitigating effects on road competition and a recovery fostered by unforeseeable rearmament programmes—the railways seem to have been unduly pessimistic during the bad years. They themselves would have been better off if they had pursued a steadier replacement policy, by benefiting from the low constructional costs of the recession and the abundance of labour and equipment. Incidentally, such a policy would have assisted in stabilizing the business cycle and hence fluctuations in traffic. The destabilizing effect of the actual maintenance policy is apparent.

It must not be overlooked, however, that the severe cut in replacements was partly the result of a deliberate rationalization. The efforts to reduce the quantity of rolling-stock and, in particular, the policy of the London Midland & Scottish Railway Company to eliminate obsolete stock have been mentioned previously. This policy was hardly conceived as a special depression policy and would have been carried out, too, in times of good trade. It was, in fact continued after

1933. But the coincidence of these permanent displacements with the downward phase of the cycle had undoubtedly an aggravating effect. In other words, had this policy been initiated a few years earlier or a few years later, we might have observed far smaller cyclical variations.

Maintenance expenditure on the ancillary part of the business, shown in Table 44, amounted to £4½ to £6 millions, of which more than a third was spent on docks, harbours, canals, another third on road transport and goods delivery services, and the remaining third on steam-boats, hotels, and power-stations. Engineering (including ship repair work) and building and civil engineering work each accounted for about two-fifths of the total, while the maintenance of horses and horse vehicles took up the rest.

The variations of this mixed total resemble those of some of the Way and Works maintenance series. A fall of about 20 per cent. from 1929 to 1933 is followed by an insignificant rise during the recovery, leaving the 1935–6 expenditure level 10 to 15 per cent. below the 1928–9 figures. This trend-like decline was largely caused by the reduction of expenditure on roads and goods delivery services where the change-over from horse-driven transport to motor transport led to savings in the recorded maintenance costs[1] and by diminished expenditure on docks, canals, and power-stations. But the cyclical movements of the component parts differed widely. While the hotel figures reflected approximately the variations of the general trade cycle, showing a trough in 1932 and a considerable expansion up to 1936, the figures for steam-boats do not seem to be correlated with the trade cycle at all. In fact, owing to larger renewals, expenditure on steamboats moved inversely to the trade cycle and rose from 1929 to 1932. This increase was big enough to raise total ancillary maintenance in 1930 slightly above the 1929 level and to modify its decline during the following two years. Expenditure on docks was also well maintained in 1930, but decreased steadily from 1931 to 1934 without recovering

[1] Maintenance of horses includes expenditure on provisions, while petrol supplies to motor vehicles are not included in the maintenance figures. The reduction in maintenance expenditure does not indicate, therefore, similar changes in working expenses.

much afterwards.[1] Goods delivery services showed, broadly, a similar pattern, except that they had already begun to decline in 1929 and reached the bottom in 1933 and that their fall was more pronounced. This severe fall was, however, largely the result of reduced costs in the maintenance of horses and, therefore, due to the more than average decline of prices of agricultural products.

It is evident that part of this maintenance expenditure on the ancillary business offers little opportunity for trade-cycle regulation. Road vehicles are comparatively shortlived capital goods, replacements of which cannot be considerably postponed or accelerated, nor is the rest of maintenance expenditure on delivery services suitable. Expenditure on power-stations must largely depend on the coordination of the railway supply system with the Grid. Railway hotels, including refreshment rooms and refreshment cars, are also not likely to come under a public works scheme for railways. From a public works aspect the important items are, therefore, docks, harbours, wharves, canals, and steamboats, involving a maintenance expenditure fluctuating between £2 and £3 millions. We have seen that renewals of steamboats increased and that maintenance expenditure on docks declined only slightly during the last depression. The question is whether railways can and will pursue a similar policy in a future depression or whether the coincidence of increasing steamships renewals with the depression occurred just by accident.

We can now consider some cross-sections, which throw further light on our previous discussions.

(*a*) *Renewals and Repairs.*

The Annual Returns allow us to distinguish between 'complete renewals' and 'repairs' for the rolling-stock, permanent way, and steamboats, that is for more than 70 per cent. of the total maintenance expenditure. The data are summarized in Table 45 and reveal some unexpected facts.

First of all, in all three cases repairs showed a drastic

[1] The sale of the L.N.E.R. Tyne Docks to the Tyne Improvements Commissioners may have slightly affected the maintenance figures for 1937.

reduction from 1929 or even from 1928 to 1933, but no cyclical rise during the following revival. Actually, expenditure on repairs increased by 6 per cent. from 1933 to 1936, but this insignificant rise was mainly accounted for by higher wages and prices and does not indicate a real increase in the amount of repair work done. Some of the reasons for this trend-like decline have been discussed previously; here it is important to realize that allowances must be made for this downward trend when comparing the variability of renewal and repair data.

The second surprise is that the expected greater sensitivity of renewals expenditure is not entirely confirmed by the facts. On the Permanent Way Accounts renewals were rising from 1928 to 1930 and maintained at a high level up to 1932. They then fell for two years to a lower level. During this downward phase—measured from the highest to the lowest point in each case—renewals decreased proportionately less than repairs, which owing to the trend factor might be expected to show a stronger decline. In the upward phase renewals rose slightly more than repairs, but it is doubtful whether this is really significant. On the whole the ratio of renewals to repairs, which according to our assumption ought to vary in conformity with the trade cycle, is comparatively stable and shows no distinct cyclical pattern. Nearly the same applies to the steamboat renewals, which move more violently and in a rather irregular way, but show also a notable rise during the general depression.

It is not quite clear what were the reasons for this anti-cyclical behaviour of these two renewal series. Railway companies may have proceeded on their own initiative with replacements even in bad times because they were not longer postponable or, as it may be in the case of ships, because an overhaul is due at certain times irrespective of the general state of trade, or because certain renewals were likely to reduce repair costs disproportionately. It is also probable that the 1929 assisted schemes of capital expenditure made necessary some simultaneous renewal of the permanent way.

But renewals of the permanent way and of ships constitute the smaller part of the recorded total expenditure on renewals. More than half and up to three-quarters of the

total is accounted for by renewals of rolling-stock. Their cyclical character is very clear and determined the shape of the aggregate curve shown in Fig. 26.

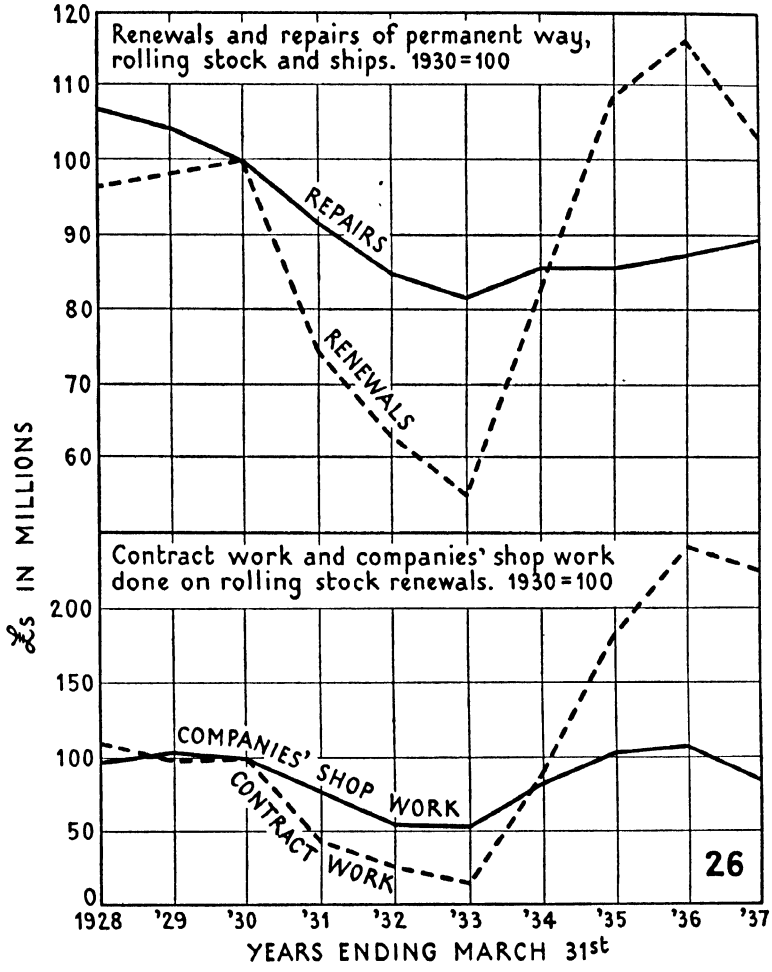



FIG. 26.

Renewals of the rolling-stock declined by about 60 per cent. from 1929 to 1933 and rose again to a level about 30 per cent. above the 1929 figure. The variations were even more extreme for locomotives and goods vehicles but somewhat smaller for passenger carriages. Even when allowance is made for the trend decline of repairs, the greater cyclical sensitivity of renewals is evident in this case. From 1928 to 1930 renewals amounted to about 40 per cent. of

the repair expenditure; in 1932–3 this ratio had fallen—in spite of the severe cuts in repair expenditure—to less than 24 per cent., rising again in 1935–6 far above the 1929 figure.

Variations in rolling-stock maintenance might be expected to be somewhat more severe than those of the permanent way. But these excess fluctuations of renewals over repairs can hardly be taken as typical for the movements of these two kinds of expenditure. They were accentuated by a deliberate policy of rolling-stock reduction and by the exceptional uncertainty about cyclical and still more about the trend development of rail traffic, which caused railway companies to postpone replacements decisions. Having curtailed renewals for some years severely the railways were apparently left with little reserve capacity to meet an increase in demand. When the traffic volume increased only moderately in 1934 the railways had to accelerate their renewals quite disporportionately.

Movements of expenditure on renewals can be corroborated by reference to the numbers of rolling-stock renewed. The movements of these volume data show even greater fluctuations (see Table 46). It is interesting to note how differences in the development of passenger and goods traffic are reflected in these constructional figures. Since the goods traffic had to bear the main impact of the depression and its future was most uncertain, we find extreme variations in renewal work. In 1933 about 73 per cent. less goods vehicles were renewed than in 1928, but the 1936 figure exceeds the high mark of 1928 by 13 per cent. The steadier and more hopeful development of the passenger traffic finds its expression in a smaller and shorter decline in coaching vehicles renewed, and in a steeper rise afterwards. While the 1936 figure for goods and passenger vehicles alike is well above the 1928 figure, the number of locomotives renewed—after a fall of about 75 per cent. between 1928 and 1933—did not quite regain the high point of 1928, presumably because of increased engine power and better organization, and partly because of the greater use made of rail motor vehicles.

There can be no doubt, however, that the railway companies took a rather pessimistic view before 1933 and severely

delayed renewals of their rolling-stock, with the result that considerable arrears had to be made up for when industrial activity recovered. Whether the acceleration after 1933 was entirely due to the omissions of the depression or whether it was enforced by optimistic expectations about the future is difficult to say. It is, however, evident that this renewal policy had a destabilizing effect in the downward as well as in the upward phase of the last cycle and also, thanks to the concentration of renewals in the boom years, in the recession of 1938.

Now, if we can assume that the ratio of renewals to that part of Way and Works maintenance for which no separate returns for renewals and repairs are given moved in accordance with the permanent way rather than with the rolling-stock data, the following conclusions seem to emerge.

1. More than half of the cyclical decline in total maintenance expenditure was due to trend-like reductions of expenditure on repairs, the nature of which offered little opportunity to a public works policy.

2. A substantial part of the renewal expenditure on Way and Works moved in an anti-cyclical way; it rose—or at least was pretty well maintained—right through the depression, fell off during the initial stages of the revival, and expanded slowly during the later phases of the upswing. This anti-cyclical behaviour was presumably the result partly of State intervention, partly of technical factors. Whether more State assistance could have greatly increased such renewal works or whether the actual acceleration of renewals represented nearly a limit of what could reasonably be done can only be decided on the basis of inside knowledge, and depends also on the degree and form of government assistance.

3. There is no doubt, however, that the severe fluctuations in rolling-stock renewals would have offered an opportunity for a public works policy, particularly in the later phases of the depression. It is remarkable that the renewals were hardly reduced during the first year of the depression but fell behind rapidly during the following three years.

(*b*) *Variations in Contract Work.*

Railway companies do part of this constructional work in their own manufacturing and repair shops with their own

staff, and give out another part to contracting firms. In general, the statistical and financial accounts do not separate these two parts of work; but in the case of rolling-stock renewals this distinction can be made and allows us to analyse the effect of railway policy on the contracting industries.

Now, we know already that total rolling-stock renewals were more than halved from 1929 to 1933 and almost trebled from 1933 to 1936; and one might expect that work done in the companies' shops would vary less than the total and less than contract work, since railway companies will endeavour to keep their own plant and staff as steadily employed as possible and order on contract only either special kinds of work or work in excess of their long-run manufacturing capacity. It is evident from Table 42 that the companies' own constructional activity, which represents at least two-thirds of the total, declined nearly as much as the total but rose far less. In other words, contract work fell to a very low figure in the depression and rose sharply afterwards. The relative movement of the two curves is illustrated in Fig. 26. Taking 1930 as 100, contract work fell to 16 in 1933 and increased to 41 in 1936, the absolute expenditure ranging from £$\frac{1}{4}$ to £$\frac{3}{4}$ million. In the case of locomotives and goods vehicles practically no contract work was given out at all at the bottom of the depression. The relative fluctuations of the two kinds of works can be illustrated by saying that while contract work amounted to about 25 per cent. of the companies' own work between 1928 and 1933, this ratio fell to a mere 7$\frac{1}{2}$ per cent. in 1933 and increased again to over 55 per cent. in 1936. That shows clearly how excessively the supply industries are burdened by variations in rolling-stock renewals, and how they act as a buffer in the railway companies' renewal policy.

What significance this policy has for trade-cycle regulation is difficult to determine. It would appear that the greater proportion of work done in the companies' shops during bad years would tend to increase the employment effect, since railway companies do not reckon profit on their own works and the leakages can, therefore, be supposed to be smaller. On the other hand, it could be argued that the

drastic curtailment of contract work may well induce the industries concerned to reduce their maintenance expenditure and stocks more than is indicated by the decline in orders, and by way of psychological reactions also affect the willingness to invest in other engineering industries. Whether the disproportionate contraction and expansion of railway contract work as compared with the railway's own work has a stabilizing or destabilizing effect on employment must depend on whether the greater primary effects of railway work outweighs the primary and tertiary displacements caused by the reductions in contract work.

Before we sum up the conclusions of this chapter we may attempt to estimate the effect of railway investment on employment. The method of estimating the primary employment caused by a given investment is described in Chapter VI. In default of detailed evidence the general ratios which have been determined there must be applied to railway investment as a whole. These rather rough estimates can be supplemented by employment figures for the technical staff of the railway companies and by some special information about the maintenance work on the permanent way. We shall deal with these specific railway data first because they reveal some interesting facts which are not brought out by the general method alone.

(*a*) The total shop and artisan staff employed by the railway companies of Great Britain during the second week of March is returned annually in the Railway Staff Returns and shown in Table 47. The total is subdivided into the Permanent Way Section and the Engineering Section of the Locomotives and Vehicle Building Department. No allowances are made for the number of hours worked, which makes the employment data vary less than the actual volume of work; nor do the figures represent an annual average. Moreover, the technical staff is employed on additions to the capital stock as well as on replacement and repair work, while our expenditure data state the work done by the companies' own staff only for renewals, not for repairs or work on capital account. That makes it difficult—if not impossible—to compare employment and expenditure data.

First, employment in the Permanent Way Section with a staff of about 20,000 workers was well maintained during the general depression: this agrees fairly well with the stability of our maintenance data during that period. In the recovery period the rise in employment exceeded considerably the increase in maintenance expenditure, which seems to indicate that the expansion of employment must be largely attributed to greater capital expenditure on the permanent way.

Secondly, employment in both departments rose from 1929 to 1930 by about 6 per cent. The actual increase of employment shows that the 1929 assisted schemes had a definite anti-cyclical effect during the first years of the depression, but were not sufficient to prevent a serious fall of employment during the following years.

Thirdly, the numbers employed in the Engineering Department show, apart from severe cyclical fluctuations in accordance with the maintenance data, a declining trend similar to that of expenditure on rolling-stock repairs. Since renewals and new constructions of rolling-stock increased considerably from 1933 to 1936, the lack of response in the employment figures must be largely attributed to an increase in output per head. Assuming that approximately the same amount of constructional work was done in the engineering shops in 1928 as in 1937, the labour force required to carry out the work was reduced by about 20 per cent. No account is taken of this factor in our general estimates of the employment effect of a given amount of investment.

Fourthly, taking an average wage of £150 per man and year for the technical staff (which may be rather too low), we can estimate that about one-third of the total capital and maintenance expenditure goes directly to the technical staff of the railway companies, the remainder being accounted for by services of other departments, purchases of materials, and contract work. The table below gives the relevant data for some typical years.

(*b*) Further evidence about the distribution of expenditure on wages and materials can be derived from the Permanent Way Accounts. Maintenance expenditure is divided here into three parts: amounts paid to wages, for materials

| | 1928 | 1929 | 1930 | 1933 | 1936 |
|---|---|---|---|---|---|
| Number of technical staff employed (thousands) . . | 137·2 | 124·3 | 132·2 | 100·9 | 117·9 |
| Est. wage-bill (£ millions) . | 20·6 | 18·6 | 19·8 | 15·2 | 17·7 |
| Est. total exp. on works . . | 61·8 | 58·8 | 59·0 | 44·5 | 55·4 |

and for rolling-stock supplied, and given separately for renewal and repair work (see Table 48).

When we first consider the totals we find that contrary to expectations the annual wage bill varied as much or even more than expenditure on materials and, in particular, that despite the fall in the general price level the latter remained high until 1931, whereas wages began to decline from 1928. We simply note this fact without attempting full explanation, because the partial disparity of the movements clearly affects the relative share of the two factors in several years. On the whole, expenditure on materials represented a fairly constant proportion of the total expenditure. About 35 to 40 per cent. of the total was spent each year on materials: that is, the total cost of materials came to about 60 to 70 per cent. of the direct wage costs. The slight variations in these proportions seem to be partly cyclical, though the correlation is not very close and was apparently affected by other factors.

One of these factors which affects the general ratio of wages to materials is apparently the distribution of total expenditure between renewals and repairs. It appears that renewals entail a low percentage of direct wages and a high percentage of materials while the opposite is true for repairs. Of one million pounds spent on repairs about 70 to 75 per cent. go to direct wages, of a million pounds spent on renewals only 24 to 30 per cent. That is to say, that the wage ratio of renewals is almost the reciprocal of the repair ratio; and the average ratio of the total is the result of the changing composition of the total. If the relative share of the renewal work increases, the proportionate share of materials tends to rise and vice versa.

In estimating the employment effect of a given investment in the permanent way the difference in the wage ratios is clearly of some importance. As is explained in Chapter VI, the primary 'leakages' and hence the primary employment

are likely to be smaller where the proportion of direct wages is low. Assuming that the average wage of the technical staff is £150 per year, and that £1 million spent on materials provides for an employment of 4,000 man-years, we find that the primary employment effect of renewal expenditure is some 20 per cent. smaller than that of repair expenditure. £1 million spent on repairs provides for a primary employment of, say, 6,000 (±5 per cent.) man-years; while a million spent on renewals creates, say, 4,700 (±5 per cent.) man-years employment. It is clear that the average effect of the total permanent-way expenditure varies with the proportion of renewals and repairs. To apply a general ratio would falsify the variation and tend to understate the employment effect because of the large share of repair work in permanent way maintenance.

We cannot apply the ratios found for permanent-way expenditure to other constructional work, although we might safely assume that the primary employment effect of repairs is in any case greater than that of renewals or new construction; nor can we split up the remainder of Way and Works maintenance expenditure in the same way; and we have no information as to the ratios for new construction. We are therefore thrown back on the use of a general ratio if we attempt to estimate the employment effect of the whole constructional activity of the railway companies. As a large part of this work is done by the railway companies themselves, we must assume a smaller primary leakage factor and allow for a greater margin of error. We have, therefore, assumed that £1 million railway investment results in a primary employment of about 4,500 man-years. After corrections for changes in investment costs it would appear that railway investment provided for some 300,000 man-years of primary employment in good years and some 240,000 in bad years.

We can now attempt to sum up the main conclusions of this chapter. They must inevitably be of a tentative nature as far as the future is concerned, because our investigation covers only the period of one cycle, which incidentally was a difficult period of transition for the railways. But to judge from the experience of the last ten years, and having in mind

that the future demand for rail services is still highly uncertain and may show a further decline, we may say that the constructional activity of railway companies is likely to fluctuate rather violently, and broadly in accordance with the timing of the general cycle. This applies to (unassisted) capital expenditure as well as to maintenance expenditure and in varying degrees to the different objects of expenditure.

What can be done to mitigate or preferably to reverse these variations in railway investment? It was shown that the railways have received government assistance to capital works in the form of interest grants, tax reliefs, and loan guarantees in the past. By accident rather than as a result of a deliberate trade-cycle policy the State help granted in 1929 came just in time to act as a stabilizer during the following depression, and not only to prevent a decline in capital expenditure but to raise it as the depression grew worse. This successful expansion was, however, not sufficient to prevent a fall in the railways' total constructional activity because it was more than offset by the decline of maintenance work.

The timing of the large 1935 work schemes was less fortunate and intensified a strong upward movement which was already bolstered up by armament works. From the trade-cycle point of view it would have been desirable to postpone these works as far as possible until a recession occurred. That does not mean that the schemes should not have been started in 1935. Some of the works were regarded as urgent—for political and social reasons—and not easily postponable. That applies to part of the L.P.T.B. schemes as well as to some projects of the main line companies. But it might have been possible to agree on a scale of urgency for various works and to make the carrying out partly dependent upon the general state of trade. Such a plan of urgent and postponable works would need revision from time to time, and acceleration and deceleration of works would have to be determined by agreement between the railway companies and the Government. To link the rate of expansion and contraction of works automatically to a general index of employment and output seems to be impracticable.

It is evident that similar considerations apply to the

financing of the schemes. Capital must be raised before the more urgent parts of the works can be carried out; and railway companies may wish to raise the amount for the whole programme in advance if they expect higher interest rates or a less favourable state of the capital market in future. The fact that the two big railway loans were issued during the upswing in 1935 is not in itself significant. It depends on how the unspent balances are employed, whether they have a mitigating effect on the trade cycle. For large schemes extending over the greater part of a cycle these difficulties cannot be avoided. The inclusion of urgently required works makes it often impossible to delay the borrowing, and to raise the money for this part of the programme separately may not be convenient if a State guarantee is sought.

How far railways might be able to support a trade-cycle policy by larger works programmes in future must depend on the trend of rail traffic and the scope for technical improvements, which are difficult to forecast. There is, of course, the great project of railway electrification on a national scale which was investigated and recommended by the Weir Committee in 1931. The committee estimated the total costs of the electrification scheme at about £320 millions, of which £80 millions would be required to expand the electricity supply industry and about £240 millions for the work on railway lines and equipment. The economies derived from electric operation were considered to yield a sufficient net revenue on the fresh capital expenditure. The railways were rather doubtful about the estimates of the Weir Report and circumstances have certainly changed since then. The traffic estimates and the cost data might need revision and many improvements to steam operation have taken place which were not foreseen by the Weir Committee. The advantage of electric working over steam working may thus have been reduced. Moreover, some work of electrification has been done. The Southern Railway is completing the electrification of south-east England, and the Manchester and Sheffield line—the first scheme of complete electrification including goods traffic—is in course of construction. Experience of these schemes may lead to a revised judgement about the prospect of electrification. Still, even if the railway

companies do not feel justified, in view of the uncertainty of holding their traffic, in proceeding with the electrification on their own initiative, it may be good public works policy to initiate and assist electrification programmes in depression times. Once strategic considerations which at the moment seem to tell against electrification become of less importance, selected electrification schemes in addition to improvements of the existing system would seem to constitute a valuable reserve of works which could be mobilized in a depression.

It is, however, not enough to consider merely the capital expenditure of railway companies. Revenue works are of greater absolute importance and their variations are of the same order of magnitude as those of capital expenditure and have offset or accentuated the movements of the latter considerably.

Now, it has been shown that an attempt to influence revenue expenditure on works would have to differentiate between various kinds of maintenance works. Repair works, which may be estimated to amount to more than half of the total maintenance expenditure, seem to be hardly amenable to trade-cycle control. Their movements, though rather wide, seem to be largely due to non-cyclical causes, and there is no evidence that they have been greatly delayed or accelerated. It is different with renewal works. Rolling-stock was apparently greatly affected by short-term considerations and shows clearly signs of cyclical postponement and acceleration.

The smaller cyclical sensitivity of renewal work on the permanent way seems to indicate that they are less likely to be postponed by the railway companies themselves. That does not mean that—and the 1930 to 1932 experience proves it—the railways cannot be induced by State stimuli to anticipate (and as a corresponding move to postpone) these works. On the contrary, it is very likely that renewals of the permanent way and other long-term durable works which are not subject to rapid obsolescence will prove to be more responsive to State inducements than renewals of rolling-stock.

Apart from general measures of rail and road policy the railway companies can only be induced to reverse their

cyclical renewal policy by subsidies or tax relief. The application of cyclical subsidies presents, however, many difficulties. First of all, it is important to make certain that the subsidized works are additional to those which the railways would have undertaken otherwise during that period. Capital grants for a definite programme of works have certain advantages in this respect over general subsidies towards the costs of all renewal works undertaken. But the prospect of State help may make the companies inclined to minimize their own renewal programmes. Moreover, such subsidies can hardly be planned in advance and must await the outbreak of the depression, particularly if the companies have done a greater amount of renewal work in the previous boom. There is, further, the question whether subsidies may not induce investments in excess of the true needs of the industry which do not prove to be justified in the light of later experience.

Finally, apart from what railways themselves can do with and without State assistance to mitigate cyclical fluctuations of their own investment, they will be greatly supported in this task by a more general application of public works policy. In a less unstable economy and at a higher average level of employment the railways could feel more confident about investing at a steady rate and would find a number of improvements profitable which at present appear to be too risky.

### *The London Passenger Transport Board*

We have already implicitly discussed the L.P.T.B.'s investment in their railway business, as far as comparable figures were available. This procedure was chosen in order to restore the statistical continuity of the railway series, disturbed by the transfer of a number of electric railway companies to the Board in 1933. For that purpose we had to make some adjustments for the overlapping of business years and to confine ourselves to aggregate figures. We obtained neither a complete picture of the railway investment of L.P.T.B., nor could we take into account the other not less important part of the undertaking, closely linked up with the railway side of the business in an integrated trans-

port system. It, therefore, seems convenient to consider the Board's activities as a whole and to give the main investment data in some detail.

The L.P.T.B. was established in June 1933[1] as a public authority to provide a co-ordinated and adequate system of passenger transport for a London area extending to over 2,000 square miles, with a population now not far short of 10 million people. Within this area the Board took over by transfer or aquisition all the local road and railway undertakings with the exception of a few services which overlapped the boundary of the area, and secured co-ordination with the suburban services of the main line railway companies by a Standing Joint Committee and a Pooling System designed to create a common financial interest. The Board is under the obligation to be financially self-supporting, has no special claim to subsidies or contributions from other public authorities, though it does in fact receive some State assistance, as we shall see later. It has found it difficult to reconcile its statutory financial obligations with the no less important social duty of providing for improvements and appropriate developments of transport facilities in its area.

When it commenced operations the Board was faced with two main problems: first, to reorganize the hitherto unrelated parts of the undertaking into a planned whole, and second, to secure for the growing and shifting population of the area adequate transport facilities. Before the unification of London transport the services were conducted by a great number of private and public bodies. The underground railways were run by seven private companies, the bus services were in the hands of numerous large and small private companies, and some were also—like the greater part of the tram services—operated by a number of local authorities. The various services overlapped in many respects, and left some areas underdeveloped and others overserved. The competitive condition increased the risks involved in making fresh capital expenditure on a large scale and made the separate units reluctant to take a long view and

[1] Drafting of the London Passenger Transport Bill, which authorized it, began in October 1930; it passed its third reading in the House of Commons in February 1933.

to embark on extensive schemes. A unified enterprise could hope to achieve considerable economies by eliminating duplicate services, by standardizing equipment, by centralizing depots and garages and workshops, and at the same time might undertake confidently extensions of the existing transport system in those areas, particularly in the north and east, where the population had grown by migration from the provinces, by movements from the inner to the outer zone, and by the natural increase in population. In addition to that, the Board had to carry out those improvements in the speed and conveniences of travel which the rising standard of the public demanded.

The first two years of the Board's operation were a period of transition during which a great number of road undertakings were still newly acquired and the services taken over were consolidated and integrated. On the basis of this two years' experience, and after a comprehensive review of London's principal transport requirements, a five-year programme of new works was drawn up in 1935.

The programme was estimated to involve an expenditure of £40 millions, but this sum is likely to be exceeded owing to the rise in prices. The Board's share can be estimated at about £29 millions, the remainder being undertaken by the L.N.E.R. and G.W.R. When the programme is completed the Board will have added 17 miles of new railway lines, with 11 new stations, and will have rebuilt 45 stations and purchased 1,690 new railway cars. During the initial five years the Board has further purchased 2,925 new buses (another 400 being on order at the end of 1937–8) and 966 trolley-buses, to which must be added a further 643 under construction. The new rolling-stock was partly to provide for the extended services, but mainly for replacements for the existing stock. Additions to the capital stock were partly balanced by withdrawals of existing assets, as can be seen from Table 50.

The aggregate expenditure of the Board, during the first five years, on additions and improvements to their capital and on replacements amounted to £22·06 millions, of which £12·31 millions related to the new works programme and £9·75 to other capital works. The net additions to capital,

other than consideration paid for transferred or acquired undertakings, came to £20·05 millions, £2·03 having been taken out of capital account by charging £1·85 against the renewal reserve and by crediting £0·18 million realized from the sale of scrap metal. In addition to this capital and renewal expenditure, the Board spent considerable sums on the maintenance of their capital assets. The tables at the end, in the Appendix, give the year-by-year expenditure on capital and revenue account subdivided according to the main objects of expenditure.[1]

The transitional nature of the first two years is apparent in all the series of capital expenditure. The year 1934–5 marked the point of lowest activity; after that the influence of the new works programme made itself felt, first in increased expenditure on buses and trolley-buses, and a year later in railway expenditure. The greater part of the latter consisted of expenditure on lines, while the former went predominantly to purchases of rolling-stock. In 1937–8 the total capital expenditure amounted to about £7½ millions, compared with the roughly £1½ million during the first two years of the Board's existence. A further considerable increase in 1938–9 is very likely, because a substantial part of the programme is not yet completed. Only £12 millions out of the proposed £29 millions had been spent up to June 1938, leaving a balance of about £17 millions for the remaining two years, if the programme is to be completed within the five years period. An estimated further expenditure on Capital Account of £23·40 millions had been authorized at 30 June 1938. As far as the mild and short 1938 depression is concerned, the rising investment had certainly a stabilizing

[1] The annual figures for capital expenditure as given in Table 50 do not add up to the totals given above. The reason is that a number of items have been neglected as not constituting effective payments. Among these are purchases of or subscriptions to other undertakings, legal and other expenses in respect to acquisitions, and expenses on issuing stock and other borrowings. It will be further observed that we again meet the problem of capital withdrawals, particularly, though not exclusively, in connexion with the replacements of tram services by buses and trolley-buses. The Capital Accounts of the Tram Department were credited for the book value of assets replaced by or transferred to Trolley-buses and for assets withdrawn from service and transferred to 'Assets displaced and not to be replaced'. Such credits occurred on a smaller scale also through the sale of land and buildings or scrap material.

influence, while in the two previous years it tended to accentuate the industrial boom. We shall discuss in a moment whether this was avoidable.

Maintenance expenditure as a whole moved narrowly at a level of about £4 millions a year, or about one-sixth of the total working expenses. About one-quarter of this represented maintenance work on railways, which tends to rise slowly. Maintenance work in the bus and trolley-bus departments is naturally rising as the fleet of vehicles grows, while that on trams declines as tram services are converted or withdrawn, leaving the total for the road services during these five years without a definite trend at an average of just under £3 millions. The rest is accounted for by maintenance of the electric power-stations and the electric distribution system. More than half of the total maintenance is spent on the rolling-stock; and the proportion is rising—up to 70 per cent. in 1937–8—because buses and trolley-buses require less other permanent works than the displaced tramways. The rest goes, as can be seen from Table 50, to buildings, equipment of routes, and, in the case of railways, to the permanent way.

The accounts of the Board do not distinguish, as do the Railway Returns, between renewals and repairs for the different categories. The report mentions, however, that the sums charged against the Renewal Reserve during the five years amounted to £1·85 million, of which £0·91 were charged in 1937–8. The sums set aside to the Renewal Reserve during the same period amounted to £11·67 millions, leaving an accumulated balance at 30 June 1938 of £9·818 millions. The actual charges against the Renewal Reserve during the initial five years period were, however, not representative, and they are bound to rise in future. For the assets so far renewed have been mainly assets which were transferred to the Board on its formation and which were charged on replacement against the Renewal Reserve at the written-down amounts at which they were taken over and stood in the Capital Account, the expenditure on the new assets being added to the Capital Account. The charges represented, therefore, only a small proportion of the total expenditure incurred upon new assets which replaced existing ones. The

accumulation of the Renewal Reserves is designed to meet at the appropriate time the full charges arising upon the renewal of the assets. The balance of the fund is, therefore, likely to grow still further by the annual provision for renewals of about £2 to £2½ millions, but at a slower rate, because the annual charges against the fund will tend to increase and to diminish *pro tanto* the capital expenditure.

Whether considerations of trade-cycle policy could have substantially altered the actual course of the Board's constructional activity is open to some doubt. A large part of the investment was, under the given circumstances, more or less unpostponable. Evidently the consolidation of the various services taken over by the Board and the building up of a composite whole required some investment, which could not be delayed for long, if the advantages of a unified control were to be realized. Further, the transport problem was already acute in some areas before the Board's formation, and the continuing migration towards the outer zones made it even more urgent. In the Board's opinion improvements and extensions to meet these needs should for overriding social reasons not be delayed. Moreover, the Board could claim to be under the statutory obligation to carry out immediately any improvements likely to improve its earning capacity, the more so as the net revenue during these years was not sufficient to pay the standard rate of 5½ per cent. prescribed by the Act of 1933 on Transport 'C' stock. That applies not only to improvements which offered operational economies, like the concentration of depots and workshops or the replacements of trams by trolley-buses, but also to works (like the reconstruction of stations) which would appear at first sight not to represent improved earning capacity and to be in the nature of the substitution of better facilities for old. In this connexion the Board points out that, for instance, the reconstruction of eight stations between 1932 and 1935 has resulted in a considerable increase in traffic, amounting to 22½ per cent. from 1931 to 1937–8 for the reconstructed stations, as against a 5 per cent. rise at the other Central Area stations.

To carry out these improvements, to weld together the

separate branches of the transport system, and to provide some overdue extensions was the very reason of the Board's formation, and the necessary investment could not be put off for a considerable time without impairing materially the advantages expected to result from a unified transport system. Trade-cycle planning might still have been possible, for instance, by setting up a minimum and a maximum programme of new works for the five years, the former to be carried out in boom times, the latter in recession periods. But here again the urgency of many of the works, owing to the recent formation of the Board, might have made the difference between the two programmes rather small during the initial period of 1935 to 1937 which coincided with the industrial upswing; and it is also doubtful whether the Board's investment could have been switched over to the high level actually prevailing in the 1938 recession, if the Board had proceeded on the lines of a minimum programme during the preceding years. Moreover, strategic reasons may have demanded, and may still demand, that the works programme be accelerated regardless of trade-cycle considerations.

We are, therefore, inclined to treat these first five years of the Board's existence as a special case, which did not offer great opportunities for trade-cycle policy and was not representative of the Board's normal investment activity. A considerable part of the recent expansion is due, in the Board's own opinion, to deficiencies in the past; but its investment has already provided for some future growth. The replacements of trams by trolley-buses and the building up of an appropriate and standardized fleet of vehicles is a non-recurrent form of capital expenditure. The reorganization of depots, garages, and workshops is also not repeatable. It would, therefore, appear that the present level of investment activity is, in many respects, exceptional, and due to a single readjustment. After its completion the future loan expenditure will primarily depend on the growth of passenger traffic in the London area and on profitable improvements to the existing system. In both cases the trend is difficult to predict. If the strong currents of public opinion which seek to prevent a further uncontrolled growth of Greater London

for economic, social, and strategic reasons succeed, directly or indirectly, in stopping the migration from the provinces to London or in inducing movements away from London, investment in extensions of lines will be limited. The Board are opposed to any arbitrary attempt to restrict the growth of London, and express the view in a Memorandum submitted to the Royal Commission on the Location of Industries that it would be not only economically undesirable but also unnecessary. It does not appear to the Board that any further concentration of population which is likely to occur would be excessive or uneconomic. The Board estimates that 80,000 additional people migrated into the London Transport Area in 1936–7 and that the natural increase of population amounts to about 30,000 people each year. They calculate that this would mean an increase in passengers to the Pool System of roughly 50 millions per annum. But the Board may have to reckon with a deliberate restriction of London's growth and with the effect of the general discussion of the problem and of the considerations behind it on the location of industries. That introduces an element of uncertainty into the decisions on further extensions and makes such investments more risky.

Moreover, the considerable extensions to the underground railways and other works, which were due to come into operation at various dates after 1939, may, in the Board's opinion, be unable in the early years to earn a full return on the capital sunk into them. They were apparently undertaken in the expectation of a future growth of the outer zones, and may make similar extensions for the near future superfluous, even if the migration from within and without continues. These considerations make it likely that expenditure due to growth and migration of the population will be smaller in future than during the reconstruction period and, owing to uncertainties, perhaps even less amenable to cyclical advance planning.

About improvements to the existing system it is more difficult to come to a conclusion. Some of the major improvements arising out of the co-ordination of the formerly separate services have been carried out. There will certainly be room for further profitable improvements, but unless

technical innovations alter the present outlook there is no indication that they will be undertaken on anything like the present scale.

But there may be a number of useful works to be carried out with further State assistance. Such assistance is now given in the form of Treasury guaranteed loans of the London Electric Transport Corporation, which enable the Board to borrow at gilt-edged rates. There are also minor grants under the Development Act, 1929, and from the Unemployment Grants Committee, made to some formerly separate undertakings and continued until the completion of the work schemes. Such inducements to invest might be increased as an anti-slump measure. Further, renewals, which during the last five years moved steadily at a rate of £4 millions a year, would have carried greater weight in future. It is, therefore, important that they should be adapted to trade-cycle planning by depleting and repleting renewal reserves and shifting works from good to bad times, a point which we already have discussed for the main-line companies. On the whole, it would seem that the position of the L.P.T.B. is likely to be assimilated to that of other railways; but the Board can expect a steadier development because of the smaller cyclical sensitivity of passenger traffic than of the mixed goods and passenger traffic of the railway companies, and because of its combined control over rail and road traffic within its area. This greater stability of passenger traffic should enable the Board to pursue on its own account a more long-range policy of constructional activity than the railway companies.

From a point of view of trade-cycle control, the case of the L.P.T.B. somewhat resembles that of the Central Electricity Board's activities in connexion with the 'Grid'. In both cases the initial reorganization involved very heavy expenditure of a constructional nature; but once the new service is on its feet, provision for maintenance, renewals, and normal growth needs a much smaller annual expenditure, only a part of which could be easily postponed or anticipated. But in the case of the C.E.B. the necessary preliminaries of legislation and planning were accomplished during a period of prosperity, and the heavy initial expenditure could be

made, and was made, in depression; whereas the L.P.T.B. was created in depression and was only ready to begin expenditure on a considerable scale in the subsequent boom. The moral seems to be that large schemes of public utility reorganization of this kind may, by accident, play a useful part in trade-cycle control; but the period of legislative and technical gestation is so long that they will always be difficult to fit into any regular policy.

## II. The Electricity Supply Industry

### *The Organization of the Industry*

Before 1914 Great Britain lagged behind other great industrial nations in electrical development. This was partly the consequence of the greater expansion the gas industry had reached in this country, partly a reflection of the lack of co-ordination and the multiplicity of small unconnected stations in the electric supply industry. Large reserve capacities of generating plant for the peak demand had to be held, the small average size of stations implied high generating costs, and the high price of electricity retarded development. The shortage of generating plant and of coal during the war brought a strong impetus to investigate the possibility of an adequate and cheap supply of electricity. Various committees were set up to consider what steps could be taken. The Electricity (Supply) Act, 1919, incorporated many of their recommendations, though it modified them in various points. The Act provided for the formation of the Electricity Commission, composed of not more than five technical experts and to be appointed by and responsible to the Minister of Transport. The Commission obtained wide supervisory and regulating powers. For our analysis the most important were (*a*) to grant statutory powers to local authorities or companies to supply electricity within a certain area, i.e. to create authorized undertakers by special orders; (*b*) to be the sanctioning authority for local government borrowing for electricity purposes;[1] (*c*) to give approval to the construction or extensions of new generating stations or

[1] Most other local government borrowing is subject to the approval of the Ministry of Health.

transmission lines; (*d*) to authorize or promote 'Joint Electricity Authorities' or 'Joint Electricity Boards' (of local authorities), but without compulsory powers in this respect and depending on the voluntary agreement of the undertakers of the district concerned; and (*e*) to collect financial and technical statistics from all undertakers.

It became soon obvious that these powers were not wide enough to achieve the desired rationalization of the supply industry. Only a few schemes of co-operation between local authorities or between municipal and private undertakers were put into effect, on a voluntary basis. Already, in 1922, the Commission expressed the view that in order to promote a rational organization of the industry some element of coercion would be necessary. On the recommendation of the Weir Committee, appointed in 1925, the Electricity Supply Act of 1926 set up a new central organization with compulsory powers in regard to generation (but not the distribution) of electricity.

This Act provided for the establishment of a Central Electricity Board (C.E.B.). The Board was a new type of semi-public institution. It is not a mere administrative body but a trading concern and operates like an industrial firm. It is outside parliamentary control in its trading and financial operations and in the choice of its personnel. On the other hand, it has to submit an Annual Report to the Ministry of Transport which is presented to Parliament, and it is partly subordinated to the Electricity Commissioners, a government agency, and it must, like other public electricity authorities, obtain their consent for raising new capital or for the construction of new generating stations and transmission lines.

The main functions of the C.E.B., relevant to our analysis, are: (*a*) to concentrate the output of electricity in the more efficient, low-costs stations ('Selected Stations') and to authorize, in conjunction with the Electricity Commissioners, extensions, alterations, and construction of new Selected Stations; (*b*) to interconnect these stations by constructing and acquiring main high-tension transmission lines, and to link this 'Grid' with the supply systems of the authorized undertakers; (*c*) to standardize the frequency of the existing supply systems in order to make their inter-connexion effective.

It should be understood that the Board does not own or acquire generating stations and has no control over the distribution of electricity to consumers. The Board owns the main transmission system, known as the Grid, and purchases the output of the selected stations and sells it to authorized undertakers, prices and tariffs being fixed by the Board according to certain rules laid down in the Act.[1] The selected stations remain the property of the individual supply undertakings, but the Board guarantees their operating costs and capital charges and also all costs arising from the installation of new selected stations or extensions required under the direction of the Board. The supply undertakings, on the other hand, are under the obligation to operate the stations according to the orders of the Board.

The supervisory, licensing, and sanctioning powers of the Electricity Commissioners and the executive and operating powers of the C.E.B. subject the electricity supply industry —at least as far as generation and main transmission are concerned—to a public or semi-public control which hardly exists in any other industrial or public utility field. In fact, the two bodies constitute a central planning organization responsible for directing on a national scale a co-ordinated development of the electricity supply industry as a whole;[2] they function as a kind of National Investment Board for a particular industry. It is these planning powers of the E.C.s and of the C.E.B. which suggested to us that the whole industry rather than that section operated by public authorities might be amenable to some sort of trade-cycle control.

In addition to the C.E.B. there existed on 31 March 1938 591 authorized undertakings which submitted their reports to the Electricity Commission. Of these 591 undertakings, 3 were Joint Electricity Authorities,[3] 5 Joint Electricity

[1] Under the Electricity (Supply) Act, 1935, the Board may also give supplies directly to railway companies for traction purposes at prices which will involve no financial loss.

[2] With the important exception of retail distribution which is (still) outside their control.

[3] London and Home Counties J.E.A., West Midlands J.E.A., North-West Midlands J.E.A.

Boards,[1] 369 local authorities, and 214 companies and persons. Besides these authorized undertakings there are over 30 tramway, railway, colliery, and other unauthorized[2] undertakings which are selling part of their output to the public. The publicly owned sector of the authorized undertakings is larger than the private sector, whether measured by the number of stations or by the number of units sold (about 5 : 3) or by plant capacity (about 3 : 2). But the undertakings within these groups differ greatly as to size, legal status, and financial and economic conditions. There are undertakings which mainly act as distributive agents, and others which are mainly concerned with generation; there are companies working under a provisional order subject to later purchase by the local authority; and 'Power Companies' operating under powers obtained through a Private Act of Parliament; there are small independent companies, and companies which are part of comprehensive financial groups. About 60 per cent. of the 211 private companies are controlled by a dozen holding companies. These are either operating companies themselves, or purely financial holdings; their control may be confined to undertakings of a certain area with a view to obtaining operational economies, or they may have interests in companies spread over the whole country. The advantages and disadvantages of holding companies as instruments of a rational co-ordination of the supply industry and the question whether they have a stabilizing effect on the investment of their subsidiary companies cannot be discussed here. It is sufficient to point out that public control extends over a great variety of types of undertakings, irrespective of their size and organization.

The institutional control which we have described so far has clearly been facilitated by the economic and technical nature of the industry, and it seems convenient to mention briefly some of the technico-economic factors which are of particular importance for the possibility of trade-cycle planning.

[1] Alderley, Edge, and Wilmslow E.B., Dearne District E.B., Stretford and District E.B., Ayrshire E.B., and Stalybridge, Hyde, Moseley, and Dunkinfield Tramways and E.B.

[2] Undertakings for which statutory powers have not been sought especially for electricity supply.

1. The production and distribution of electricity is monopolistic by nature. To set up two rival supply systems within the same area would certainly represent a waste of capital and would produce neither stable conditions nor the best service for the consumers. Within its statutory area the supply undertaking can plan ahead its investment without fear of competitors, although it is not protected against the competition of substitutes, such as coal and gas for domestic and power purposes.

2. Supply undertakings are compelled to hold considerable capacities in reserve to meet seasonal peak loads, as a protection against contingencies, and, more recently, as a precaution against damage in time of war. Within certain limits these excess capacities can be allowed to vary inversely to the general cycle by anticipating constructional works in bad times and postponing them in good times. We shall see in a moment that this factor was not operating during the 1930–2 depression, owing to the rationalization effect of the Grid which actually reduced the required reserve capacity during the depression.

3. The demand trend for electricity can be predicted with fair accuracy some years ahead, particularly as long as the cyclically not very sensitive demand for domestic purposes represents a substantial part of the whole. This should enable the supply undertakings and the two national bodies to plan ahead investment and to adjust their policy to the needs of trade-cycle regulation.

The fact that the C.E.B. eliminates the risk of the individual undertaking by guaranteeing the costs of new generating plant is also important. Although it is financially self-supporting, it is not a profit-seeking undertaking, and this should facilitate the task of trade-cycle planning.

4. Moreover, the steady growth of consumption, which was practically maintained even between 1929 and 1932, should encourage a steady investment policy and reduce the risk involved in anticipatory investments, at least in generating plant, and main transmission lines, though distribution mains and services may be less plannable. These four elements in conjunction with the regulating powers of the two

national bodies seem to make the electricity supply industry a useful instrument of public works policy.

The main features of the post-War development can be seen from Table 51, showing the growth in the number of consumers and in sales for different purposes, the increase in output and in the capacity of generating plant installed, and, at the same time, the fall in the number of generating stations.

For our purpose we may confine our remarks to a few outstanding points.[1] The net sale of the authorized undertakings was about six times greater in 1936 than in 1920. Consumption per head (for all classes of supply other than bulk supplies) rose from 82 units per head in 1920–1 to 419 in 1937–8. Sales for domestic purposes show the greatest proportionate increase and were almost doubled between 1928 and 1933 despite the depression. The proportion of power supply in the total sales declined from over 70 per cent. in 1920 to just over 50 per cent. in 1937–8. Its greater cyclical sensitiveness is shown by the fact that it advanced only by 5 per cent. from 1929 to 1932, while sales for domestic uses rose by 48 per cent. during the same period; while power supply rose by 64 per cent. and domestic supply by 86 per cent. during the upswing between 1932 and 1936. Public lighting and traction together accounted for about 10 per cent. in the earlier years, but this share has tended to fall.

It is clear that this remarkable expansion in demand was accompanied by a large expansion in plant and equipment. But it will be noticed that the capacity of generating plant installed grew considerably less than units generated or sold. The number of stations has actually declined since 1929–30, because the less economical smaller stations were eliminated and output was concentrated in the bigger and more efficient stations, and, consequently, the ratio of generating plant installed to units generated increased appreciably from 1 : 1·5 in 1926 to 1 : 2·45 in 1936. About 15 of the biggest

[1] For a more detailed description of the post-War development see the 'Annual Reports' and the 'Statistical Returns' of the Electricity Commissioners, the Annual Report of the C.E.B., the reports of various commissions, and various recent books on Britain's new industries or public utilities and public planning.

stations supplied more than half of the total output in recent years, and it was possible so to control the operation of the 171 generating stations[1] under the direction of the Board that only 30 ran the full year (of 8,760 hours) while 43 stations were in operation less than 2,400 hours, and 9 were shut down altogether. In conjunction with other technical improvements this rationalization made it possible to reduce substantially the average price to the consumer with the result that the field of potential consumers was widened considerably. The construction of the Grid and its route through rural areas helped also greatly to develop the use of electricity in less populated areas. Actually, the number of consumers increased at the rate of about 800,000 a year after 1925. Considerable savings both in capital expenditure and in operating costs (particularly fuel costs) resulted from this co-ordination of the industry.

No similar savings in capital expenditure were effected in the field of transmission and distribution lines, partly because less densely populated areas were developed, partly because co-ordination and rationalization on a national scale were not attempted in this field. But efficiency increased here, too. An index of the improvements which took place in the industry as a whole is perhaps the sales to consumer per £100 of aggregate capital expenditure; this increased by nearly 30 per cent. from 1926 to 1936.

To sum up this general survey, we may say that investment of the electricity supply industry was determined by the interaction of several elements in the post-War period. (1) The basic reason was the extraordinary expansion of demand. The factors determining this steep rise in consumption were (*a*) the conversion of British homes to electric lighting; (*b*) the tapping of new sources of demand through extending domestic uses for cooking, heating, and other appliances, and the opening up of non-industrial markets with low densities of population; (*c*) the general progress in mechanization and in metallurgical and chemical research, making possible, for instance, the electric furnace, with both high and regulated temperatures, or new synthetic industries, and spreading

[1] 136 selected stations and 35 non-selected stations which for a time could usefully be operated in conjunction with the Grid.

the use of the electric motor with its adaptability to modern processes of mass production and—perhaps more important—to small-scale production; (*d*) adjustments and reductions in tariffs, which strongly stimulated the advance of electricity in the domestic and industrial field. This reduction of charges[1] was, in turn, largely due to the technical and organizational improvements within the industry, and by stimulating demand made further improvements possible.

(2) This growth of demand was broadly reflected in the constructional activity of the electric supply industry. More generating plant had to be installed, transmission mains had to be built, and distribution lines and apparatus had to be added. But the fixed capital of the industry did not grow in proportion to consumption. Technical and organizational improvements enabled the industry to supply a given amount of electricity with a smaller capital outlay. In a strongly expanding industry such economies would have been made in any case. But these tendencies were greatly fostered by the rationalization efforts of the two public supervising and controlling bodies, the Electricity Commissioners and the Central Electricity Board.

(3) The formation of these two bodies had a decisive influence on the investment of the industry, though the net result is difficult to measure. On the one hand, major economies in fixed capital and running costs resulted from better co-ordination. On the other hand, the improvements and cost reductions stimulated consumption, and the capital outlay required to meet this extra demand which might not have arisen without public planning must be attributed to the influence of the two national bodies. Finally, the C.E.B. though soon effecting savings in generating plant, added greatly to the investment in main transmission lines. At least during the period of construction and of the standardization of frequency its capital expenditure considerably exceeded any possible savings in other respects.

In our analysis of the investment activity of the industry we propose first to describe the movements and distribution of total investment, then to discuss the constructional

[1] Revenue of all authorized undertakers from sale of current to consumers fell from 2·48*d.* per B.T.U. sold in 1920–1 to 1·08*d.* in 1936–7.

activity of the C.E.B. and its effects and, finally, to consider the similarities and differences in the investment policy of local authorities and company undertakings.

### *The Central Electricity Board*

From the point of view of investment activity the C.E.B. has two main functions, namely, (*a*) to construct, and if necessary to extend, the network of main transmission lines, and (*b*) to direct and plan extensions and additions to the system of generating stations. The latter is a permanent function and regulates the investment in generating stations of private and public undertakers, while the construction of the Grid was carried out by the C.E.B. itself and was a non-recurrent task involving large constructional activity once only. Once the construction of about 4,000 miles of high-voltage transmission lines with adequate switching points, control rooms, and other equipment was completed in a period of six years and the supply systems were converted to the same standard frequency, it was expected that the constructional activity of the Board would be confined to minor expansions to and improvements of the network. Since maintenance work on the Grid is also likely to be small, at least for some time to come, the 'normal' constructional activity of the C.E.B. will be of minor importance for the electricity supply industry as a whole.

The total cost of this scheme was estimated to come to about £50 millions, of which £34·4 millions were allocated to general 'Grid' purposes and £15·6 millions to standardization of frequency.[1] For the planning and construction of the Grid the country was divided into ten regional Grid areas. After the selection of the most efficient generating stations of each area the direction and costs of lines linking up these stations were determined. The areas differ greatly in size, density of population, and economic nature as well as in generating capacity and length of Grid lines. One regional scheme, that of north Scotland, covering about one-fifth of

[1] Interest charges for capital expenditure on frequency standardization are not borne by the Board, which for this purpose only acts as an agent. They are recovered from the Electricity Commission, which in turn receives the required amounts by a levy on the industry, the scrapping and replacement of equipment of non-standard frequency being a charge on the whole supply industry.

the total area but only 1·8 per cent. of the total population, has been postponed for the time being. The other nine schemes were drawn up one after another, starting with central Scotland and ending with south Scotland, but the actual constructional work on the various schemes overlapped, as we shall see later.

The movements of the Board's capital expenditure are shown in Table 52. During the first $1\frac{3}{4}$ years of the Board's existence expenditure on the Grid was negligible.[1] Actual construction started early in 1928, but apparently at a moderate rate on regional schemes. In 1929 work on these and on other new schemes, adopted in the meantime, proceeded faster and led to an expenditure of about £2 millions, then gathered momentum and reached a peak of £8·19 millions in the trough of the depression in 1932. With the gradual completion of the schemes it fell off rapidly to about £3 millions in 1934 and about £1·74 millions in 1936. Expenditure on frequency standardization kept pace with the Grid expenditure, showing a maximum of over £4 millions in 1933 and tapering off to about £2 millions in 1935 and £0·27 million in 1937.

Both curves represent an almost perfect example of anti-cyclical investment. Both together rose considerably with the fall of industrial activity and were, absolutely, almost equal to the amount spent by local authority undertakers, whereas during the preceding (1927 to 1929) and following (1936–7) upswing they represented only one-eighth or one-tenth of local authorities expenditure. Deliberate trade-cycle planning, which actually played no part in the formation or decisions of the Board, could hardly have improved this course. It was probably even not a disadvantage that the

[1] Statistical information about the initial year from March to December 1927 and for 1928 is not quite clear. According to the Financial Accounts total capital expenditure amounted to £1·95 millions at the end of 1928 and to £2·92 millions at the end of 1929, which would make expenditure during the third year lower than that of each of the first two years. According to Statistical Statements about the progress of work in relation to capital expenditure, expenditure on transmission lines at the end of 1928 amounted to not more than £0·28 million, rising to £2·23 millions in the following year. Since the Financial Accounts reveal that up to the end of 1929 only £0·63 million were spent in standardization of frequency, there is a considerable difference in the statements about Grid expenditure during the first two years. We have taken here the expenditure on Grid purposes from the Statistical Statements.

scheme was well under way in 1929, because it acted thus as a break to the downturn in the late summer of that year and because the moderate expenditure of that year was presumably a prerequisite for the substantial expansion during the following years of declining business activity. Assuming that the programme could not have been accelerated at will, it would have certainly been less useful if the Board's works had begun a year later: the anti-depression investment would have been smaller. Actually the Board, in drawing up the time-table of its constructional works, had to take into account the capacity of the electrical engineering industry and mentions explicitly that it planned the regional schemes so that steady employment was obtained in the manufacturing industries. A stronger concentration of C.E.B. orders might have induced an expansion of the manufacturing industry and thus have provided a further stimulus for depression investment, but, at the same time, it would presumably have left the industry with a capacity in excess of 'normal' demand, as soon as the 'Grid' was completed. Whether the Board's contracts actually made the manufacturing industry work near to full capacity appears doubtful in view of the fall of exports and other home demands; but the possibility of causing an over-expansion of the industry had to be taken into account at the planning stage.

But to look at the constructional activity of the C.E.B. in this isolated way and to stress its ideally inverse movement to the general cycle does not reveal the full significance of its investment for that cycle. The very reason for the formation of the Board was to rationalize the electricity supply industry and to secure, by selecting and interconnecting the most efficient generating stations, capital economies and a reduction of operating expenses. It is obvious that semi-public investment designed to increase directly and instantaneously the productivity of an industry is most desirable for general reasons and is preferable to works which contribute little or only in a long and roundabout way to the increase of productive power. But the same reasons which recommend this sort of investment may make it less effective for purposes of trade-cycle regulation because it may dis-

place as much investment and employment as it actually creates.

In two ways C.E.B. investment might have affected other investment in the electricity supply industry: (*a*) by inducing undertakers to postpone investment while the Grid scheme was under consideration, and (*b*) by making fullest use of the capital investment in existing generating stations. The actual postponement caused was probably very small because the rise in demand made extensions to generating plant necessary and involved no risk. The capital saving effects were appreciable. The construction of the Grid made available for revenue-earning a large proportion of the reserve plant in selected generating stations; for while un-co-ordinated generation had compelled the individual undertakings to hold large reserve capacities to meet the particular peak loads, the pooling of the output of the selected stations made it possible to reduce considerably these expensive reserve capacities for the industry as a whole. The Board calculates that in 1931 over 45 per cent. of the total generating plant was held in reserve and that it was possible to reduce this ratio gradually to less than 20 per cent. in 1937, a ratio of 15 per cent. being regarded as a safe normal ratio under Grid conditions. While the Grid was under construction, between 1930 and 1934, the then existing reserve plant was already used under temporary arrangements and by constructing portions of the Grid in advance of the normal programme to meet the growing demand of authorized undertakers. As a result, the new generating plant installed during this period was far less than would have been required under conditions of isolated operation. It is estimated that, given the actual increase in electrical consumption, this saving in capital investment generating plant, arising as a direct result of the construction of the Grid, exceeded

| | | | | |
|---|---|---|---|---|
| £6 | millions | up | to the end of | 1933 |
| £9 | ,, | ,, | ,, | 1934 |
| £11·4 | ,, | ,, | ,, | 1935 |
| £14·0 | ,, | ,, | ,, | 1936 |
| £17·0 | ,, | ,, | ,, | 1937 |
| £22·0 | ,, | ,, | ,, | 1938 |

This set of figures shows that by 1940 the saving would have been equal or in excess of the construction cost of the Grid of roughly £30 millions.[1] But we are concerned here with the cyclical effects, not with the trend effects of these economies in capital investment caused by the Grid.

Now the savings in investment during the constructional period 1928 to 1935 have been estimated at over £6 millions. It is safe to assume that the greater part of this accrued during the final stages of Grid construction and that in spite of temporary arrangements with public and private undertakers economies were relatively small during the first half of the constructional period, i.e. from 1928 to 1930, when capital expenditure on the Grid was also relatively low. Moreover, allowance should be made for the fact that the Grid itself contributed to the immense increase in demand for electricity which came to about 50 per cent. from 1930 to 1934. It seems fairly certain, although it is difficult to be precise about it, that consumption would have risen less without the intervention of the C.E.B. and that, therefore, proportionately smaller additions to generating plant would have been required.

Still, even if we accepted the figure of £6 millions capital savings,[2] the construction of the Grid represented a considerable net addition to the investment which could otherwise have been expected in any single year and during the whole construction period. For up to the end of 1933 the C.E.B. had expended almost £29 millions on Grid purposes and in addition almost £12 millions on standardization of frequency. The saving in capital expenditure was thus over the construction period as a whole about one-seventh of the extra expenditure caused by the C.E.B., and has certainly not altered its anti-cyclical nature.

Although the anti-cyclical timing of the Grid work was

[1] For difference between total cost and construction cost of the Grid see footnote, p. 268.

[2] In addition to these capital economies, a saving in operating costs, particularly fuel costs, resulted from group work of the selected stations, which may be estimated to have been less than £1·5 millions for the six years period of construction. Again, some economies would have been effected under conditions of unco-ordinated operation, and at the same time the rate of increase of demand would have been slower. Thus the offsetting effects of economies in running costs were probably very small during this period.

purely accidental, and trade-cycle consciousness might have speeded up work somewhat more in certain stages, experience from this centrally directed scheme shows how far in advance larger schemes must be planned and set going to be in time for a depression.

This question of timing can be usefully studied in the case of the Grid because more detailed information is available than in most other cases. We can broadly distinguish three periods in the genesis of the Grid scheme.

1. The *legislative period* ending with the establishment of the Board. The preparatory work leading to the formation of the Board began with the appointment of the Weir Committee in January 1925, which was asked to investigate the co-ordination and rationalization of the electricity supply industry and after hearing witnesses delivered its report in May 1925. The recommendations of the Committee were incorporated, in a partly modified form, in the Electricity Supply Bill, which was introduced in Parliament in March 1926 and passed on to the statute book in December 1926. The members of the Board were appointed early in 1927, and the C.E.B. was formally established in March 1927.

2. The period of *work preparation* ending with the commencement of constructional work on the spot. The first transmission tower was erected in central Scotland early in 1928, ten to eleven months after the formation of the Board. This ten months period was used to survey routes, to approach local authorities and companies, to negotiate about way leaves (negotiation was preferred, although the Board had been granted compulsory powers), to estimate costs, to get into contact with manufacturing firms, and to place contracts. The planning procedure proper was as follows: The plans for the regional schemes were drawn up by the Electricity Commissioners and had been partly drafted before the Board came into being. Thus the first regional plan was passed from the Electricity Commission to the C.E.B. a fortnight after the Board's formation. The Board discussed the scheme with the supply undertakers concerned, heard other interested parties, and made, if necessary, its own suggestions for modifications before the schemes were finally

adopted in consultation with the Electricity Commission for execution.

The period between the receipt of a regional plan from the Electricity Commission and its final adoption by the C.E.B., needed for harmonizing public and private interests, varied for the various schemes between a minimum of $2\frac{1}{3}$ and a maximum of $7\frac{2}{3}$ months, and took on the average for the nine schemes $4\frac{1}{4}$ months.

Further time elapsed between the final adoption of the scheme and the beginning of construction. We have no exact dates for the constructional commencement of the various schemes; but the central Scotland scheme (number 1) was adopted at the end of June 1927 and work started six months later, at the beginning of 1928. The table on page 267 shows, further, that little or no work was carried out on schemes adopted in the course of 1928 up to the end of that year and sometimes not up to the end of 1929. A six months period for this preparatory stage might thus be representative. It must not be overlooked, however, that work started in the contracting industries, supplying the pylons, cables, &c., before work on the spot was begun. The scheme spread employment as soon as contract works were carried out; and that might be several weeks or months before the foundations for pylons were laid.

The construction of the Grid as a whole gives us still more insight into the stages of the preparatory planning process. The progress towards the 4,000 miles of Grid routes contemplated is shown in the following table:

| *Years* | *Years* | *Number of schemes adopted* | *Length of routes in miles* | *Per cent. of total* | *Cumulative percentages* |
|---|---|---|---|---|---|
| 1st | 1927–8 | 2 | 1,125 | 28·1 | 28·2 |
| 2nd | 1928–9 | 3 | 1,455 | 36·4 | 64·5 |
| 3rd | 1929–30 | 1 | 181 | 4·5 | 69·0 |
| 4th | 1930–1 | 2 | 867 | 21·7 | 90·5 |
| 5th | 1931–2 | 1 | 372 | 9·3 | 100·0 |
| | | 9 | 4,000 | 100·0 | |

Just over one-quarter of the total route miles proposed had been adopted during the first year. After two years almost two-thirds of the total route mileage and five out of nine

schemes had been sanctioned, but little constructional work had been done until then.

3. The *construction period.* The actual construction of the Grid lines took almost exactly six years. The last transmission tower was erected in September 1933 in Dean Forest and construction was completed at the end of that year. But from a trade-cycle point of view it is important to know whether the work was evenly spread over the six years, and, particularly, how much time elapsed before the rate of construction reached a maximum.

One of the difficulties in determining the progress of work becomes apparent when we look at the constructional data summarized in the table opposite. This compares the progress of work in three series: (1) the construction of transmission lines (primary and secondary), (2) the value of contracts placed for lines and equipment (work in process), and (3) the payments made to contractors and the capital expenditure of the C.E.B. on the Grid (process of spending) which is usually taken as a simultaneous reflection of the progress of works. In order to make the various series comparable we have expressed the annual results as a percentage of the total of the whole period.

The sequence, order—completion—payment, is natural, but the intervals in this order are significant. It will be noticed that contracts placed reached a maximum in 1929, two years before the construction series and three years before capital expenditure. There is, therefore, a two years lag between the placing of orders and the completion of the work on the spot which must be observed in planning public works of this kind. Moreover, it will be seen that at the end of the third year (1930) two-thirds of the total contracts had been placed but only one-fifth of the constructional work had been done. After four years over 80 per cent. of the contracts had been settled, but only 57 per cent. of the transmission lines had been completed and less than half of the capital expenditure been incurred.

It apparently took some time to check accounts with the contractors and to certify and make final payment. It will be noticed that the amounts certified and paid out to contractors lagged behind the returned capital expenditure for

## *Construction of the Grid*

## *Progress of Work and Process of Spending*

| *Year ending Dec.* | *Total contracts placed* | | *Towers erected in route, miles* | | | | *Amounts paid for contracts placed* | *Capital expenditure on Grid purposes* | |
|---|---|---|---|---|---|---|---|---|---|
| | *In £s millions* | *Per cent.* | *Miles* | *Per cent.* | *Primary lines* | *Secondary lines* | *In £s millions* | *In £s millions* | *Per cent.* |
| 1928 . . | 2·90 | 10·9 | 25 | 0·6 | 1·0 | .. | .. | 0·28 | 0·87 |
| 1929 . . | 8·00 | 30·0 | 246 | 6·1 | 6·1 | 5·8 | 0·90 | 2·01 | 6·36 |
| 1930 . . | 7·37 | 27·6 | 545 | 13·5 | 14·7 | 10·3 | 3·50 | 5·19 | 16·17 |
| 1931 . . | 3·58 | 13·4 | 1,493 | 37·0 | 39·5 | 30·6 | 5·64 | 7·92 | 24·70 |
| 1932 . . | 2·95 | 11·0 | 1,362 | 33·8 | 35·2 | 30·1 | * | 8·19 | 25·50 |
| 1933 . . | 1·90 | 7·1 | 329 | 9·0 | 3·5 | 23·2 | * | 5·41 | 16·80 |
| 1934 . . | .. | .. | .. | .. | .. | .. | * | 3·08 | 9·60 |
| | 26·70 | 100·0 | 4,000 | 100·0 | 100·0 | 100·0 | 26·70 | 32·08 | 100·0 |

* Information not available.

the three initial years for which information is available. But it must be remembered that capital expenditure includes other elements besides the payments to contractors, such as costs of stock issues and discounts, legal expenses, and similar non-effective items, which make its movements diverge from contractors' payments.[1]

Moreover, the line mileage constructed might also be not quite representative for the total constructional work done, because a considerable part of the work (say 40 per cent.) consisted of switching points, control rooms, &c., the construction of which might either precede or lag behind the erection of towers.

It is difficult to determine when Grid construction produced the maximum effect on employment. For we do not know how the manufacturing industries, producing the necessary equipment, distributed the execution of their orders over time. It seems reasonable to assume that work in hand and employment of the manufacturing industries for the C.E.B. developed somewhat before work on the spot. It is also plausible that purchases of equipment from other industries generated as much, if not more, employment as the actual construction of the lines. If these two assumptions are correct, it would appear that the construction of the Grid produced its maximum effect not in 1932, as the expenditure figures indicate, but in the course of 1931. Still, it is very likely that the employment effect in 1932 was not very much lower than in 1931, provided that the manufacturing industries produced at the same rate (and slightly ahead) of that at which equipment was used.

The general shape of the various curves is rather similar: a rapid rise to a maximum in the third year is followed by an equally rapid fall. Work was not evenly spread over the construction period and this was certainly an advantage,

[1] The total capital expenditure on general Grid purposes to 31 December 1938 of £39·49 millions is made up as follows (in £s million): land and buildings purchased or leased 0·54, overhead lines 9·78, underground and other cables 6·19, transforming and switching stations and control rooms 13·87, together 30·38 on expenditure on the construction of the Grid. In addition: expenses preliminary to construction, office fittings, furniture and equipment, transport vehicles, tools and instruments 0·27, and 6·13 interest on borrowed money (net), 2·59 discount and costs of issue of stock allocated to general purposes, and 0·12 payments to Minister of Transport and Electricity Commissioners.

because the counteracting effects increased as the depression deepened and fell off when recovery began.

To sum up the main features of the time sequence: the legislative period took about two years, preparatory work another ten months, of which more than four months, on the average, were required to improve the preliminary plan by public discussion, and three more years elapsed before constructional activity was at its height. That gives a total of almost six years from the initial step to the generating of the full effect and seems to make trade-cycle planning of such schemes a fairly hopeless task. In order to time such large work programmes for depressions, it is clearly desirable to have the legislative steps completed and the technical plans, including negotiations with landowners for the acquisition of sites or way leaves, ready before a crisis begins.

It might then still take considerable time before a scheme, started with the onset of the depression, will have appreciable effects. In this respect the rather belated occurrence of the full effects of Grid construction can perhaps not be taken as typical, because the regional schemes were deliberately developed one after another and no attempt was made to spread the work as evenly as possible or to secure a maximum effect as early as possible. Provided that the capacities of the manufacturing industries had been sufficient, constructional work could have been accelerated from the beginning by embarking on several regional schemes at once. Nevertheless, some time will elapse even in this case before a scheme will produce the desired employment. In order to act as an immediate antidote against a fall in general investment activity it might well be necessary to start such schemes going at a slow rate during the final stages of the preceding boom. There are undoubtedly technical, social, and economic reasons which make it difficult to retard the progress of work, once execution of a scheme has been decided and initiated, but it is essential that a compromise should be found between the social and economic urgency of work programmes like the Grid or the L.P.T.B. five years programme and the needs of trade-cycle planning, by weighing the social and economic advantages of immediate

construction against the somewhat uncertain advantages of greater stability of the system as a whole.

### *Public and Private Undertakings*

We have already seen that the whole electricity supply industry was subject to some investment control by the Electricity Commissioners and the Central Electricity Board, and we have also indicated that the operations of the C.E.B. affected considerably the investment of the industry in generating plant and in transmission lines. To trace these effects and to describe how the constructional activity of the supply industry was affected by the interaction of State control, industrial cycle, and the trend of demand for electricity is the task of this section.

To give an idea of the relative importance of the industry in the capital structure of the country it may be observed that the aggregate capital expenditure of all authorized undertakers up to the end of 1936–7 amounted to about £570 millions. That compares, for instance, with a net capital liability of all the railway companies of Great Britain (including the London electric railways) of about £1,200 millions or a total of the Post Office of about £150 millions. Most of the expenditure on the electricity supply systems was incurred after the War. From 1921 to 1936 capital expended by all authorized undertakers on extensions and improvements of the industry's equipment amounted to about £425 millions, far more than what the railways spent during the same period on capital account and not much less than the country's expenditure on the road system. Of the total increase in capital expenditure during the last fifteen years the C.E.B. accounted for about £55 millions, other public authorities for about £220 millions, and company undertakings for about £150 millions. Thus almost two-thirds of the total expansion was due to the publicly owned section of the industry.

The distribution of aggregate capital expenditure on the main types of assets is illustrated in the following table, which shows the growth and the relative proportion of various groups of assets at some representative dates.

*Distribution of Aggregate Capital Expenditure*

| | 1921–2 | | 1927–8 | | 1933–4 | | 1936–7 | |
|---|---|---|---|---|---|---|---|---|
| | £m. | per cent. | £m. | per cent. | £m. | per cent. | £m. | per cent. |
| Generation . | 66·36 | 46·2 | 111·41 | 41·4 | 146·14 | 31·3 | 163·48 | 28·7 |
| Main transmission | 4·13 | 2·9 | 13·78 | 5·1 | 46·07 | 9·9 | 57·28 | 10·0 |
| Distribution . | 61·43 | 42·8 | 110·21 | 41·0 | 219·75 | 47·1 | 273·36 | 48·0 |
| Other purposes*. | 11·79 | 8·1 | 33·60 | 12·5 | 54·25 | 11·7 | 75·63 | 13·3 |
| Total . . | 143·72 | 100·0 | 269·00 | 100·0 | 466·21 | 100·0 | 569·75 | 100·0 |

* Standard of frequency, apparatus on consumers' premises, other and miscellaneous expenditure.

It will be noticed that expenditure on generating plant grew least of all the series, and was not quite doubled, while that on transmission and distribution was more than quadrupled. At the beginning of the period total expenditure on generation exceeded that on distribution, at the time of the establishment of the C.E.B. the two classes of expenditure were almost equal. At the end of 1936, when the Grid was in full operation, expenditure on distribution exceeded that on generation by about 20 per cent., and accounted for almost half the total expenditure at that date, while the share of generation had fallen from 43 per cent. in 1921 to about 29 per cent. in 1936. That shows in a general way the economies achieved by the C.E.B. on the generation side and the growing significance of the less controllable investment in distribution equipment for any given increment of total investment. To discover the trade-cycle significance of these shifts we must turn to the movements of annual capital expenditure[1] and investigate differences in the investment

[1] The Annual Report (1922–3) of the Electricity Commissioners states: The aggregate capital expenditure on the undertaking should be regarded as meaning original capital expenditure (whether defrayed from loan or otherwise) on existing assets only, exclusive of any undischarged expenditure on (*a*) discarded assets, (*b*) deferred charges, and (*c*) consumers' installations and apparatus sold on hire purchase or deferred payments terms. The Commissioners add that they have no power to give a binding opinion as to the interpretation of the expression, but they concur in the views set out above which were expressed (on consultation) by the Institute of Municipal Treasurers and Accountants. The actual accounting practice differs, and it must be emphasized that the statistics of capital expenditure include expenditure on the acquisition of undertakings and of other existing assets such as land and buildings, which should be excluded for our purposes, but cannot be determined separately. Moreover, the figures represent, as occasional negative figures show, 'net'

behaviour of public authorities and private companies as well as the variations of the various divisions of expenditure.

Capital expenditure of all authorized undertakers (including the C.E.B.) rises in conformity with the reference cycle, from 1922 to 1925, and—if allowance is made for the break in 1926, caused by the general stoppage—right through to 1931. The total increase over the period of about 156 per cent. corresponds precisely to the increase in net sales for the same period and the agreement also holds good approximately for the two sub-periods 1922–5 and 1925–31. This close relationship between the rate of increase of demand and of investment was broken after 1931. Although consumption continued to grow, partly at an increasing rate (plus 37 per cent. from 1931 to 1934), capital expenditure not only ceased growing, but actually declined for three years to a point 22 per cent. below the 1931 figure. After 1934 capital investment expanded again (plus 21·5 per cent. from 1934 to 1936), but markedly less than consumption (plus 31·5 per cent.).

Yet, neither the 'good' Relation-effects of the earlier period nor the 'bad' ones of the later period are in themselves significant. For total investment from 1928 onwards was clearly influenced by the double effect of the C.E.B., namely its additional constructional activity and the capital economies derived from it. When we exclude the C.E.B. investment from the total the story becomes different. (See Table 53.)

The proportionate expansion of consumption and investment holds good between 1922 and 1925, and if we take the average investment of 1926 and 1927 as representative for the two years,[1] even between 1922 and 1928. Then it ceases to exist; investment declined in accordance with the general business cycle until 1933 (minus 26 per cent.) and rose steeply (plus 71 per cent.) with the general recovery.

expenditure, i.e. gross expenditure minus credits for sales or write-offs and displacements. The average expenditure on 'existing' assets and the average credits are probably small, but they may be of some importance in single years. Allowance should be made throughout this chapter for these undisclosed elements of expenditure.

[1] Work delayed through the general strike had to be made good in the following year.

General cyclical factors and possibly the off-setting effects of the C.E.B. activity seem to outweigh the trend factor of electricity consumption, and the disturbance of the Relation-effect appears about three years earlier than in the former case, where we included C.E.B. investment.

In order to explain this cyclical behaviour of the investment of the electricity supply industry, which contrasts with the uninterrupted growth of demand, we can, first of all, investigate the behaviour of public and private companies.

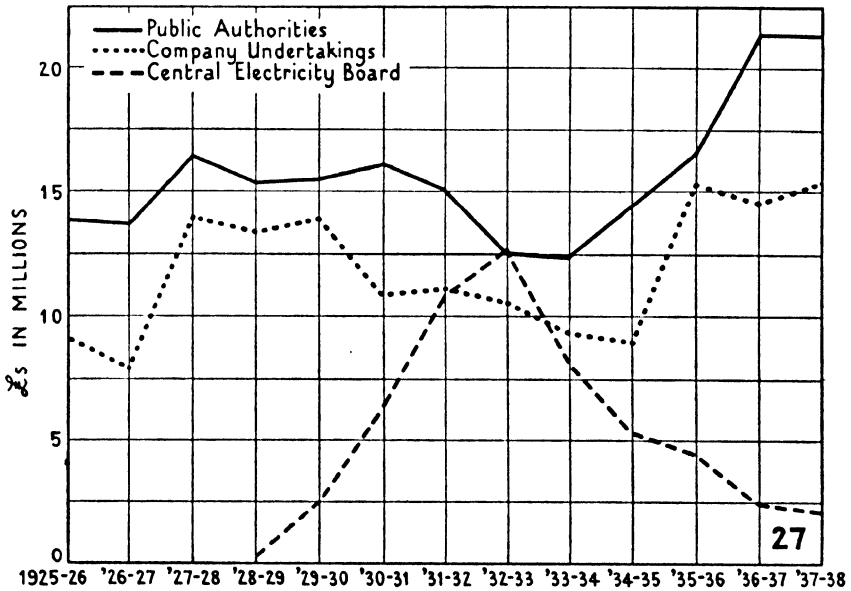



FIG. 27. Net Capital Expenditure of Electricity Supply Undertakings of Great Britain.

The investment policy of the two classes of undertakings differed notably. Investment of public authorities varied less than that of companies. Moreover, it declined a year later in the downswing after 1929 and rose a year earlier in the upswing after 1932 than that of company undertakings; and, finally, it fell less severely and rose more gradually than company investment between 1929 and 1937. The latter was hit severely by the depression and declined about 35 per cent. between 1929 and 1934, but reacted equally violently to the recovery (plus 70 per cent.). The reasons for the

different behaviour of the two groups are complex.[1] The different timing may be connected with the retarded effect of the general demand cycle on public revenue and expenditure, found in most of the expenditure series of local authorities. The earlier rise of public electricity investment may well have to do with the more urban nature of the local authority electricity areas and similar economic factors. The different intensity of variation might partly be due to the same factors. But the steadiness of public authority investment is notable in view of the 1931 economy circular, which actually excepted profitable trading services from restrictions but had discouraging effects in this field, too. On the whole, public undertakers seem to have taken a longer view and were probably in a better position to do so, because social reasons weighed more and immediate profitability less with them than with private companies; the subjective risk factor was also probably smaller for local authorities, administering a number of trading services and having taxation power, than for private undertakers, who were presumably affected by general business rather than by 'official' psychology. Whatever the reasons might be, the greater instability of company investment was (but need not be in future) one element in the situation.

The second and certainly more important element was the difference in the movements of the main divisions of investment (Table 54). It is clear from our analysis of the C.E.B. that we must expect a sharp reduction of investment in generating plant as a result of the construction of the Grid. In fact, capital expenditure of all undertakings on generation after moving at a level of about £7 millions between 1922 and 1925 and rising sharply to about £11 millions in 1927 and 1928 already began to decline in 1929. It was substantially reduced in each following year until 1934, when net additions to generating plant were less than £0·5 million. The fall in expenditure was more severe for plant and machinery than for land and buildings and applied equally to public authorities and companies. Moreover, these expenditure figures are fairly well confirmed by volume

[1] We assume here that Grid economies have affected both sections of the industry simultaneously and proportionately.

figures relating to the capacity (in kilowatts) of generating plant sanctioned for the main groups of undertakers by the Electric Commissioners (Table 56). The decline of investment in generation, lasting six years, coincided for the greater part with the industrial depression and the first stages

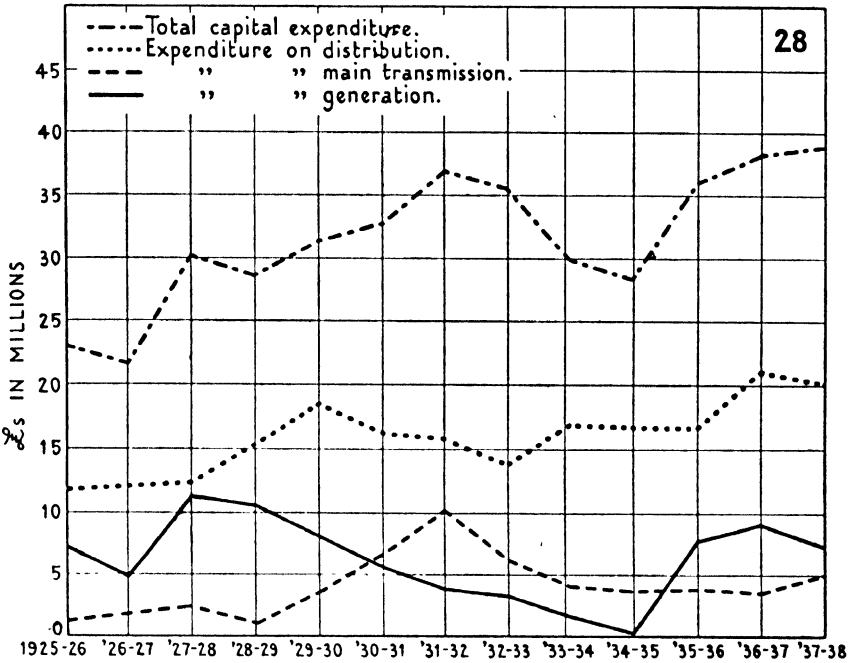



FIG. 28. Capital Expenditure of Authorized Electricity Supply Undertakings of Great Britain for Different Purposes.

of the recovery. Far more rapidly than it had contracted investment expanded again after 1934 and in 1936 already exceeded the 1929 figure. It thus intensified the existing expansionist forces of the later phase of the upswing.

The early and prolonged decline was, of course, largely the result of the Grid, which made it possible to meet the increased demand for electricity by bringing into active use a large proportion of the reserve generating plant. This improvement of the efficiency of the industry through a reduction of the necessary reserve ratio was clearly desirable, and it was just pure accident that these capital savings coincided with the general depression. Moreover, we have

already pointed out that this reduction was more than compensated by C.E.B. investment on transmission lines.

The main question is whether the C.E.B., which in conjunction with the Electric Commissioners, was primarily responsible for the planning of investment in generating plant, could have mitigated the decline, possibly by forgoing some of the savings of the Grid in the interest of trade-cycle stabilization. It could be argued that the C.E.B. in a natural endeavour to demonstrate the rationalizing value of its scheme went rather too far in this direction and not far enough in the direction of trade-cycle mitigation and advance planning. Viewed *ex post*, and judging from the sudden and drastic expansion to which the Board was forced when the industrial recovery gathered momentum after 1934, it has certainly expedited the economizing too much or too long and allowed unnecessarily large and destabilizing fluctuations of investment in generation. But it must be conceded that the Board could not completely foresee the effects of its own policy on the demand for electricity and had to base its estimates of future requirements largely on the demand trend of the past. Nor could it foresee the strength of the industrial revival and the exogenous factors which intensified the recovery. Finally, ordinary caution compelled it to keep on the low side in estimating and anticipating future requirements. One must, therefore, expect that some reflection of a strong recovery would show itself even in anti-cyclically planned investment. *Ex ante*—and that is how investment decisions must be taken—there are these obstacles to advance planning, and they must be carried to the credit side of the Board. Still, some doubts remain whether the Board has not overstressed its economy policy at the expense of appropriate and *ex ante* advance planning.

Investment in generating plant is almost completely controlled by public or semi-public institutions. Investment in distribution plant and equipment is hardly subject to State regulations and at the same time less amenable to trade-cycle control. It offers less opportunities for advance investment or deliberate postponements, because local demand is less predictable than national demand and depends very much on unplanned housing developments or the fate and

prospects of local industries. On the other hand, investment in distribution was less affected by Grid operations, at least by their capital savings aspects. It was, therefore, determined mainly by the trend growth of demand and by trade-cycle factors.

Total capital expenditure on distribution was, in fact, very closely related to the general business cycle. Expenditure of all authorized undertakers rose (by about 40 per cent.) during the recovery 1927 to 1929, fell (by about 25 per cent.) for the three years of the subsequent depression, and re-expanded to a high level in the recovery period after 1932. The correlation of distribution investment with the general cycle was almost too good, in view of the uninterrupted rise in demand and, on a closer scrutiny, seems less significant than at first sight. In any case the main subdivisions, shown in Table 54, do not confirm its cyclical character. Expenditure on 'Mains and Services', usually accounting for over two-thirds of the total, showed no distinct cyclical pattern at all and could rather be described as anti-cyclical; the figures were higher, on the average, for the three depression years than in the three preceding and following upswing years. Expenditure on distribution, plant, and machinery, or on land and buildings, reflected the depression 1930–2, but both series rose as early as 1932. The totals were apparently considerably affected by the fluctuations in 'Other Expenditure', which showed large additions in some years and considerable withdrawals of capital[1] in other years without any recognizable regularity. It is the sum of these very different and non-cyclical movements which brings about the appearance of a cycle in total distribution expenditure. The total net expenditure of local authorities tended to fall during the depression, while that on companies after a drop in 1930 tended to rise. By contrast, expenditure on 'Mains and Services' moved on a high level during the 1930–2 depression in the case of public authorities, but was not quite maintained in the case of company undertakings. Both groups increased, however, their expenditure in the following upswing.

There is one factor closely connected with the development of the distributive systems which showed the distinct

[1] Through sales, write-offs, &c.

trend which one might have expected for distribution investment as a whole, that is, expenditure on apparatus on consumers' premises. But for an isolated peak in 1932 this investment rose gradually year by year from 1928 to 1937, steadily in the case of local authorities, more fluctuatingly in the case of companies. This trend rise in outlay on consumers' apparatus indicates at the same time one of the reasons why distribution equipment did not grow with the expansion of consumption. The increased use of electrical appliances raised the consumption per head and required relatively little additional outlay on distribution. The same applied to a minor extent to the increase in the number of consumers, when only modest extensions were needed to connect more consumers to the same main.

We need not comment here on the expenditure on main transmission lines and standardization of frequency. Both were mainly determined by the activities of the C.E.B., which have already been discussed.

But it seems convenient to mention another cross-section of the investment of the electricity supply undertakings. Table 53 distinguishes between expenditure (*a*) on land, buildings, and other permanent works, (*b*) on plant and machinery, and (*c*) on transmission (main and distribution lines). It will be noted that the largest item, the construction of transmission lines, varied relatively least and was well maintained during the two depression years 1930 and 1931; it also expanded moderately until 1935, and increased considerably in 1936. Investment in plant and machinery (for generation and distribution purposes) fluctuated rather violently, but not in close correlation with general business activity, while expenditure on land and buildings declined fairly steadily from 1929 to 1934 and showed high levels from 1927 to 1929 and from 1935 to 1936. The available statistical data do not permit us to eliminate the purchase of land and existing buildings, which do not constitute 'effective' or employment creating payments, from the sub-total. But the Electricity Commissioners return the allocation of loans sanctioned by them to different purposes and distinguish between purchases of land and buildings and building work. This statement (see Table 55) makes it clear that

purchases of site and buildings absorbed a very varying proportion (between 0·5 and 3 per cent.) of the annual loans sanctioned to public authorities, but that over the period 1923 to 1936 the amount is less than 1 per cent. of the total and about one-ninth of land and buildings together.

If we assume that expenditure on transmission involves mainly civil engineering work and add to it expenditure on buildings, it becomes clear that more than half of the constructional work of the electricity supply industry consisted of building and civil engineering works, and, further, that almost 40 per cent. was spent, on the average, on engineering works, i.e. plant and machinery, meter instruments, and apparatus. The remainder went to purchases of existing assets (including purchases of existing undertakings).

Before we sum up, it seems practicable to consider briefly the industry's revenue expenditure on works (Table 57). Total maintenance expenditure of public authorities and companies was in 1936 of the order of £12 millions, excluding maintenance expenditure on the Grid, which is not shown separately in the accounts of the C.E.B. In relation to the total capital sunk into the industry the maintenance expenditure is not very big; but most of the investment was undertaken in recent years and will come up for major repairs and replacements later. Maintenance works have already increased in the past; they were more than doubled between 1924 and 1936.

As is to be expected, they move far more steadily than capital expenditure and show in fact an almost uninterrupted growth. The rate of increase slowed down visibly during the depression; but only public authorities returned an absolute decline in the year following the economy campaign and very likely as a result of it. It is also notable that the rate of growth increased with the upswing.

More than half, and in later years about two-thirds of the total was devoted to maintaining the transmission and distribution system (including meters, apparatus, &c., which showed a particularly steep rise for the years for which they are returned separately). The trend rise of this kind of maintenance work was solely responsible for the expansion of the total. Revenue expenditure on generating plant and

equipment showed no definite trend at all and kept an average level of about £2 millions per annum from 1924 to 1936. It is obvious that this was again due to the capital-saving effects of group working which made it possible to displace some of the generating plant. A slight recession in generation maintenance from 1930 to 1932–3 and the subsequent acceleration might be explainable in the same way as the parallel investment of capital expenditure on generating plant.

Whether and to what extent the industry could not only maintain a steady rate of maintenance expenditure, but above that adjust it inversely to the trade cycle is difficult to say. There would seem to be some scope for such an attempt in the field of generation, where advance planning and postponements appear to be easier, while in the field of distribution much more depends on the actual and unpostponable demand of consumers for alterations and repairs. Still, work on mains and services might also be amenable to trade-cycle regulation, and it is clearly desirable that appropriate steps should be taken to adjust maintenance finance by an appropriate reserve policy and by shifting as much as possible from good times to bad times.

We must now draw the moral from the whole story of electricity investment between the wars. Three main factors determined the course of investment: the continuous expansion of demand, which in itself should have secured a certain stability of electricity investment, particularly since the growth of consumption was to some extent predictable; the construction of the Grid, which involved an enormous expansion of investment and coincided accidentally with the slump of 1930–2; and the effects of Grid operation which, on the one hand, greatly stimulated consumption and, on the other hand, enabled the industry to derive considerable economies in capital investment. As a result of the interaction of these forces the rise of investment activity which was apparent from 1922 to 1929 continued through the following depression. But in the early stages of the recovery, when Grid construction was nearing completion, the capital-saving effects began to outweigh the capital-creating effects of the reorganization scheme. These economies resulted

mainly in the field of generation, whereas expenditure on transmission and distribution was rising under the influence of main-line constructions and was well maintained afterwards.

For the same reasons investment in plant and machinery and on land and buildings fluctuated more violently than that in transmissions, mains, and services. We saw further that public authorities were able, in spite of discouragements by the central authority, to pursue a steadier investment policy than company undertakings.

Now, what can we expect on the basis of this experience to be the place of electricity investment in future trade-cycle regulations? It is fairly obvious that many of the factors operating in the past will not be operating with equal strength in the same direction in future. The construction of the Grid and the additional investment it provided for the depression was a single task, which cannot be repeated on a similar scale in future. On the other hand, the reduction in the capacity to be held and the capital savings effected by bringing into use large proportions of this reserve capacity can equally be achieved only once. The system has now reached a reserve ratio of about 15 per cent., which is regarded as normally necessary under conditions of group working. In future any increase in demand must again be fully met by proportionate additions to generating capacity. That should offer some scope for future public works policy, particularly because the C.E.B. has now power to plan extensions in generating capacity for the country as a whole and is therefore in a far better position to indulge in advance planning than the independent local undertakers of former times.

Investment in transmission seems to be less suitable for central planning and trade-cycle adjustment. But a greater trade-cycle consciousness on the part at least of local authorities in conjunction with some encouragement by the central government could perhaps make that part of distribution investment, which does not depend directly on the short-term variations of consumers' demand, move inversely or at least not parallel to the general cycle. Moreover, it is a widespread belief, supported by the findings of the McGowan Committee, that there is a definite scope for rationalization

of the distribution side of electricity. Such a reorganization would certainly require some initial capital outlay before the benefits of better co-ordination could be reaped, and it would be well to have such a scheme prepared and set in motion at the onset of a future depression.

The expansion of the industry and hence the amount of investment which can be mobilized in depression times will ultimately depend, of course, on the trend of consumption. No certain forecasts can be made about this, but it seems fairly certain that a saturation point is not yet in sight. It has been estimated,[1] for instance, that the potential number of consumers in this country is probably not far short of 15 millions, so that the total already connected is only just over half the possible number. Moreover, consumption per head is capable of being increased by extended use of domestic appliances and still more by the spread of electricity for industrial purposes. Modern technical processes in the metal and chemical industries depend essentially on the use of electricity, and the adaptability of the electric motor to large-scale and small-scale production is likely to spread its use further. Coupled with a continuous reduction of electricity charges and the development of rural areas, if necessary by means of initial State assistance, these general technical tendencies should open to the electricity supply industry wide new fields of expansion. If the prospects of the future growth of the industry are favourable, the industry should be particularly able to practise trade-cycle planning in future and to contribute its share to the mitigation of industrial fluctuations.

## III. Assistance to Other Semi-public or Private Investment

State assistance to railway investment and the organization of the electricity supply system on a national scale are the two most important examples of State help towards industrial investment. Miscellaneous other cases which have been of minor importance but have attracted a certain amount of attention or might attain greater significance in the future will be discussed in this section. State-assisted shipbuilding,

[1] *P.E.P. Report*, l.c.

though analogous to other assistance schemes, has some interesting features of its own. The significance of forestry work for employment creation and of the investment activity of the broadcasting services and of civil aviation cannot be entirely neglected.

(*a*) *State Assistance to Shipbuilding.*

Financial assistance to shipbuilding was granted under the British Shipping (Assistance) Acts of 1935 and 1939. These assisted building schemes must be distinguished from other aids to British shipping which are given in various ways and on varying scales throughout the period. Operational subsidies, protectionist measures, or preferential treatment of British shipping did undoubtedly affect the shipbuilding industry. Ships were kept trading which otherwise might have been laid up or scrapped; and repairs and replacements of these ships had to be carried out. There is, however, no way to determine the actual effect of State assistance to shipping on shipbuilding work.

The second part of the British Shipping (Assistance) Act, 1935, usually known as 'The Scrap and Build Scheme', provided financial assistance to British ship-owners to build new tonnage or to modernize existing tonnage on condition that two tons were scrapped for every new ton built and one ton scrapped for every ton modernized. The owners were allowed to buy ships for scrapping from foreign owners as well as to scrap British ships. The Board of Trade was empowered to assist such building of cargo vessels by making advances bearing interest at a rate not exceeding 3 per cent. per annum and repayable within a period of twelve years by equal instalments covering capital and interest. But the borrower was entitled to defer payments for the first two years and to spread the repayment, with interest, over the remainder of the twelve years' period. The loan was to be secured by a first mortgage on the ship. The maximum limit of advances was fixed at £10 millions: that is, approximately the cost of building 1,000,000 dead-weight tons of modern cargo ships.

The Ships Replacement Committee considered 74 applications for assistance, covering proposals for the building of

95 vessels aggregating 334,794 gross tons. The estimated cost was £6·46 millions, of which the applicants wanted to borrow £6·23 millions. After rejections (about 25 per cent. of the proposed gross tonnage) and withdrawals by applicants (about 15 per cent.) 37 applications covering the construction of 50 ships of about 186,000 tons gross were finally approved and built. The total estimated cost of these ships was £3·66 millions and the total of advances approved was £3·55 millions.[1]

In connexion with this new building 97 ships of 386,625 tons gross were nominated for demolition. No applications at all were received for the modernization of existing vessels.

The actual construction came only to about a third of the provisions made available under the scrap-and-build scheme and fell short of expectations. The reason was, apparently, that the scheme had been introduced two or three years too late. As it was, shipbuilding, freight, and shipping were already recovering in 1935 and still more in 1936. As a result the scarcity of scrap tonnage has been throughout a principal difficulty in the way of the scheme. Only 6 of the 97 ships selected for scrapping belonged to the applicant companies. The majority of applicants had to buy in the open market the scrap tonnage they required at a premium. This became increasingly heavy as time went on, so that early in 1936 an increasing number of over-aged ships were nominated for demolition which, in the Commission's view, had no real competitive value. Later in 1936 it became practically impossible to secure suitable tonnage for scrapping. Moreover, the original provision of the scheme that all ships under the scheme should be broken up in this country had to be abandoned. The condition was consequently modified. At first up to 50 per cent. of the scrap tonnage could be broken up abroad, and later all restrictions were removed. Of the 374,707 tons nominated for demolition only 204,103 were scrapped in the United Kingdom and 170,604 abroad.[2]

This shortage of scrap tonnage was a clear sign of the

[1] *Report of the Ships Replacement Committee*, 1937 (Cmd. 5459).

[2] About 12,000 tons to be demolished had not yet been disposed of at the time of the Replacement Committee's Report (March 1937).

wrong timing of the scheme. Most of the ships built under the scheme were commenced in 1936, at a time when rising freight rates produced a natural growth of mercantile building, and increased warship construction was already providing an artificial stimulus; as a result the price of a new 7,500-ton cargo steamer rose by 20 per cent. between 1934 and 1936.[1] But though the subsidy was ill timed from a trade-cycle aspect, it may have been useful to the shipping industry and to the shipbuilder. It increased the efficiency of the fleet as a whole, and supported the shipbuilding industry, which even at the peak of 1936–7 shipbuilding boom was far from being employed to full capacity.

The special advantages of a scrap-and-build scheme as an instrument of trade-cycle policy, which have largely been missed through the unsuitable timing of the scheme, are obvious. First, most of the public works schemes, and particularly State-assisted private schemes, depend on the expected growth of demand which they are to serve, while scrap-and-build programmes can be carried out even when demand for a particular service is expected to remain stationary or to fall. They are a means of increasing efficiency without increasing capacity. They seem to be particularly suitable for a declining or stagnating industry and for preventing or removing a sectional excess capacity. Secondly, these schemes have a particularly high employment value, because they couple State-assisted new building with the work of demolition and may be said thus to generate automatically tertiary effects. Thirdly, they are another instance[2] of a form of government assistance which places at the disposal of private industries the benefit of cheaper government credit without necessarily involving any charge to the taxpayer. Such guarantees of the capital costs of private construction may be particularly useful when general psychological conditions make a drastic increase in public expenditure difficult. Finally, if combined with the idea of a sliding scale, stipulated in the Tramp Subsidy, the scrap-and-build scheme could be made a semi-automatic instru-

[1] According to 'Fairplay', quoted from the *Economist*, February 1938.

[2] Similar Treasury Loan guarantees were offered to railway companies, the L.P.T.B., and the C.E.B.

ment of public works policy. If, for example, the conditions of subsidy were varied inversely to the tonnage laid up[1] in the United Kingdom, the lengthy process of *ad hoc* legislation and inequalities, which temporary assistance nearly always imply, could be avoided, and the danger of ill timing be considerably reduced.

The 1939 scheme contrasted in many respects with that of 1936. To loan guarantees were added capital grants, the scrap programme was replaced by a lay-up programme, the timing was clearly determined by political rather than by economic reasons, and assistance and effects were far greater than those of the old scheme. The Bill provided that any contract for cargo liner, tramp, or coastal vessel entered into after 28 March 1939 could qualify for loan. The total amount was limited to £10 millions, and the period during which it would be available to two years. In addition the sum of half a million pounds was to be available for five years for the construction of certain types of ships most needed in war time, provided that the freight index for the four years 1940–4 was, on the average, less than 120 (base 1929). Further, the Government had announced its intention to form a reserve of merchant ships to be operated in any emergency on government account and to be maintained in a state in which they could put to sea at short notice; and it provided for this purpose the sum of £2·1 millions for the fiscal year 1939. In conjunction with the renewal and increase of the tramp subsidy these big plans produced the immediate effect which was explicitly desired. The rush of new orders was so great that one month after the opening of the scheme it was necessary to suspend acceptance of any fresh applications and to indicate that the rate of grant would have to be scaled down if the orders received would entail a subsidy exceeding the total of half a million pounds at standard rates.[2] Orders were placed during that month for 37 cargo liners with a total gross tonnage of 210,000 and for

[1] By private owners, of course, not by the State schemes of 1939.

[2] Since full particulars of the rates of grants are not yet available, the total value of orders likely to be produced by the annual grants of half a million pounds cannot be estimated. The maximum rates of grant per gross ton would be: for coal-burning or dual-fired cargo liners 16*s.* 6*d.*, other cargo liners 15*s.* 0*d.*, coal or dual-fired tramp ships 11*s.* 0*d.*, other tramp ships 10*s.* 0*d.*

110 tramps with a tonnage of 495,000; another 300,000 tons of proposed building were notified, bringing the total to over 1 million tons.

This quick response to the scheme contrasts with the slow progress under the scrap-and-build scheme and indicates that moderate State assistance and proper timing may produce considerable effects within a fairly short time. The new feature of capital grants may have been partly responsible for this quick reaction. They were clearly more expensive from the point of view of the Exchequer, but they may be a more powerful instrument than loans to maintain a certain level of construction during a depression, and they can be more easily applied on a sliding scale. On the other hand, capital grants are more liable to be curtailed in times of depression unless they can be paid out of borrowed money. As revenue payments they constitute a mere transfer of income, but in contrast to many other income transfers they generate 'tertiary effects'.

The 1939 scheme, which implemented the peace-time programme of assistance drawn up by the shipowners themselves, was certainly effective. Whether it represents the best solution of the British shipping problem under peace conditions is a different question. An attempt to maintain the shipbuilding industry through subsidies at a level inconsistent with the long-term demand for ships might well prove to be very expensive. Nor is it certain that subsidies are the best way of promoting the prosperity of the industry, for they may even hinder desirable adjustments and co-ordination. Still, it is evident that State assistance may produce considerable investment effects in the shipbuilding industry without unduly taxing the budget and may be usefully applied in time of depression, particularly if it is linked with reorganization measures.

(*b*) *The Forestry Commission.*

Expenditure on forestry work is in itself a rather small item which would hardly deserve separate investigation but for the fact that forestry operations have often been considered as a particularly cheap way of re-employing workers by public expenditure and that forestry works in this country

have been carried out according to a predetermined long-range plan.

One might expect that the existence of such a plan would have a stabilizing effect during depression times and that acceleration or retardation of the programme might serve as an instrument of public works policy. Actually these hopes have not been realized. The Government of the day did not adhere to the original programme under the pressure of the severe 1931 depression, and cut down the grants severely (Table 58). And the Forestry Commission has made it quite clear that forestry operations were by their very nature not capable of responding to sudden and short-term variations in the scope of works. As a preliminary step to expansion an increased stock of nursery plants must be provided—a process which takes up the greater part of a three years depression, and the acquisition of suitable land involves lengthy negotiations which cannot be speeded up at will. Even if land is bought in advance and retained in an unused condition it may take many years before the farm tenancies will be terminated. The length of the preparatory period in relation to the duration of the upward or downward phase of the cycle is too great to allow of suitable variations of activity and makes a steady trend-like development preferable. In any case, forestry operations on the present scale are too small to exercise any noticeable influence on employment, as is shown by the employment data in Table 58. To undertake them on a much larger scale would, however, raise questions of labour supply, for the kind and place of work are usually not suitable for unemployed industrial workers, or attractive to them.

Between 1927 and 1935, when effective expenditure moved around a level of, say, about £500,000 to £600,000 a year, the Commission employed about 3,000 to 3,500 manual workers. Or to put it in our usual way, £1 million spent on forestry works—excluding land costs—employed on the average 6,000 to 7,000 workers on the spot, or about 4,000 to 6,000 workers if we include land costs. That is an exceptionally high direct employment, which is hardly matched even by work on recreation grounds or cheap kinds of relief work. But, as in these cases, direct employment is practically

equivalent to total primary employment. Even so, the primary employment value of forestry operations exceeds considerably that of an average kind of capital work which we estimated at about 4,000 men a year. This difference in favour of forestry works is obviously due mainly to the absence of profits on the primary stage, lower average income per worker, and lower leakages through imports.

But quite apart from the fact that forestry expenditure has been financed from revenue, and therefore is not additional, there are other offsetting factors which tend to reduce its net employment value. Land taken over by the Forestry Commissions is usually not completely waste land but has been used for other purposes, mostly sheep farming. Forestry work is, therefore, partly a substitution for other employment which might have gone on but for the land acquisition of the Commission. In fact, it has been argued that as many or more workers are displaced from the sheep farm as are re-employed after the forests have been established, though afforestation may give greater employment temporarily during the process of establishing the forest.[1] Incidentally this substitution means that largely self-supporting employment is replaced by employment which depends largely on subsidies. These offsets must be taken into account when assessing the net employment value of forestry operations in the short run as well as in the long run when employment is mainly needed for maintenance.

This partly substitutional nature of forestry work, in conjunction with its inelasticity to sudden changes in the scope of operations and its localized effects, makes it rather unsuitable to relieve cyclical and particularly urban unemployment. It may be helpful in curing part of the 'structural' unemployment where it is necessary to secure permanent transfer and re-employment of workers, e.g. in the Special Areas. On the other hand, it is clearly undesirable from the point of view both of forest policy and public works policy

[1] In the case of labour-saving technical improvements, such as the 'Grid' or railway electrification, a similar question arises: the improved equipment will provide less employment, though an increased employment will result during the period of construction.

to cut down an afforestation programme in depression times, as happened in 1931, and to speed it up when revenue is flowing more abundantly. Public works policy may certainly attempt to prevent this maladjustment to the trade cycle and to maintain at least the planned rate of planting or even to accelerate it somewhat in bad times, preferably by borrowings or by using up accumulated reserves. This seems to be the chief way in which forestry works can be made to serve the ends of trade-cycle policy.

(*c*) *The British Broadcasting Corporation and Imperial Airways.*

In spite of the remarkable expansion and the rapid technical development of broadcasting, television, and civil aviation which have taken place, the annual gross investment of the British Broadcasting Corporation and Imperial Airways Ltd. has been comparatively small.[1] During the first decade of its existence (established by Royal Charter in December 1926) the B.B.C. has added £3·22 millions to its capital, almost two-thirds thereof in land and buildings (£1·98 millions), the remainder in plants, instruments, furniture, &c.[2] If we exclude the heavy expenditure on sites and leasehold interests the average expenditure on newly produced assets was certainly less than £300,000 a year and expenditure on new plant was of the order of £100,000 to £200,000. 'Maintenance' expenditure on plant, power, &c., has steadily risen since the formation of the Corporation and was about £500,000 in 1936.

Constructional work of Imperial Airways Ltd. seems to have been of a size similar to that of the B.B.C. Imperial Airways used to be a private concern receiving general operational and special mail subsidies and was subject to a certain amount of public control. In 1939 the company was merged with another subsidized company, the British Overseas Airways Corporation. Our reference period covers only the phase preceding the merger.

[1] See Table 58.

[2] About £2·18 millions was appropriated from Revenue Account, the balance was supplied by utilizing depreciation reserves for capital expenditure. Up to 1937 capital expenditure on Television Fixed Assets amounted to £137,485.

During this period the company's net additions to capital[1] fluctuated violently and in no regular way. Figures and reports indicate a rather loose connexion between subsidy policy and constructional activity. But the view expressed by the Committee of Inquiry into Civil Aviation,[2] that general subsidies do not sufficiently promote aircraft development and production, found general recognition. As a remedy the Committee proposed among other things that State assistance should be afforded to encourage the production of suitable types and also to meet the cost of the jigs and tools necessary for the production of the aircraft of each design.[3] Subsidized companies should with the aid of special grants keep their fleets equipped with new aircraft, before the normal obsolescence period has expired. Although made before the combination of the two companies, these suggestions apply fully to the B.O.A. Corporation and express a principle which may be capable of making subsidies in other fields less defective and more amenable to trade-cycle regulations.

The disparity between the remarkable growth of broadcasting and civil aviation and the smallness of the capital outlay of the two corporations becomes evident if one compares, for instance, the outlay on broadcasting with that on telephone development or the capital expenditure of Imperial Airways with that of trolley-buses. One of the reasons is, of course, that these new services need not incur much expenditure on lines or other ground equipment. The ground organization for air services is provided by public authorities, and the B.B.C.'s semi-public investment is supplemented by private investment in the radio industry and in wireless receivers. Taken absolutely the equipment

[1] In order to get the annual gross expenditure on constructional works the net additions to aircraft & plant should be corrected for payments on work in progress made on these aircraft in previous years, and amounts written off should be added back. The published accounts do not allow us to disentangle this, and the figures given in Table 58 are, therefore, not entirely significant for the annual movements of the company's constructional expenditure, though they might be taken as representing on the average a plausible order of magnitude. No figures at all are given for expenditure on replacements and repairs.

[2] Cmd. 5686, p. 8.

[3] Recoverable in part or entirely in the event of the aircraft being commercially successful.

of the new services is comparatively inexpensive. The costs of a regional station, for instance, have been estimated at £140,000, and the costs of a modern flying-boat are perhaps of the order of £50,000. Even perfect anti-cyclical investment, e.g. the construction of an additional two-transmitter station or of a dozen flying-boats in depression times, would thus not markedly relieve cyclical unemployment.

# VI

## THE EFFECTS OF CAPITAL EXPENDITURE ON EMPLOYMENT: PRIMARY EFFECTS

WE shall attempt in this chapter to estimate the effects on employment of capital expenditure by local authorities. The methods which we use here could in principle be applied to any expenditure on constructional works by public authorities; but owing to the lack of completeness and uniformity in the statistical material available in other parts of the field, we have not attempted this extensive task.

The expenditure of a given sum of money causes a certain number of men to be employed for a certain period of time. It is usual to speak of the 'employment caused', and to measure it in terms of 'man-years'. Employment is caused in two or three distinct ways. That part of the initial expenditure which goes into wage and salary payments, whether directly at the first stage as the labour cost of the scheme, or indirectly at later stages as the labour costs of the industries which produce the materials used, causes Primary Employment, Direct and Indirect. The *spending* of these primary wages and salaries, and of primary profits, causes a demand for consumption goods, and hence further employment. This we call Secondary Employment. Moreover, both the primary and the secondary expenditure may sometimes make necessary additions to capital equipment or to stocks of goods in process of production, and may thus be another cause of further employment. This we call Tertiary Employment.

The discussion of secondary and tertiary effects is reserved for the next chapter. For the moment, we are concerned with an estimate of primary effects only.

### I. The Split-up of Constructional Expenditure

The first problem is to discover how much of an initial expenditure of, let us say, £1 million found its way into the pockets of wage and salary earners and caused primary employment under pre-War conditions.

A typical expenditure on capital works may be divided at the first stage as follows:

(*a*) Purchase of land and payments for compensation, &c.
(*b*) Legal costs and architects' charges.
(*c*) Wages and salaries, including National Health and Unemployment Insurance charges, and contributions to pension and superannuation funds.
(*d*) Costs of materials, including haulage and tools.
(*e*) If the work is done by contract instead of by direct labour, profits of contractors.

Of these, (*a*) causes no primary employment, though it may produce some secondary employment if it is spent by the recipient. (*b*) represents no doubt some additional employment for lawyers and architects and their staffs; but it does not occur in the unskilled labour groups where the main body of unemployment usually exists, and is anyhow small enough to be neglected. (*e*), contractors' profits, also does not represent primary employment in any statistical sense. (*c*), labour costs, are the direct payments to labour on the site, and represent the *primary direct* employment caused.

(*d*), costs of materials, may be subdivided again into labour costs, profits and other non-effectives, and cost of materials, according to the productivity functions of the industries which produced the materials used on the site. The wage-payments and the non-effectives at this second stage are simply added to their respective factors at the first stage. The cost of materials splits up again into labour costs, non-effectives, and cost of materials; and so again, the residual item, 'materials', rapidly decreases at each stage. It finally disappears in the extractive industries, after which its cost is merely a royalty or rent payment which is a non-effective from the point of view of primary employment.[1]

For the first, or 'direct', stage, as will be shown later, we have in some cases special information about the division of expenditure in various kinds of public works. But where such information is lacking, and for the second stage, we can make use of distribution ratios for the appropriate

[1] The whole process may be expressed in this way (see opposite):

industry derived from the Census of Production, 1930; and for the third and all subsequent stages we can use likewise general ratios for the whole of the constructional industries. According to the Census of Production, the

| *Wages* | *Profits and other non-effectives* | *Materials* |
|---|---|---|
| At the first stage let the ratios be | | |
| $w_1$ | $p_1$ | $m_1$ |
| where $w_1+p_1+m_1 = 1$. | | |
| At the second stage let the ratios be | | |
| $w_2$ | $p_2$ | $m_2$ |
| where $w_2+p_2+m_2 = 1$ again. | | |
| Then $m_1$ splits up into | | |
| $m_1 w_2$ | $m_1 p_2$ | $m_1 m_2$ |
| and similarly, $m_1 m_2$ into | | |
| $m_1 m_2 w_3$ | $m_1 m_2 p_3$ | $m_1 m_2 m_3$ |
| At the $r^{\text{th}}$ stage we have | | |
| $m_1 \ldots m_{r-1} w_r$ | $m_1 m_2 m_3 \ldots m_{r-1} p_r$ | $m_1 m_2 m_3 \ldots m_{r-1} m_r$ |
| and finally we have then | | |
| wage payments are | $\sum (w_1+m_1 w_2+m_1 m_2 w_3 \ldots)$, | |
| profits | $\sum (p_1+m_1 p_2+m_1 m_2 p_3)$ | |

This is the complete theoretical 'set-up' of the process, but certain simplifications are necessary. While it is within certain limits possible to determine in detail the ratios at the first, and in some cases at the second stage, beyond that, since the 'materials' are drawn from the whole range of the capital goods industries, no further detailed separate figures are possible. But little inaccuracy is likely to be introduced if we use, for the third and all subsequent stages, proportions determined from an average of all the capital goods industries, weighted according to their Gross Output figures. Let us call these figures $w$, $p$, $m$, without suffix. Then we have

$$\text{wages} = w_1+m_1 w_2+\frac{m_1 m_2 w}{1-m},$$

$$\text{profits, etc.,} = p_1+m_1 p_2+\frac{m_1 m_2 p}{1-m}.$$

Or, since as before $m+w+p = 1$,

$$\text{wages} = w_1+m_1 w_2+\frac{m_1 m_2 w}{w+p},$$

$$\text{profits} = p_1+m_1 p_2+\frac{m_1 m_2 p}{w+p}.$$

$$\text{Adding, we get wages+profits} = w_1+p_1+m_1(w_2+p_2)+\frac{m_1 m_2(w+p)}{(w+p)}$$

$$= w_1+p_1+m_1(1-m_2)+m_1 m_2$$

$$= 1$$

percentage division of the value of gross output in the main constructional industries was as follows:

*The General Ratios*

(*percentage of gross output of firms which returned details of wages*)

| *Industry* | *Materials* | *Wages, &c.* | *Profits* |
|---|---|---|---|
| Building and contracting | 51·5 | 36·5 | 12·0 |
| Engineering | 50·0 | 35·0 | 15·0 |
| Building material | 36·6 | 46·5 | 16·7 |
| Iron and steel | 61·3 | 29·4 | 9·3 |
| Other mines and quarries | 20·0 | 55·0 | 25·0 |
| TOTAL (weighted average) | 51·5 | 35·1 | 13·4 |

Thus after the second stage we can always divide the remaining 'materials' in the ratio wages 35·1, profits and other non-effectives 13·4.

But two corrections may have to be made to this approach. First, at every stage a certain proportion of 'materials' will be imported and will not provide employment in this country. Again, at the first stage it is sometimes possible to obtain direct figures for the proportion of imported materials used; but in general we are thrown back upon an indirect estimate, based on a calculation of the ratio $i$ of the annual increments of imports destined for the capital goods industries to the increment of total output of the capital goods industries. This may be obtained as follows:

*Calculation of 'i'*

| *Year* | *1929* | *1930* | *1931* | *1932* | *1933* | *1934* | *1935* | *1936* |
|---|---|---|---|---|---|---|---|---|
| Gross fixed investment* | 623 | 607 | 560 | 526 | 556 | 619 | 662 | 690 |
| Exports of the products of the capital goods industries† | 217 | 184 | 109 | 98 | 106 | 120 | 130 | 142 |
| Corrected F.O.B.‡ | 204 | 173 | 102 | 92 | 99 | 113 | 122 | 134 |
| Total [output of capital goods] | 827 | 780 | 662 | 618 | 655 | 732 | 784 | 824 |
| Imports destined for the capital goods industry† | 166 | 140 | 102 | 71 | 72 | 104 | 105 | 122 |

* From C. G. Clark, *National Income and Outlay*.

† The items included in exports are: glass plate and sheet, iron and steel products, railway materials, brass, copper, nickel and tin products, implements and tools, electrical goods, machinery, painters' colours, vehicles, ships and arms as given in the *Statistical Abstract*.

Imports are: asphalt and bitumen, iron, copper, manganese and tin ores, timber excepting pit props, rubber, pig iron and other forms of semi-manufactured steel, iron, aluminium, copper, lead, nickel, tin, and zinc; electrical goods, machinery, manufactured wood and timber, painters' colours, and vehicle parts.

‡ See London and Cambridge memorandum: 96 per cent. of gross value.

If we construct a scatter-diagram of Total Output of Capital Goods against Imports, we have for the slope of the line,

| | |
|---|---|
| 1929, 1930, 1931 . . . . | 0·362 |
| 1932–6 . . . . . | 0·253 |

which represent the marginal values of the import ratio. The lower value after 1931 must be mainly due to the change in tariff policy.

Our final general ratios for the constructional industries therefore are:

| *Wages and Salaries* | *Profits* | *Imports* |
|---|---|---|
| 54·13 | 20·57 | 25·30 |

Second, there is the possibility that an increased consumption of materials at one stage may be met by a reduction of stocks, which may not be immediately, or ever, replaced. But the statistical materials available do not allow us to make any allowance for this; and our calculations of the amount of employment caused have to be based on the assumption that stocks were always fully and rapidly replaced.

We can now turn to the special distribution ratios applicable to particular objects of capital expenditure by local authorities.

*Building.*

In this case it is possible to calculate a more accurate import ratio by taking the values of building output and of imports for building industry, as follows:

(*£ millions*)

| | *1931* | *1932* | *1933* | *1934* | *1935* | *1936* | *1937* |
|---|---|---|---|---|---|---|---|
| Building output (Colin Clark: adjusted) | 236 | 230 | 252 | 296 | 317 | | |
| Imports for the building industry (net): | | | | | | | |
| Timber . . . | 20·5 | 25·3 | 32·2 | 28·3 | 35·9 | 47·0 | |
| Other . . . . | 6·3 | 8·0 | 10·1 | 10·5 | 10·1 | 12·9 | |
| Total . . . . | 26·8 | 33·3 | 42·3 | 38·8 | 46·0 | 60·0 | |

The appropriate scatter-diagram then gives an import proportion for building of 15·2 per cent.

The Census of Production, 1930, gives details of the firms engaged in building and contracting, and in the

building materials trades, which returned figures for wages.[1] The distribution of gross output was as follows:

(£ *millions*)

| | *Gross output* | *Materials and sub-contract* | *Wages* | *Salaries* | *Profits, &c.* |
|---|---|---|---|---|---|
| Building and contracting | 113 | 58·7 | 38·1 | 4·7 | 11·5 |
| (percentage) . . . | 100 | 51·9 | 33·8 | 4·1 | 10·2 |
| Building materials . . | 47·4 | 16·86 | 16·65 | 4·40 | 9·49 |
| (percentage) . . . | 100 | 35·6 | 35·2 | 9·3 | 20·0 |

For building work done by contract we may use these ratios for the first and second stages, and split the remaining materials according to the general ratios for the constructional trades. For building work for local authorities done by direct labour we can assume that there is no profit element at the first stage, but that the ratio of wages to materials, &c., is the same as in building by contract. This gives us a final distribution thus:

| | *Wages and salaries* | *Profits* | *Imports* |
|---|---|---|---|
| Building by contract . . . | 63·7 | 21·1 | 15·2 |
| Building by direct labour . . | 72·15 | 12·65 | 15·20 |

*Roads*

A number of local authorities engaged in large schemes of road building and street improvement give detailed accounts of the distribution of expenditure for their schemes. A sample inquiry was undertaken, the results of which are summarized below.

These seem to fall into three groups, with South Shields as a stray case. Investigation shows that the first group consists mainly of the construction of by-passes and main roads; the second is a mixture of main roads and street works; and the third is almost entirely street works. South Shields constructed two and a half miles of coast road between 1924 and 1929, which entailed the movement of a

[1] In building and contracting the firms which returned figures for wages accounted only for rather more than half of the total output. It is possible that they were not representative of the whole industry.

railway and excavation of the cliffs. It was a special Unemployment Relief scheme; and this probably accounts for the exceptionally high proportion of direct wage-payments.

| *Scheme* | *Wages* | | *Materials, haulage, tools, &c.* | | *Total payments causing employment* | |
|---|---|---|---|---|---|---|
| | £000 | *per cent.* | £000 | *per cent.* | £000 | *per cent.* |
| GROUP I | | | | | | |
| Northampton (1) . | 26·0 | 28·0 | 67·4 | 72·0 | 93·4 | 100 |
| Great Bath Road . | 55·7 | 29·5 | 134·6 | 70·5 | 190·4 | 100 |
| Manchester . . | 7·7 | 33·2 | 15·5 | 66·8 | 23·2 | 100 |
| Swansea (1) . . | 11·8 | 33·9 | 23·0 | 66·8 | 34·9 | 100 |
| Oxford N. By-pass . | 93·8 | 34·1 | 178·2 | 65·9 | 272·0 | 100 |
| GROUP II | | | | | | |
| Northampton (2) . | 59·5 | 37·7 | 97·9 | 62·3 | 157·4 | 100 |
| Warrington . . | 10·1 | 37·8 | 17·8 | 62·2 | 27·8 | 100 |
| Middlesbrough . | 22·1 | 38·0 | 35·4 | 62·0 | 57·4 | 100 |
| Blackpool . . | 81·2 | 41·2 | 111·4 | 58·8 | 192·7 | 100 |
| Grimsby . . | 19·4 | 43·0 | 25·4 | 57·0 | 44·8 | 100 |
| GROUP III | | | | | | |
| Swansea (2) . . | 11·8 | 49·4 | 23·1 | 50·6 | 34·8 | 100 |
| Leicester . . | 60·5 | 52·5 | 54·4 | 47·5 | 114·8 | 100 |
| South Shields . | 82·6 | 73·0 | 30·2 | 27·0 | 112·7 | 100 |

Imports of materials for road construction are negligible and can be ignored at all stages. Since our sample seems to give evidence of differing distribution for main roads and for street works, it seems best to take average ratios for each type. If we then split the 'materials' at the first stage according to the building ratios, and at later stages according to the general ratios, we obtain the following final distribution:

| | *Percentage* | |
|---|---|---|
| | *Wages* | *Profits, &c.* |
| Main roads and by-passes . . . . . | 81·9 | 18·9 |
| Street works . . . . . | 83·3 | 16·7 |

It is interesting to notice that considerable variations in the proportion of direct labour costs on the site appear to make little difference to the total employment caused. In fact, the expensive relief scheme at South Shields probably only caused about 10 per cent. more primary employment than the others.[1]

[1] But the proportionate expenditure on land (not shown here) is much greater in the case of street works than elsewhere.

These results were based on road works carried out by direct labour.[1] An indirect estimate, which is probably of no great value,[2] can be obtained of the results of contract work from the Census of Production. This gives for the final distribution:

| | *Wages and salaries* | *Profits* |
|---|---|---|
| Main roads | 57·4 | 42·6 |
| Street works | 66·7 | 33·3 |

*Sewerage*

This item, the dominant one for public health expenditure, has also been investigated through a sample inquiry. The summary results of this are:

| *Scheme* | *Wages, &c.* | | *Materials* | | *Total employment producing* | |
|---|---|---|---|---|---|---|
| | £000 | *per cent.* | £000 | *per cent.* | £000 | *per cent.* |
| Blackpool | 82·8 | 53·0 | 73·0 | 47·0 | 155·7 | 100 |
| Swansea (F.W.D.) | 45·1 | 59·5 | 30·8 | 40·5 | 75·8 | 100 |
| Plymouth | 37·1 | 56·5 | 28·4 | 43·5 | 65·5 | 100 |
| Leicester | 84·4 | 64·0 | 47·2 | 36·0 | 131·6 | 100 |
| Middlesbrough | 52·5 | 57·2 | 39·3 | 42·8 | 91·8 | 100 |
| Stoke-on-Trent | 53·0 | 46·0 | 63·0 | 54·0 | 116·0 | 100 |
| Swansea (S.W.D.) | 111·28 | 46·5 | 126·9 | 53·5 | 238·1 | 100 |

The first five of these were foul sewerage schemes, the last two surface-water drainage. Taking average figures for each group, splitting 'materials' according to the general ratios, and allowing an average contractors' profit of 15 per cent. in the case of work placed to contract, we get:

| | *Wages* | *Profits* | *Imports* |
|---|---|---|---|
| Foul sewerage: | | | |
| by direct labour | 70·1 | 4·6 | 25·3 |
| by contract | 56·8 | 17·9 | 25·3 |
| Surface-water drainage | | | |
| by direct labour | 66·8 | 7·9 | 25·3 |
| by contract | 55·0 | 20·7 | 25·3 |

[1] The sample does in fact contain a little contract works: e.g. bridges are usually given out to contract.

[2] The Census distinguishes firms 'mainly engaged in road construction'. But the resulting calculation gives an unplausibly high 'profit' ratio; and there are some divergencies from the sample in the ratio of wages to 'materials', which may be due to the fact that the firms engage in other work besides road construction.

*Public Health and Education*

Capital expenditure on public health services other than sewerage, and on education, goes mainly for the erection of buildings; and the building ratios obtained from the Census of Production have therefore been used.

*Trading Services and Miscellaneous*

No local authority data of sufficient generality are available, and we have therefore used the general ratios for the constructional trades throughout.

Before these figures can be used to obtain an estimate of the employment created, two further adjustments have to be made. First, since capital expenditure on housing includes the cost of sewers and roads needed for the houses, it was necessary to obtain by a sample investigation of local accounts an appropriate split-up of housing expenditure.[1] The result was as follows:

| | *Land* | *Buildings* | *Roads* | *Sewerage* |
|---|---|---|---|---|
| Percentage of total going to | 6·16 | 80·93 | 9·60 | 3·31 |

Second, it was necessary to obtain from a similar source an estimate of land costs. Under this heading we have here included all the non-effectives at the first stage, that is, cost of land and existing buildings, compensation payments, legal and professional fees, and costs of loan issues. The proportion of total expenditure thus absorbed varied, as might be expected, very widely from place to place; but the proportions derived from the sample[2] were as follows:

*Percentage of Gross Outlay going in Non-effective Payments*

| | | | |
|---|---|---|---|
| Housing | 6·16 | Remaining Public Health* | 15·51 |
| Education | 15·70 | Trading services | 8·09 |
| Roads | 18·80 | Miscellaneous† | 2·96 |
| Sewerage | 2·10 | | |

* This includes all services described under Public Health or Mental Health in the Local Taxation Returns, except sewerage, refuse disposal, and public conveniences.

† This includes all services not specially listed except small dwellings acquisition, which has been excluded altogether.

1 The sample covers some 60% of the County Boroughs.

2 This sample was, for reasons of accessibility and suitable form of accounts, almost restricted to County Boroughs. It may therefore tend rather to overestimate land costs, especially in the case of roads, owing to the high proportion of street improvements carried out by county boroughs.

We can now bring together in the following table our final conclusions about the distribution of capital expenditure made on the various services:

*Distribution of Gross Expenditure*

| *Service* | *How performed* | *Land* | *Imports* | *Profits* | *Wages and salaries* | *Of which direct* | *Total* |
|---|---|---|---|---|---|---|---|
| Housing* | Contract | 6·16 | 13·11 | 20·86 | 59·87 | 35·29 | 100 |
| | Direct labour | | 13·11 | 11·03 | 69·70 | 40·34 | 100 |
| Education | Contract | 15·70 | 12·81 | 17·79 | 53·70 | 31·95 | 100 |
| | Direct labour | | 12·81 | 10·70 | 60·79 | 35·66 | 100 |
| Public health, not sewerage | Contract | 15·51 | 12·84 | 17·82 | 53·83 | 32·02 | 100 |
| | Direct labour | | 12·84 | 10·73 | 60·92 | 35·74 | 100 |
| Sewerage: | | | | | | | |
| F.W.D. | Contract | 2·10 | 24·77 | 17·52 | 55·61 | 48·26 | 100 |
| | Direct labour | | | 4·50 | 68·63 | 57·76 | 100 |
| S.W.D. | Contract | | | 20·27 | 53·85 | 38·28 | 100 |
| | Direct labour | | | 7·73 | 65·40 | 45·03 | 100 |
| Roads: | | | | | | | |
| Main | Contract | 18·80 | 0 | 34·59 | 46·61 | 18·59 | 100 |
| | Direct labour | | | 15·35 | 65·85 | 25·74 | 100 |
| Street works | Contract | | | 27·04 | 54·16 | 25·98 | 100 |
| | Direct labour | | | 13·56 | 67·85 | 32·07 | 100 |
| Trading services | .. | 8·09 | 23·25 | 18·93 | 49·73 | .. | .. |
| Miscellaneous | .. | 2·96 | 24·54 | 20·00 | 52·50 | .. | .. |

* Assuming roads are street works. Sewers are foul water drainage.

## II. The Amount of Employment created

The table given above shows that of every million pounds spent on, for example, 'Housing by contract', £598,700 was devoted to wage payments at the various stages, of which £352,900 was at the primary stage. In order to estimate how much primary employment was caused thereby, we need some estimate of the average annual wage of the recipients. As the total primary employment is caused in a number of different industries, it seems best to choose a general figure which is applicable over a wide field. C. G. Clark estimates[1] the average wage of males in Great Britain at £150 a year, or 57*s*. 8*d*. per week without allowance for unemployment, short time, or overtime. Comparison with the wage-rates for certain constructional industries given in the *Abstract of Labour Statistics* suggests that this is a

[1] C. G. Clark, *National Income and Outlay*, p. 120, and *Economic Journal*, Sept. 1934.

sound estimate for our purposes for the year 1930; and movements in wage-rates between that time and the end of 1936 were too small to make special adjustments for them worth while.[1] It is then possible to compare the amounts of employment (measured in man-years) created by capital expenditure on the various services.

*Primary Employment per £1 million gross*

| | *Total* | *Direct* | *Indirect* |
|---|---|---|---|
| Housing: | | | |
| Contract | 3,990 | 2,350 | 1,640 |
| Direct labour | 4,650 | 2,690 | 1,960 |
| Education: | | | |
| Contract | 3,580 | 2,130 | 1,450 |
| Direct labour | 4,050 | 2,380 | 1,670 |
| Public Health other than Sewerage: | | | |
| Contract | 3,590 | 2,130 | 1,460 |
| Direct labour | 4,060 | 2,380 | 1,680 |
| Sewerage: | | | |
| Foul-water Drainage: | | | |
| Contract | 3,710 | 3,220 | 490 |
| Direct labour | 4,580 | 3,850 | 730 |
| Surface-water Drainage: | | | |
| Contract | 3,590 | 2,550 | 1,040 |
| Direct Labour | 4,360 | 3,000 | 1,360 |
| Roads: | | | |
| Main Roads: | | | |
| Contract | 3,110 | 1,240 | 1,870 |
| Direct labour | 4,390 | 1,720 | 2,670 |
| Street Works: | | | |
| Contract | 3,610 | 1,830 | 1,780 |
| Direct labour | 4,510 | 2,240 | 2,270 |
| Trading Services | 3,320 | .. | .. |
| Miscellaneous Services | 3,500 | .. | .. |

These estimates may be compared with those which have been made by certain other authorities. The Unemployment Grants Committee conducted an inquiry into the amount of

[1] See *Abstract of Labour Statistics*, 1934, pp. 84–8, and, for a special inquiry carried out in 1933, which related to wages in Oct. 1931, p. 104. The London and Cambridge index of weekly wage-rates, which stood at 98¼ throughout 1930, was at its minimum of 94 from 1933 (1st quarter) to 1935 (3rd quarter), and had risen to 98¾ by Jan. 1937.

*direct* employment created by a number of schemes which they had assisted: these were, on the whole, probably of a kind in which the direct employment would be rather abnormally high.

*Unemployment Grants Committee: Direct Employment (Man-years) per £ million*[1]

| | | | |
|---|---|---|---|
| Sewerage | 3,206 | Recreation grounds | 3,752 |
| Roads* | 2,395 | Municipal offices | 1,622 |
| Docks and harbours | 2,430 | Sea defence | 2,733 |
| Water-supply | 2,564 | Miscellaneous | 1,910 |
| Electricity supply | 1,170 | | |

* Secondary roads and foot-paths, not main roads or street improvements.

The figure of 4,000 man-years for *total* primary employment has had considerable support. It was quoted by Mr. J. H. Thomas in the House of Commons in 1929,[2] and by the May Committee in 1931, and is accepted by Mr. Keynes in his most recent writings,[3] though in earlier years he and Mr. Kahn appear to have worked with a figure of 5,000. Estimates of the employment caused by the construction of the 'Grid' work out at 3,970 man-years; and the Weir Committee, when discussing in 1931 the electrification of railways, also worked to a 4,000 figure.

Some general remarks may be made about our own results. First, the range of the estimates of primary employment is small: the minimum, 3,110, is for main road construction done by contract, the maximum, 4,580, is for foul-water sewerage done by direct labour. The low place taken by road construction—the politicians' favourite public work—is due to the heavy land costs (which may be exaggerated by our sample). If these could be reduced either by more far-sighted purchases of land, or by stronger legal powers of compulsory purchase at fair prices, the employment value of expenditure on road works would be much higher.

Second, the services fall into two very distinct groups

[1] *Final Report of the Unemployment Grants Committee*, 1933, p. 24 and Appendix IV.

[2] *Hansard*, 12 Nov. 1929, col. 1699.

[3] Keynes, 'Crisis Finance' (*The Times*, 17 Apr. 1939); *The Means to Prosperity* (1933). Kahn, *Economic Journal*, June 1931.

in the relation between the amounts of direct and indirect employment which they cause. In the case of main road construction some 60 per cent. of the total employment is indirect, though much of this no doubt represents the quarrying and transport of road materials, which may take place at no great distance from the site of the works. In the case of the building group, including housing, education, and public health services other than sewerage, and in the case of street works, indirect employment is between 40 and 50 per cent. But in sewerage works it is as low as 15 to 30 per cent. of the whole. These differences may be of some importance in determining the types of works on which individual local authorities should concentrate. From a national point of view, it is the total employment caused, both primary and secondary, which is important; but from a purely local point of view the amount of direct primary employment only may often be the determining factor. Areas with very high unemployment would be ill advised to choose a housing programme rather than sewerage works, if the two were otherwise equally eligible; but areas with unemployment below the national average might be encouraged to undertake those activities which spread their effects most widely over the country. The distinction may also be of some importance when it is desired to assist industries engaged in making materials or machinery rather than those which use mainly unskilled labour. It is also worth remembering that the occurrence of indirect employment may be prevented, for a time at least, by reduction of stocks; the direct employment caused on the site is to that extent a more certain gain.

It is now possible to estimate, within limits that are not extravagantly wide, the total amount of primary employment for which the capital expenditure of local authorities has been responsible during the last few years. Limits are provided by taking the maximum and minimum estimates, for each particular service, of employment per £1 million spent, and multiplying them by the recorded total expenditure.[1]

[1] e.g. in sewerage the maximum is foul water drainage done by direct labour the minimum is surface water drainage done by contract. The figures of capital expenditure exclude expenditure on Small Dwellings, and have been adjusted to exclude balances repaid to lenders.

*Employment caused by Capital Expenditure of Local Authorities in England and Wales*

(*Thousands of man-years*)

| | *1929–30* | *1930–1* | *1931–2* | *1932–3* | *1933–4* | *1934–5* | *1935–6* |
|---|---|---|---|---|---|---|---|
| Maximum . | 400·2 | 429·4 | 465·3 | 326·2 | 290·7 | 295·3 | 357·1 |
| Minimum . | 345·7 | 367·3 | 397·0 | 282·1 | 253·0 | 260·1 | 314·6 |
| Mean . | 373·0 | 398·4 | 431·4 | 304·2 | 271·9 | 277·7 | 357·1 |

If we take the mean of these figures, and make allowance for expenditure by Scottish local authorities, of which full details are not available, we obtain this result for Great Britain.

| *Year* | *Total effective capital expenditure (£ millions)* | *Primary employment caused (thousands of man-years)* | *Employment per £ million man-years* |
|---|---|---|---|
| 1929–30 . . | 106·6 | 419 | 3,787 |
| 1930–1 . . . | 112·2 | 441 | 3,864 |
| 1931–2 . . . | 120·5 | 473 | 3,901 |
| 1932–3 . . . | 86·6 | 340 | 3,956 |
| 1933–4 . . . | 77·8 | 306 | 4,016 |
| 1934–5 . . . | 81·2 | 319 | 3,990 |
| 1935–6 . . . | 98·1 | 385 | 3,985 |
| 1936–7 . . . | 110·0* | 432 | .. |
| 1937–8 . . . | 123·0* | 483 | .. |

* Partly estimated.

The last column suggests that there was some tendency for the employment value of a given expenditure to rise as the depression deepened, possibly through a greater concentration on works which provided high employment.

The figures of the total primary employment caused by the constructional work of local authorities may be compared, in the following table, with the movements of employment in the main constructional trades. On the assumption that the whole of the employment caused by capital expenditure of local authorities took place in these trades,[1] it is possible by subtraction to obtain an idea of relative size and move-

[1] This assumption is probably near to the truth; but it must be remembered, in using these figures, that the range of error in the local authority estimates is probably 10 per cent., and that they are also annual figures which centre on August–September, while the figures of total employment in the constructional industries are for one week in July.

ments of local authority and other demands on labour in the constructional trades.[1]

*Employment in Certain Capital Goods Industries*

(*Thousands*)

| | *July* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *1929* | *1930* | *1931* | *1932* | *1933* | *1934* | *1935* | *1936* | *1937* |
| 1. Brick, tile, &c. . | 72 | 73 | 72 | 68 | 73 | 83 | 89 | 93 | 98 |
| 2. Building . . | 705 | 695 | 669 | 605 | 677 | 760 | 817 | 876 | 899 |
| 3. Public works, &c. . | 126 | 138 | 196 | 179 | 151 | 147 | 149 | 166 | 182 |
| 4. Engineering . . | 687 | 647 | 546 | 507 | 511 | 578 | 609 | 686 | 779 |
| 5. Iron and steel . . | 231 | 200 | 152 | 146 | 168 | 199 | 201 | 224 | 255 |
| 6. Metal trades . . | 485 | 475 | 446 | 455 | 489 | 544 | 579 | 628 | 696 |
| TOTAL . . . | 2,306 | 2,228 | 2,081 | 1,960 | 2,069 | 2,311 | 2,444 | 2,673 | 2,909 |
| 1, 2, and 3 . . . | 903 | 906 | 937 | 852 | 901 | 910 | 1,055 | 1,135 | 1,179 |
| 4, 5, and 6 . . . | 1,403 | 1,322 | 1,144 | 1,108 | 1,168 | 1,321 | 1,389 | 1,538 | 1,730 |

Source: *Statistical Abstract*, numbers of insured workers employed in one week in July of each year.

It appears that local authorities were responsible for between one-fifth and one-sixth of employment in the main constructional trades, and the major part of it must have been in building and building materials and in public works contracting. The moderate increase in local authority expenditure in 1930 and 1931 certainly appreciably softened the

*Employment*

(*Thousands*)

| *July* | *Total* | *Local authority demand* | *Other demand* |
|---|---|---|---|
| 1929 . . . | 2,306 | 419 | 1,887 |
| 1930 . . . | 2,208 | 441 | 1,767 |
| 1931 . . . | 2,081 | 473 | 1,608 |
| 1932 . . . | 1,960 | 340 | 1,620 |
| 1933 . . . | 2,069 | 306 | 1,763 |
| 1934 . . . | 2,311 | 319 | 1,992 |
| 1935 . . . | 2,441 | 385 | 2,056 |
| 1936 . . . | 2,673 | 432 | 2,241 |
| 1937 . . . | 2,909 | 483 | 2,426 |

effects of the considerable decline in the 'other demands' on these industries. The very great fall in local authority

[1] See next page.

demand in 1932 coincided with a slight improvement in 'other demands'; and by 1933 the recovery of the latter was sufficient more than to offset the effects of the further reduction of local authority expenditure. Thus the lag between the movements of local authority and total demand, the causes of which have been already discussed, did exercise some stabilizing effect on employment in the constructional trades.

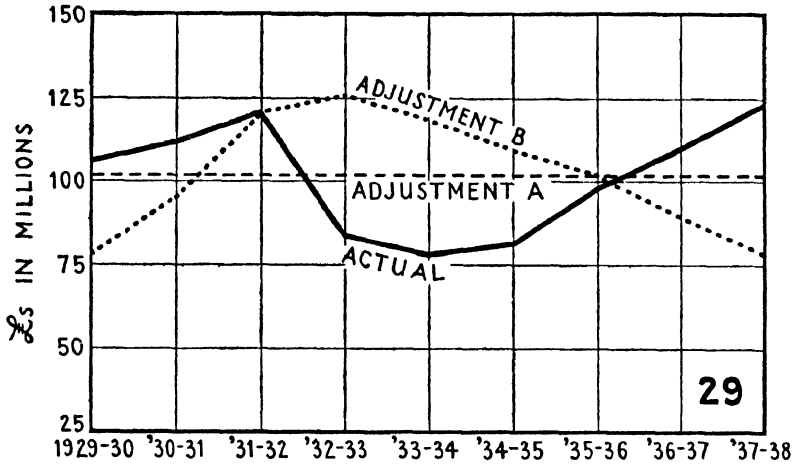



FIG. 29. Local Authorities (Great Britain) Employment-causing Capital Expenditure

It is possible to speculate about the effects of employment of a more conscious policy of stabilization on the part of local authorities. If their total expenditure had been evenly spread throughout the period, at a rate of £101·75 millions a year, causing an annual employment of about 400,000 men,[1] the total employment figures would have been:

*Six Constructional Industries*

(*Thousands*)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1929 | 2,287 | 1932 | 2,020 | 1935 | 2,456 |
| 1930 | 2,167 | 1933 | 2,163 | 1936 | 2,631 |
| 1931 | 2,008 | 1934 | 2,392 | 1937 | 2,828 |

The actual decline in employment from 1929 to 1932 was 346,000, and the subsequent rise to 1937 was 949,000. Stabilization of local authority demand would have reduced

[1] That is, Adjustment A, Figs. 29 and 30.

these fluctuations to 279,000 and 820,000, and recovery would have begun a year earlier.

If local authorities had had complete foreknowledge of the course of the cycle and of the later rearmament demand,

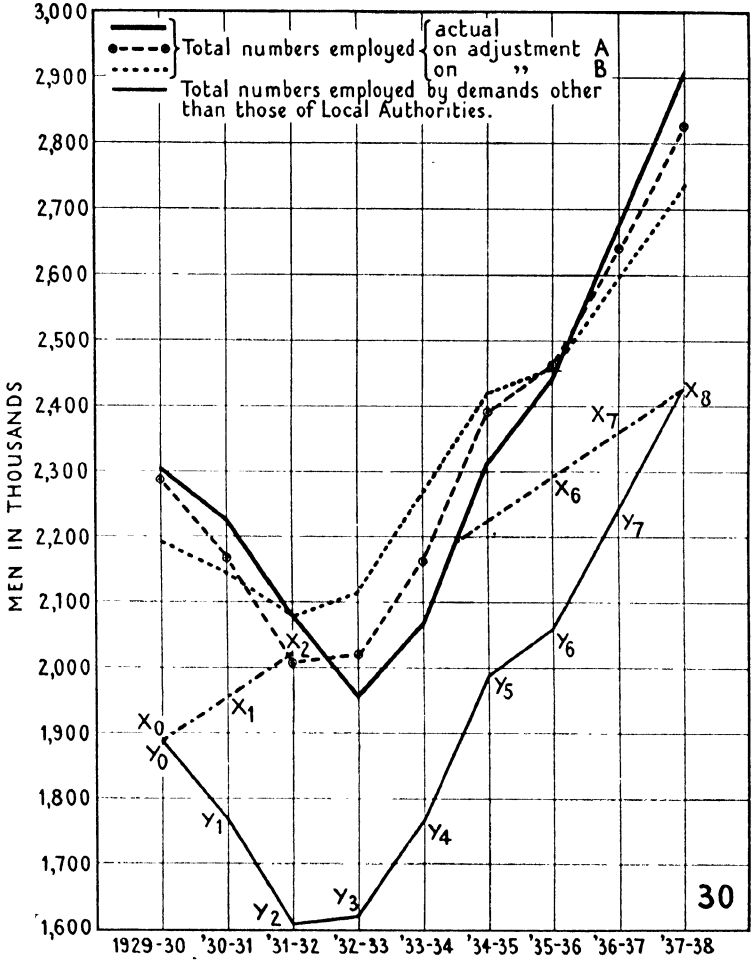



FIG. 30 Employment in Certain Capital Goods Industries

and had adjusted their expenditure to it in the best possible way,[1] what would have been the effect on (primary) employment? A certain minimum of annual expenditure is not capable of postponement: in default of better information, we shall take the expenditure for 1933–4, when the economy

[1] That is, Adjustment B, Figs. 29 and 30.

campaign was having its full effect, as an indication of the amount of this minimum. The rest we assume to be distributed annually in proportion to the depth of the curve of actual employment, as shown in Fig. 30, below the linear trend between 1929 and 1937. The result would be as follows:

| | *Adjusted L.A. expenditure (£ millions)* | *Employment caused thereby (thousands)* | *Adjusted total employment on constructional industries (thousands)* |
|---|---|---|---|
| 1929 . . | 77·86 | 306 | 2,193 |
| 1930 . . | 95·93 | 377 | 2,144 |
| 1931 . . | 119·85 | 471 | 2,079 |
| 1932 . . | 125·19 | 492 | 2,112 |
| 1933 . . | 117·81 | 463 | 2,226 |
| 1934 . . | 109·41 | 430 | 2,422 |
| 1935 . . | 101·78 | 400 | 2,456 |
| 1936 . . | 89·82 | 353 | 2,594 |
| 1937 . . | 77·86 | 306 | 2,732 |

Estimates of this kind are obviously liable to error for a great number of reasons; moreover, they explicitly take no account of possible secondary and tertiary effects. But very tentative conclusions may perhaps be drawn from them. It appears that an 'ideal' adjustment in time of the actual volume of capital expenditure by local authorities alone might have reduced the instabilities of employment in the constructional industries to quite small proportions. Judged by this standard, expenditure was £20 to £25 millions too high in 1929 and 1930, and about right in 1931. In 1932, instead of the sharp decline caused by the economy campaign, a small further expansion would have been desirable, to be followed by a contraction until, in 1935, the actual and desirable expenditure approximately coincided. In 1937 local authorities may have been spending some £40 millions too much.[1]

[1] See Fig. 29.

## VII

## THE EFFECTS OF CAPITAL EXPENDITURE ON EMPLOYMENT: SECONDARY AND TERTIARY EFFECTS

WE have seen that it is possible to estimate fairly accurately the amount of primary employment, both direct and indirect, which can be created by an addition to expenditure on representative public works. The volume of secondary employment is, however, a much more doubtful and uncertain matter.

The general nature of the secondary effects of an increment of 'investment' have already been indicated. Expenditure at the primary stage means an expansion of income; some of this increment of income will be spent on consumption goods and services, in the production of which yet more income and employment will be generated; some of this, in its turn, will be spent and will have further beneficial effects, and so on. In addition, it is possible that the original investment or the secondary expansion of consumption may make necessary additions to productive equipment, and will so have further 'tertiary' effects along the lines of the Acceleration Principle. Apart from such 'tertiary effects', the initial stimulus afforded by a single 'dose' of expenditure on public works is supposed to die away gradually over time, as a result of leakages through purchases of imports, the building up of idle balances, deflationary expenditure on the repayment of debts, and the like. But if we are considering the effects of an increased level of public expenditure, maintained for some considerable time, the effects would show themselves in cumulative fashion at first, as the 'secondary' effects of the first dose were superimposed on the primary effects of the second, and so on; after a time the curve would flatten out to approximate stability, to be succeeded by rapid decline when the public expenditure was discontinued. If, however, the leakages were less for the later doses than for the earlier, or if 'tertiary' effects developed, there is no reason why the increase of employment should

be stabilized at any particular level, and the size of the doses of public expenditure could be diminished gradually without producing any collapse in the level of employment. It is, of course, this latter possibility which inspires the 'pump-priming' idea of the part to be played by public expenditure in dissipating a depression.

Two methods of approach have been used by various writers to the problem of measuring the importance of secondary effects. One is what may be called the direct method, since it involves tracing in detail the course of a particular increment of expenditure on public works through its secondary stages. This method was first seriously applied by Kahn in 1931, and gave rise to the general idea of the 'multiplier', or the ratio between the increments of primary and of total employment.[1] The other, which may be called the indirect method, consists of comparing the magnitude of changes in 'investment' and in 'national income', and in deducing therefrom a generalized Multiplier applicable to a *net* increment of investment, whether public or private. This method, suggested by J. M. Keynes, has been worked out for Great Britain mainly by C. G. Clark.[2] The Multiplier so obtained is, of course, an 'Income' Multiplier; the generalized method has not so far been applied directly to secure an Employment Multiplier.

Kahn was originally concerned to calculate the ratio between the amounts of secondary and primary employment caused by an increase of expenditure on public works; as an example, he cited road works. He assumed a certain proportionate distribution of expenditure, both primary and secondary, between wages ($W$), profits ($P$), and payments for imported raw materials and unfinished goods ($R$). Of the additions to home income ($W+P$) at each stage, he assumed that a certain proportion of both wages and profits would be saved rather than spent on home-produced consumption goods, and that a certain proportion of wages did not constitute a net increment of income, but was merely

[1] R. F. Kahn, 'The Relation of Home Investment to Unemployment', *Economic Journal*, June 1931.

[2] J. M. Keynes, *General Theory*, cap. 10; C. G. Clark, *National Income and Outlay*, cap. 12, and 'The Determination of the Multiplier from National Income Statistics', *Economic Journal*, Sept. 1938.

substituted for unemployment benefit, charity and the like: but he made no express allowance for additional savings by the newly employed wage-earners. His analysis thus took account of three types of leakages—through payments for imports, both of materials and of finished goods; through saving by the recipients of profits; and through reduction of expenditure on the relief of the unemployed, which is equivalent to saving by the State and other public authorities. These leakages give the process of generating secondary income and employment its character of a declining series through a succession of gettings and spendings. If the sum initially expended in providing primary employment for each man be distributed between $W+P+R$, the primary addition to national income is $W+P$.[1] Of this, a certain proportion, $mW+nP$, is spent on additional purchases of home-produced consumption goods, and consequently gives rise to a further addition to employment of

$$m\frac{W}{W+P+R}+n\frac{P}{W+P+R}\text{men (say } k \text{ men)},$$

and so on at the further stages. Total secondary employment therefore sums to $\frac{k}{1-k}$ men, which is the ratio of secondary to primary employment. The Employment Multiplier is then

$$1+\frac{k}{1-k} \quad \text{or} \quad \frac{1}{1-k}.$$

In 1931 Kahn was perhaps more concerned to demonstrate the general principle of a Multiplier than to give it a definite value. He did, however, undertake estimates of the quantities involved,[2] as a result of which he argued in favour of a ratio between secondary and primary employment of at least 0·75—that is, a Multiplier of 1·75—applicable to an

[1] More strictly, the *net* addition to national income is $P+(W-U)$, where $U$ represents unemployment benefit financed from loan or reserves.

[2] The actual estimates were as follows:

(*a*) $W$, 0·7; $P$, 0·2; $R$, 0·1 at all stages.

(*b*) $m$, from 0·48 to 0·42.

(*c*) $n$, from 0·75 to 0·33.

(*d*) $k$, from 0·94 to 0·56. 'If we were to suppose that in actual fact the ratio is 0·75 we might, it may perhaps be suggested, be erring on the side of understatement.'

extension of employment on public works in Great Britain in that year, or, on the assumptions so far stated, to an increment of income so generated. He then proceeded to modify this preliminary conclusion by allowing for the possibility that the elasticity of supply of consumption goods, though certainly very large under depression conditions, might not be infinite, as had been previously assumed. This would not necessarily reduce the Multiplier of Income, but would reduce that of Employment, since part of the additional spending on consumption goods would be taken out at each stage by a rise of wages and of prices. He suggested that to allow for this the values for secondary employment might have to be reduced by something less than one-fifth.

One rather serious criticism which may be made in principle against Kahn's method is the use of a single general ratio for the distribution of an increment of expenditure between wages, profits, and imports at all stages, both primary and secondary. In fact the distribution must depend on the particular circumstances of each industry for the products of which there is an increment of demand; and the magnitude of secondary effects upon employment will depend partly upon this distribution. Expenditure upon imported goods is a complete leakage; and the other elements of leakage may well be greater in the case of profits than of wage payments. Now at the primary stage there is a presumption that the distribution will be more favourable to wages than at the secondary stages. On the one side, deliberate attempts will usually be made in a public works programme to force up the proportion of expenditure going directly to labour, and, even if this is not done, serious depression of the constructional trades will probably keep the margins of profits to contractors and others at a minimum. On the other side, an increment of expenditure by final consumers is likely to go in much smaller proportion to wage-payments and the immediate creation of employment. This is particularly clear in the case of transport, public utilities such as the supply of electricity and gas, and services of retailers: in these cases quite a large increase in physical volume of turnover may have practically no effect on the numbers of persons employed, and the major proportion of the additional receipts

will accrue to 'profits'.[1] And recent investigations[2] seem to show that such a condition of falling marginal cost may also be applicable to many manufacturing enterprises under depression conditions, especially if they are operating in a highly imperfect market. These circumstances have much the same effect in reducing the Employment Multiplier as a *rise* of costs and prices due to inelasticity of supply, which Kahn took into account; but they are probably much more important, at least in the early stages of a recovery movement.

An attempt has been made to meet this and certain other less important defects of Kahn's method in a recalculation of the Multiplier, the details of which are given in the appendix to this chapter. In this, the distribution between *W*, *P*, and *R* at the primary stage has been obtained (as described in the preceding chapter) largely from Census of Production material which relates to the constructional trades only; at the secondary stage, the value of *R* has been calculated from national income and import statistics, and those of *W* and *P* have been based (with some slight amendments) on the material provided by C. G. Clark in the *Economic Journal*, September 1938.[3] As will be seen from the accompanying table, these results differ significantly from each other and from Kahn's estimates. Our final estimates, which, like those of Kahn, do not take into account the

*Distribution of an Increment of Expenditure between Wages, Profits, and Imports*

| | *W* | *P* | *R* |
|---|---|---|---|
| Kahn: all stages . . . | 0·7 | 0·2 | 0·1 |
| Our estimate for primary stage . | 0·46 to 0·54 | 0·18 to 0·21 | 0·36 to 0·23 |
| Our estimate for secondary stages | 0·13 to 0·33 | 0·56 to 0·55 | 0·33 to 0·17 |

[1] This point is argued at length by Mitnitzky (*International Labour Review*, 1934, p. 446). He concludes that 'a rough estimate of the magnitude of the increase in employment . . . suggests that the *percentage increase* in employment is about two-thirds of the simultaneous increase in the real turnover of home products'.

[2] For example, by C. G. Clark in *National Income and Outlay*, and in *Economic Journal*, Sept. 1938; and, for imperfect competition, Harrod, *The Trade Cycle*.

[3] This material relates to the distribution of *any* increment of income between wages and profits. It therefore, unfortunately, includes income generated in the constructional trades; and the resultant distribution may be rather more favourable to *P* than would be that for the consumption trades alone.

effect of price and wage changes (which were, in fact, very slight before 1936), give the following values:

| *Year* | *Income multiplier* | *Employment multiplier* | *Expenditure multiplier*[1] |
|---|---|---|---|
| 1930 . . | 1·64 | 1·19 | 1·05 |
| 1931 . . | 1·60 | 1·18 | 1·03 |
| 1934 . . | 1·85 | 1·58 | 1·39 |
| 1935 . . | 1·80 | 1·55 | 1·35 |
| 1936 . . | 1·79 | 1·53 | 1·34 |

It was unfortunately impossible to obtain an estimate for the years 1932 and 1933, because of the especial defectiveness, for those years, of the information about the distribution of increments of expenditure between wages and profits. The difference between the first two years and the last three appears to be mainly due to a reduction of the importance of leakages through imports, which was the result of the change in tariff policy initiated in 1932. On the other hand, the average proportion of unemployment benefit to the wage appears to have risen somewhat after 1932: and this, of course, told in the opposite direction and tended to reduce the values of the Multipliers. Since our analysis does not take account of price and wage changes, it does not show the growing divergence between the Income Multiplier and the Employment Multiplier which might be expected to take place in the later stages of recovery.

These estimates cannot lay claim to any very high degree of accuracy; but for what they are worth, they suggest values for the Multiplier applicable to increments of expenditure on public works which are both somewhat lower and more stable than has often been thought likely. They may now be compared with estimates of a more general character arrived at from total 'investment' and national income statistics, which have been worked out by C. G. Clark. In his first attempt[2] he compared estimates of total 'investment' (apparently defined as the total of gross home investment in fixed capital, changes in working capital, and net overseas investment)

[1] Expenditure multiplier is the ratio of the total increment of national income to increment of expenditure on public works.

[2] *National Income and Outlay*, pp. 248–50, and diagram.

with estimates of national income, both on a quarterly basis. He then found that during the period 1929 to 1935. a given change, upward or downward, in 'investment' was accompanied by an equal change in the value of output in the consumption-goods industries, and concluded that change in total national income was twice the change in investment; though he found rather different relationships for the years before 1929 and in the latter part of 1935 and 1936. In this second attempt[1] he applied a more complicated technique. Starting from the assumption that the Multiplier idea could be applied to *any* net change of spending which did not itself increase the supply of consumption goods, he proposed to take as the 'determinants', to which an appropriate Multiplier should be applied, the sum of the changes in gross home investment and in value of exports (positive determinants) and of changes in value of imports and in government and local authority surpluses on current account (negative determinants). Allowing for leakages through imports and through unspent profits,[2] he first obtained by estimation a Multiplier applicable to an observed unit change of the 'determinants' of 1·532 for the years 1929–33, and 2·082 for 1934–7. But he then qualified this on the ground that an increase of imports consequential on a change in national income ought not to be treated as a 'negative determinant'. He accordingly deducted from any initial unit increase of the 'determinants' a fraction equal to the proportion of leakage through imports, and obtained a final Multiplier by dividing his preliminary Multiplier by the 'determinant' so reduced. The result gave a value of 2·07 for 1929–33 and of 3·22 for 1934–7. He then found that quarterly figures of national income computed by applying these Multipliers to the deviations of the total 'determinants' from their mean over the period corresponded very closely with estimates of national income obtained from other sources.

Some doubt may be felt about the procedure of inflating

[1] *Economic Journal*, Sept. 1938.

[2] Part of any increment of profits he assumes to be spent at once, and another part after an average time-lag of fifteen months. This point is discussed later on p. 319.

the preliminary Multiplier by deduction of consequential imports; for it is not clear on the face of it how a worsening of the balance of payments through 'consequential' imports differs in its general effects from one which is due to a reduction of exports or an increase of imports other than those which are 'consequential'. But apart from this, on consideration it does not appear to be surprising that the values of the general 'Income Multipliers' obtained by Clark are higher than the particular Income and Employment Multipliers obtained by Kahn's direct method. For it is apparent that Clark's determinants, investment, balance of payments, and government surplus, are not independent variables. An increment of home investment, for instance, must be accompanied, not only by an increase of imports, but also by an increase of government surplus through reduction of unemployment relief, of which Clark takes no account. Recorded variations in the total of 'determinants' are a net result of changes in mutually dependent variables; and it is clear that the Multiplier applicable to such a net change must be higher than that appropriate to a change in a particular variable considered in isolation.

So far, little has been said of the length of time required for the appearance of full secondary effects. Kahn dismissed the matter in a short footnote to his original article; and, though it was discussed at some length by J. M. Clark[1] with reference to American conditions, C. G. Clark appears to be the only English writer who has attempted to incorporate it in his analysis of the Multiplier. The problem resolves itself into two elements: the time-lag between the generation of additional employment and income, and of additional expenditure upon consumption goods; and the time-lag between an increase of sales of goods (whether raw materials at the primary stage or of finished goods at the secondary stages) and an increase of employment in replacing them.

At each stage there must clearly be some time-lag between an increase of earnings and an increase of consumption. In the case of wage-earners, this lag must in general be very short: the bulk of an increment of wage-income will be spent within a week of its receipt, and a high proportion

[1] J. M. Clark, *Economics of Planning Public Works*, p. 91.

actually on pay-day.[1] Some residuum will no doubt be spent only over a longer period, on holidays, clothes, furniture, and the like: whether this should be treated as a part of 'saving' or as 'delayed expenditure' depends on the unit of time with which it is convenient to work. C. G. Clark treats the whole of any increments of wage-income as being spent on consumption within a three-month time period. The case of an increment of profit-income is clearly more complicated. An increment of company profits will not be reflected in increased dividends to shareholders for some considerable time—perhaps, on the average, not for at least six months; and a further considerable time may well elapse before a change in income received leads to a change in the rate of expenditure on consumption. C. G. Clark appears to estimate the average length of the lag between an increase of profits earned and an increase of consumption expenditure by profit recipients at fifteen months,[2] which seems reasonable, though he does not explain very clearly how the estimate is arrived at. It is, of course, quite likely that the length of this lag may be different at different phases of the cycle. The effect of differences in this time-lag between different classes of income receivers must be to smooth out the secondary effects, making the level of total employment and total incomes less rapidly responsive to changes in investment. This presumably makes it less likely that a large but short-lived programme of public works could be used to jerk the whole economic system into recovery.

Second, there is the question of the time-lag between the appearance of an increased rate of demand for goods and a consequent increase of productive activity. The volume of goods sold in a given period of time at the end of any particular stage of production need not be equal to the volume of goods produced. Sales of goods from the shelves of a shopkeeper, or from any other stock, do not necessarily cause an immediate increase of production to replace them; and the interval between increased sales and increased production may be more or less long. As demand falls off in the earlier

[1] In the village in which one of the authors resides it is regarded as axiomatic that a bazaar or a whist-drive can only be held successfully on pay-day.

[2] *Economic Journal*, Sept. 1938, p. 437.

stages of a general trade depression, stocks of many finished goods and of materials tend to accumulate in amounts which are inappropriate, possibly, even to the pre-depression rate of sales, and still more inappropriate to the reduced rate. Under these circumstances, a moderate increase of demand by public authorities for materials, or by their employees for consumption goods, may merely accelerate the depletion of stocks, without leading, for some considerable time, to any increase of production. If this happens, a deduction must be made, from any short period point of view, from the increments of both primary and secondary employment as we have previously estimated them: in the extreme case, the total increment of employment caused by public expenditure might be little greater than the amount of 'primary direct' employment. Since the depletion of stocks is in these cases a necessary prerequisite for the recovery of production, public expenditure which hastens this is by no means wasted; but its effects will not be immediately apparent in a reduction of the unemployment figures or of any other generally understood index of business conditions. On the other hand, if increased demand occurs after a period of stagnation, in which the volume of stocks has already become adjusted to a low level of sales, it must rapidly cause a demand for replacement. In the analysis of the Multiplier it has so far been implied that a given depletion of stocks by increased sales will be followed by an exactly corresponding replacement. But there are, of course, other possibilities. Retailers, wholesalers, and manufacturers may well aim at holding a stock which bears some definite proportion to the most recently experienced volume of sales. In this case, increased sales in any given week or month would be followed by a somewhat larger immediate increase of production. If, for instance, the practice is to aim at holding a stock equal to 20 per cent. of weekly sales, when these rise by 10 per cent. it will be necessary to increase production by 120 per cent. of the increase in sales in order to preserve the desired ratio; but, unless the weekly volume of sales continued to grow still further, production would later fall back to the old level plus 100 per cent. of the increase in sales. It is further possible that sellers may try to adjust their stocks, not to the

level of sales most recently experienced in the past, but to expectations about future sales, based upon the rate of growth of sales in a past period. In such cases an actual increase of 10 per cent. in a given period, if it gave rise to expectations of a further increase of the same amount, would necessitate an increase of production amounting to over 140 per cent. of the original increase. But this is a highly unstable situation, since any check to the rate of growth of sales will cause a sharp absolute fall in the level of production. The larger is the 'normal' ratio of stocks to turnover, the more will considerable changes in final consumers' demand be magnified in their effects upon production. On the other hand, since one of the purposes of holding a stock is to enable the holder to meet unexpected changes of demand without inconvenience, a moderate increase of demand, which is not expected to be permanent, will have less effect upon production in an industry where large stocks are held than elsewhere.

These possibilities of stock variation, which serve to minimize or to exaggerate the effects of an increase of consumption on productive activity, are best regarded as possible 'tertiary' effects, usually dealt with under the heading of the 'Relation' or Acceleration Principle. Their effects, whether positive or negative, are superimposed on those which have already been accounted for in the Multiplier analysis. They are not, strictly speaking, concerned with the time-lag between the stimulus of increased sales and its transmission to production, but rather with the size relationship between stimulus and result. Distinct, though closely connected, is the pure problem of the speed with which the stimulus is transmitted. Assuming for the moment, that, as in the Multiplier analysis, a given increase of sales is to be followed by an equivalent increase of production, the question, after how long? still remains. The answer will normally depend on the frequency with which retailers give orders to wholesalers, wholesalers to manufacturers, and so on; and this frequency will itself often be related to the size of the stock normally held, small stockholders being more frequent buyers, and consequently more rapid transmitters of any stimulus from final demand. It is clear also

that variations of demand in highly seasonal trades will only be slowly transmitted.

Unfortunately, there is great lack of reliable information about even the total magnitude of stocks and goods in process, and still more about the degree of variation in the course of the trade cycle. There is, of course, fairly accurate information about stocks of certain raw materials; but many of these are imported, and their variations are consequently not of direct importance from our point of view. C. G. Clark has made certain estimates[1] of the change in the values of total stocks and goods in process of manufacture (valued at 1930 prices) between the beginning of 1929 and the end of 1934; but his estimates differ widely from one another, and it is clear that neither the relative nor the absolute magnitude of the annual changes which they show can be relied upon. On the whole, it seems probable that the reduction of stocks actually effected between the end of 1929 and the end of 1933 amounted to something between £250 and £350 millions (at 1930 prices); and there is some evidence that the recovery of investment and consumption during 1933 was accompanied at first by a sharp reduction of stocks below the level which they had reached in 1932. If these figures are broadly correct, it would seem that most of the 'Multiplier' effects of an expansion of public expenditure considerably greater than that actually achieved between 1929 and 1931 might have been neutralized for the time by stock reduction —though, as has been pointed out above, that would not be a reason for regarding it as utterly useless.

The effects of possible spending and production lags on the operation of the Multiplier can be illustrated thus. Let us suppose that a programme of public expenditure is commenced, which is sufficient to provide primary employment (direct and indirect) for 1,000 men throughout a year; and that the Multiplier applicable to this is 1·5. If we allow an average interval of three months between the receipt of additional income and the making of additional expenditure on consumption, the result is as shown opposite (Table A). We might also allow for an average lag of three months

[1] C. G. Clark, *The National Income, 1924 to 1931*, p. 142; *National Income and Outlay*, p. 296.

between the making of additional expenditure (both indirect primary and secondary) and the resultant increase of production and employment. If we assume that half of the primary, employment is direct, and therefore not subject to the lag, the result is as shown below (Table B).

TABLE A

| | *Primary employment per month* | *Levels of secondary employment* | *Total employment* |
|---|---|---|---|
| 1st 3 months . . . | 1,000 | Nil | 1,000 |
| 2nd „ . . . | 1,000 | 333 | 1,333 |
| 3rd „ . . . | 1,000 | 444 | 1,444 |
| 4th „ . . . | 1,000 | 481 | 1,481 |
| 5th „ . . . | Nil | 493 | 493 |
| 6th „ . . . | Nil | 164 | 164 |
| 7th „ . . . | Nil | 55 | 55 |
| &c. (remainder, 30, in later months). | | | |

TABLE B

| | *Primary employment* | *Secondary employment* | *Total employment* |
|---|---|---|---|
| 1st 3 months . . . | 500 | Nil | 500 |
| 2nd „ . . . | 1,000 | Nil | 1,000 |
| 3rd „ . . . | 1,000 | 167 | 1,167 |
| 4th „ . . . | 1,000 | 333 | 1,333 |
| 5th „ . . . | 500 | 389 | 889 |
| 6th „ . . . | Nil | 444 | 444 |
| 7th „ . . . | Nil | 296 | 296 |
| 8th „ . . . | Nil | 148 | 148 |
| 9th „ . . . | Nil | 99 | 99 |
| 10th „ . . . | Nil | 50 | 50 |
| &c. (remainder, 74, in later months). | | | |

These tables are purely illustrative; but they serve to bring out certain interesting points. It appears that, when the lags are considerable relative to the duration of the public spending programme, they reduce the maximum *level* to which employment is raised quite considerably (1,481 or 1,333 as against 1,500 with an 'instantaneous' Multiplier); on the other hand, they diminish the rapidity with which total employment falls off when the programme is discontinued. That is, the existence of lags smooths out the impact

effects of changes in investment. Their practical importance also varies with the value of the Multiplier. In our first example seven-eighths, and our second two-thirds, of the total employment generated is obtained within the year; but with higher values for the Multiplier than 1·5—that is, with secondary employment a more important part of the total—the proportion obtained within the year would clearly be smaller. With a Multiplier of 3, it would in fact be reduced in our examples to about six-tenths and nine-sixteenths respectively. But under conditions similar to those which existed in Great Britain during the years from 1929 to 1934, the practical importance of the true time-lags (i.e. apart from the question of stock reduction) was probably not very great; for it is unlikely that they were in fact as long as the six months of our second example, and the Multiplier was certainly not much above 1·5. (See Figs. 31 and 32.)

This discussion has so far been conducted on the assumption that increased expenditure on public works does constitute, for the time being, a net increase in total fixed investment, and that it does not cause any offsetting reduction in private investment. This assumption must now be examined.

First, it must be noticed that it may sometimes be difficult to ensure that a particular public works programme is wholly additional even to public investment. This difficulty is particularly likely to arise where the instrument used to secure expansion of expenditure is the granting of special assistance by the State to local authorities or to public utility enterprises, who would in any case have made some expenditure. The Unemployment Grants Committee during most of its life tried to make it a condition of assistance that proof must be produced that assisted work would not otherwise have been undertaken at all, or at least not for five years; but after 1929 this condition had to be relaxed. There was, indeed, something of a dilemma: if the condition were rigidly insisted upon, the volume of work-creating plans put forward became small; but if it were relaxed, the Committee risked wasting part of its always limited funds in subsidizing capital expenditure which would have taken place in any case. And we have seen that the same difficulty arises in estimating the effects of public guarantee of borrowing by the railway

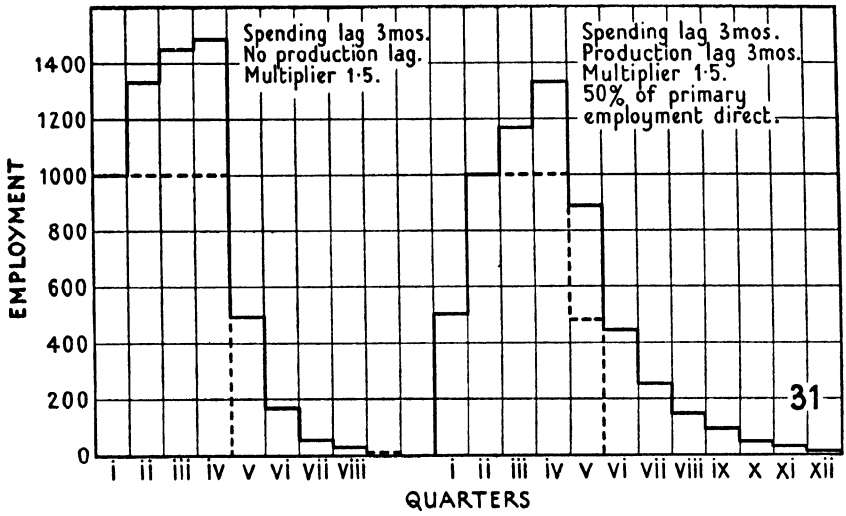

Spending lag 3mos.
No production lag.
Multiplier 1·5.
Spending lag 3mos.
Production lag 3mos.
Multiplier 1·5.
50% of primary
employment direct.
EMPLOYMENT
1400
1200
1000
800
600
400
200
0
i ii iii iv v vi vii viii
i ii iii iv v vi vii viii ix x xi xii
QUARTERS
31

FIG. 31.

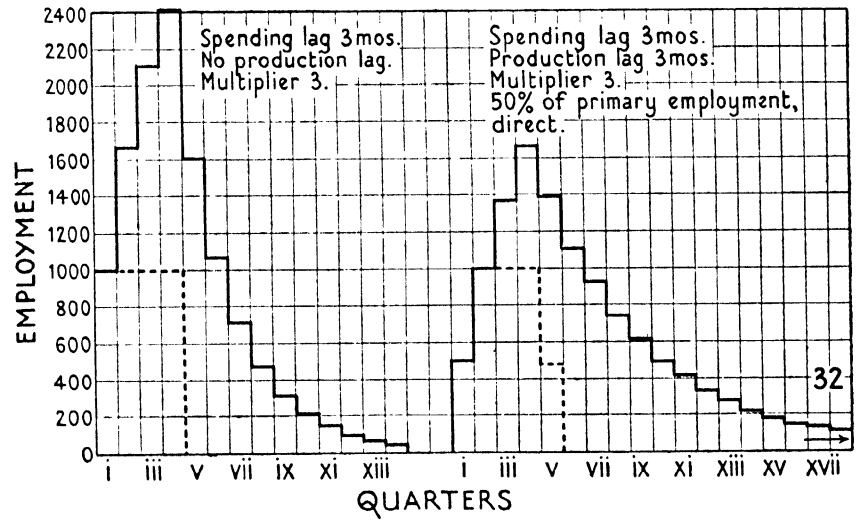

Spending lag 3mos.
No production lag.
Multiplier 3.
Spending lag 3mos.
Production lag 3mos.
Multiplier 3.
50% of primary employment,
direct.
EMPLOYMENT
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
i iii v vii ix xi xiii
i iii v vii ix xi xiii xv xvii
QUARTERS
32

FIG. 32.

companies, and also in calculating the net effect of expenditure by the Central Electricity Board, which was accompanied by a reduction of some categories of expenditure by the generating and distributing authorities. These difficulties are in part financial and administrative, where the 'assisting' authority is not the same as the authority which has to plan and execute the relevant capital expenditure; in part they are truly economic, when (as in the case of the C.E.B.) much of the capital expenditure has a 'rationalizing' or cost-saving object.

Granted, however, that these difficulties can be largely overcome, and that a substantial expansion of total public expenditure on constructional work can be achieved, we have to examine its effects on the private section of the economy.

The most general—and also the most intangible— question is that of the effects on 'business confidence'. There is a strong impression that the attempt by the Labour Government to expand public capital expenditure between 1929 and 1931—however meagre was the expansion actually achieved—did contribute to the unwillingness of private industry to take an optimistic view of the future. The basis of this attitude may defy rational analysis; but its importance is not lessened thereby. It may be suggested that it is less likely to be prevalent if an expansion of public works takes place as a part of a regular plan which has been worked out, advertised, and financially prepared beforehand. It is also probably important in this connexion that the expansion should be undertaken on such a scale and at such a time that it will show *rapid* results in the reduction of the total unemployment figures; this condition was conspicuously not fulfilled between 1929 and 1931. There is no general reason why the effects on business confidence should be bad; and if there is a general belief that the policy is sound, the mere initiation of it should lead to a positive increase in private investment rather than the opposite.

More tangible difficulties may arise in so far as public investment is in any way competitive with private. This may happen in several ways. There may be direct competition, if public authorities invade fields of activity which were previously the preserve of private enterprise. Expenditure

on housing is to some extent an example of this in post-War Britain, as has been already noticed. In such cases, it may well happen that the *immediate* competition may be small, if public authorities expand investment in depression, when little would in any case be done by private enterprise. But the subsequent effects may be more serious, if public authorities satisfy in depression an investment demand which would otherwise have been met by private enterprise during a subsequent recovery; for the difficulties of transition from a recovery initiated by public expenditure to a state of prosperity maintained by private expenditure will then be increased. It would seem to be a sound principle that the State should not, merely as a matter of trade-cycle policy, enter fields where it will later compete with private enterprise; if it is desired to stimulate investment in such fields, the methods of subsidies and loan guarantees are probably to be preferred.

Indirect competition may take place if public expenditure raises the costs of materials, labour, or capital to private enterprise, or maintains them at unduly high levels reached during a previous boom. This may be a real danger if a large public works programme is launched at an early stage after the end of a period in which the constructional trades have become much over-expanded and in which long-term interest rates have risen considerably. But not all periods of prosperity possess this character; and in any case there would seem to be little danger from such indirect effects once the early stages of price liquidation have been passed, except possibly in the case of labour. It is clearly undesirable that labour employed on public works should be paid at wages much above those obtainable elsewhere, otherwise there may be difficulties in securing re-transfer to private employment at a later date.

All these circumstances, in so far as they are present, work to reduce the stimulating effects of an expansion of public expenditure below that which is accounted for in the direct calculation of increments to primary and secondary employment and incomes. It remains to discuss the 'tertiary' effects which are additional to those so accounted for. The 'Multiplier' analysis attempts to trace the effects on

consumption of an increase of investment at some previous date. But, as has already been pointed out, an increase of consumption may also react on investment by creating a need for more durable equipment and for stocks of raw materials and finished goods. Any additional employment or incomes so caused are not included in the 'secondary effects' of the original increment of investment, but are additional to them; and they have, of course, their own set of secondary effects.

It would seem at first sight as if a public works programme launched during a depression would not give rise to much in the way of tertiary effects; for there will be at first an excess of productive capacity and possibly also of stocks, and the 'Relation' is therefore sterilized. To this general proposition, however, there are important qualifications. In the first place, it must be remembered that rise of demand, whether for materials or for consumption goods, may well stimulate expenditure on repairs and replacements of existing plant; that is, may make it possible to maintain durable equipment which would otherwise have been reduced in amount and efficiency. The general figures quoted in an earlier chapter suggest that the variations of expenditure by private industry upon maintenance and repairs in the course of a trade cycle are in fact quite considerable. Second, it is clearly wrong to suppose that even in an acute general depression all industries suffer from excess capacity. For those in which the secular trend of demand is upwards, a depression shows itself merely as a slackening or a cessation of the rate of expansion of output and sales; and for them a slight increase of demand will very rapidly lead to an expansion of equipment. Domestic house-building and the manufacture of motor-cars, in the field of durable consumption goods, and the manufacture of electrical equipment were cases in point during the period from 1929 to 1933. Tertiary effects will be larger the greater is the volume of the increase in public expenditure and the higher is the value of the Multiplier; but it is also important that there should be a general expectation that the public expenditure will be maintained for some time, since an increase of consumption which is believed to be temporary will not give rise to much investment in plant extensions and the like.

That there should be tertiary effects is clearly essential if public expenditure is ultimately to be reduced; for the primary and secondary effects are not themselves self-perpetuating, and require to be constantly renewed by fresh expenditure. Public expenditure which caused no increase of private investment might, if it were large enough, absorb through its primary and secondary effects all the unemployed; but it could never be reduced without precipitating a depression. There is a strong suggestion that this was the fate which befell the public spending programme in the United States between 1933 and 1937. But if public expenditure stimulates a revival of private investment, it can be gradually reduced as this increases; indeed, its reduction at some time is essential to prevent an excessively rapid growth of total investment. It is, of course, quite possible that the process of transition may be assisted by stimuli to private investment other than public expenditure itself—such as a revival of the export industries, a fall in the rate of interest, or the imposition of a tariff which makes necessary an extension of capital equipment to provide for even an unchanged rate of consumption at home. If so, it is clearly all to the good; but if expenditure on public works is supposed to be more than a means of bridging the gap until independent stimuli to recovery appear, it must also have some tertiary effects of its own.

Consideration of 'tertiary' effects also leads to an explanation of an apparent difficulty in the Multiplier analysis which has attracted some attention. An increase of expenditure on public works means an injection of an additional flow of money into the economic system: it may, though it need not, also mean an increase of the total supply of money. But the Multiplier analysis supposes that, in either case, this additional flow rapidly 'disappears' through a series of leakages. What happens to it? As far as the internal leakages are concerned, they take the form of 'savings' of one kind or another—additions to the assets of the Unemployment Insurance Fund, to the cash balances of private individuals and businesses, and so on. If the process were to end there, it would of course be true that the initial flow disappeared through a fall in the velocity of circulation of

money. But if the initial public expenditure stimulates the desire of private businesses to invest, this investment is capable of being financed from the original 'leakages'. It is also possible, of course, that later instalments of public expenditure may be financed from the increased savings which have resulted from the earlier instalments. Thus it is not true that the Multiplier analysis involves the constant disappearance into inertness of money which is 'saved' and not spent on consumption. It merely implies that the re-entry of such funds into active use requires a stimulus over and above that which has been accounted for in the Multiplier analysis itself.

Internal leakages which originate at the primary and secondary stages find their way in part into the hands of the government and other public authorities, and either diminish their expenditure or increase their revenues. Besides the saving of monies previously spent on relief of the unemployed, there are increased contributions to the Unemployment Insurance Fund and to other social insurance funds; and an increase in investment and employment carries with it a rise in the yield of direct and indirect taxation. In the next chapter we have estimated the proportion of the initial expenditure which may be expected to 'come back' in these ways to the State, in order to determine the net cost of public works. Sums which accrue to public authorities in these ways are not directly an addition to the demand for consumption goods, and are usually regarded as leakages. How in fact they will be disposed of by the State depends on the general course of its financial policy. Part will probably be spent on an extension of current services; another part may be used to build up the balances of the social funds, or to repay debt, or to finance further investment.

External leakages, through payments for imports, stand on a different footing. They represent initially a real loss of income to the importing country. But in the rest of the world they constitute a primary increase of spending, which raises incomes and is itself subject to the Multiplier process. They will therefore ultimately have some beneficial effect even on the importing country; for a rise of income in the rest of the world is likely to lead to *some* increase in the

demand for its own exported products. Moreover, it is unlikely that any considerable expansion of imports will take place without some lowering in the international value of the currency; and this is also likely to prove beneficial to its exporting industries. Thus even additional expenditure on imported commodities may be said to have some faint secondary effects on incomes and employment at home. There is no material upon which to base an estimate of the magnitude of this secondary effect; but it would be safe to assume that, in the case of Great Britain, a considerable though unmeasurable part of the value of any increment of imports is likely to 'come back' in the form of an increased demand for exports, and, possibly, in reductions of defaults by overseas debtors of this country.

It may now be well to attempt a summary of the conclusions which can be obtained about the secondary and other effects of expenditure on public works during depression.

We have found that, under the conditions which ruled in this country between 1929 and 1933, a representative expenditure of one million pounds (net of land costs) might be expected to provide primary employment for about 4,000 men; of this about 2,500 would be directly employed on the work, and the remaining 1,500 on the production and transport of materials. This total of primary employment would be subject to a Multiplier which probably did not much exceed 1·5; that is, there would be additional secondary employment of 2,000, and a total of about 6,000 men for every million pounds spent. But it is clear that the value of these estimates is necessarily very limited. Not only is their statistical foundation in places rather weak, but they clearly do not, and cannot, embrace the whole problem. They may be over-optimistic, in that they take no account of the possibility that an increase of public investment may in certain circumstances diminish concurrently investment by private industry, or that part of the stimulus may be absorbed for the time being in mere reduction of pre-existing stocks. In the extreme, though highly improbable case, this might almost completely wipe out the indirect primary and the secondary employment, leaving as a result perhaps

an immediate increase in employment of only between 2,500 and 3,000 men per million pounds spent. On the other hand, they may be unduly pessimistic, in that they take no account of possible tertiary effects, both on stocks and on gross investment in fixed capital, or of possible favourable connexions between an increase of imports and the volume of exports, or of still more intangible effects on general business psychology. It must further be remembered that the estimates, such as they are, are based upon values and quantities applicable to an expenditure by local authorities of capital works of round about £100 millions per annum. It does not follow that, if this amount had been doubled, the amounts of primary and secondary employment created, and the more intangible tertiary and other effects, would have been altered in proportion. There is some reason to suppose that a considerably higher rate of expenditure would have caused some rise of prices and wages, and would therefore give a lower amount of primary and secondary employment per million pounds spent. On the other hand, neutralization through stock reduction would presumably have been proportionately much less important at a higher rate of expenditure; and beneficial tertiary effects should have been felt much more than in proportion.

The total effects of a public works programme cannot be embraced within the scope of any formula which professes to give exact or even approximate guidance in all situations. The most that such estimates can do is to provide a limited guide to the probable behaviour of certain variables under given assumptions about the psychological reactions of private business; but the validity of these assumptions in any particular case is necessarily surrounded by a haze of uncertainty.

## Statistical Appendix: a Re-calculation of the Multiplier

The general analysis follows closely that of Mr. Kahn in the *Economic Journal* of June 1931, but it has been found desirable to use a somewhat more complicated set-up to allow for certain distinctions that Mr. Kahn did not make. The statistical information now available makes possible more accurate estimation of the terms entering into the determination than Mr. Kahn was able to undertake.

Let us in the first place assume, as Mr. Kahn did, that the supply of consumption goods produced at home is perfectly elastic, so that their output can be increased without any rise of prices or wages. We will consider the effects of a unit increase in the amount of money spent on representative public works.

Let the distribution of this expenditure at the primary stages between wages and salaries, profits, and imports of unfinished goods and raw materials be $W'$, $P'$, and $R'$. Then, if we neglect for the moment the reduction of payments for unemployment benefit and the like, the addition to the national income at this primary stage is $W'$ plus $P'$. It is now required to find how much of this increment will appear again in the form of additional expenditure on home-produced consumption goods, and will so generate 'secondary' incomes; and how much of these will be spent on home-produced consumption goods; and so on until the initial stimulus is completely exhausted.

Let us say that recipients of 'primary' wages and salaries dispose of their additional income thus:

$mW'$ spent on home-produced finished consumption goods,[1]
$i_wW'$ spent on imported finished consumption goods,[2]
$s_wW'$ saved;[3]

and that profit recipients dispose of their additional income thus:

$nP'$ spent on home-produced finished consumption goods,
$i_pP'$ spent on imported finished consumption goods,
$s_pP'$ saved;

where
$$m+i_w+s_w = 1,$$
$$n+i_p+s_p = 1.$$

Then the first addition to expenditure on home-produced finished consumption goods is

$$mW'+nP' = k' \text{ (say)}.$$

Total leakages through imports at this stage are

unfinished goods: $R'$;
finished goods: $i_wW'+i_pP'$.

[1] The retail value of home-produced finished consumption goods, of course, includes the value of some imported raw materials, and therefore does not constitute a net addition to home income; but this is taken care of at the next stage in the analysis, where they will form part of $R$.

[2] Imported finished consumption goods only contribute to an addition to home income by the amount of the transport and distribution services included in their retail value.

[3] The portion of the increment of income 'saved' must be defined as that not spent on consumption within a definite period of time; which for our purposes should be the average length of the period between the generation of 'primary' and the first stage of the 'secondary' income.

Total leakages through saving at this stage are

$$s_w W' + s_p P'.$$

Now this expenditure on home-produced finished consumption goods $(mW' + nP')$ generates 'secondary' home income in the form of wages-and-salaries, and profits, and also foreign incomes, with which we are not concerned, in the form of payments for the imported raw materials. Let the distribution between these factors at this stage be $W$, $P$, and $R$;[1] and let the distribution remain constant at all subsequent stages.[2] Then we have by a similar process:

Additional expenditure on home-produced finished consumption goods is $(mW' + nP')(mW + nP)$.

Leakages through imports:

materials: $(mW' + nP')R$;

finished goods: $(mW' + nP')(i_w W + i_p P)$.

Leakages through savings:

$$(mW' + nP')(s_w W + s_p P).$$

Addition to national income:

$$(mW' + nP')(W + P).$$

This process of creation of secondary incomes continues indefinitely at a declining rate; so that, if we now put $k = (mW + nP)$, we have finally that

total additional expenditure on home-produced consumption goods is

$$k' + k'k + k'k^2 + k'k^3 + k'k^4 + \ldots = \frac{k'}{1 - k}.$$

Total leakages through imports are

$$R + Rk' + Rk'k + Rk'k^2 + \ldots \text{ (materials)} +$$
$$+ (i_w W' + i_p P') + (i_w W + i_p P)k' + (i_w W + i_p P)k'k^2 +$$
$$+ (i_w W + i_p P)k'k^3 + \ldots \text{ (finished goods)}$$
$$= \left[R + \frac{Rk'}{1 - k}\right] + \left[(i_w W' + i_p P') + (i_w W + i_p P)\frac{k'}{1 - k}\right].$$

Total leakages through savings, similarly, are

$$(s_w W' + s_p P') + (s_w W + s_p P)k' + (s_w W + s_p P)k'k +$$
$$+ (s_w W + s_p P)k'k^2 \ldots = (s_w W' + s_p P') + (s_w W + s_p P)\frac{k'}{1 - k}.$$

[1] The analysis departs from that of Mr. Kahn at this point, in that (*a*) he assumes the same distribution for the consumption-goods industries as for the constructional —i.e. that $W'$, $P'$, and $R'$ are the same as $W$, $P$, and $R$; and (*b*) in that he makes no explicit mention of $s_w$.

[2] The distribution might, of course, change in subsequent stages, particularly if our initial assumption of perfect elasticity in the supply of consumption goods is relaxed.

Total leakages are

$$(R'+i_wW'+i_pP'+s_wW'+s_pP)+$$
$$+\frac{k'}{1-k}(R+i_wW+s_wW+i_pP+s_pP)$$
$$=[R'+(1-m)W'+(1-n)P']+\frac{k'}{1-k}[R+(1-m)W+(1-n)P]$$
$$=(R'+W'+P')-(mW'+nP')+$$
$$+\frac{k'}{1-k}[(R+W+P)-(mW+nP)]$$
$$=1-k'+\frac{k'}{1-k}(1-k)=1.$$

That is, the original injection goes on creating new incomes in successive stages until it disappears through leakage; but the bulk of the total increase occurs in the first two or three stages.

The total addition to national income is

$$(W'+P')+(mW'+nP')(W+P)+$$
$$+(mW'+nP')(mW+nP)(W+P)+\text{etc.}$$
$$=(W'+P')+(W+P)\frac{k'}{1-k},$$

where, it must be remembered, $W'+P'$ is the primary income generated.

It is clear that, if we define the Expenditure Multiplier as

$$\frac{\text{the total addition to national income}}{\text{the initial expenditure on public works}},$$

it is equal to this latter expression

$$(W'+P')+(W+P)\frac{k'}{1-k},$$

since the initial expenditure was one unit. Also the ratio of total increment in income to primary income generated—i.e. the Income Multiplier—is clearly

$$1+\frac{(W+P)k'/(1-k)}{W'+P'}.$$

The Employment Multiplier is defined as

$$\frac{\text{total additional employment}}{\text{total primary employment}}.$$

It is clear that, if the average wage at the primary stage be £$a$, and at the secondary stage £$b$, then

$$\text{employment at the primary stage is } \frac{W'}{a} \text{ man-years,}$$

employment at the secondary stage is $\frac{Wk'/(1-k)}{b}$ man-years,

and the Employment Multiplier is

$$1+\frac{W\{k'/(1-k)\}/b}{W'/a}=1+\frac{W}{W'}\times\frac{a}{b}\times\frac{k'}{1-k}.$$

It is clear that the Income and Employment Multipliers are only equal if[1]

$$\frac{W'+P'}{W+P}=\frac{W}{W'}\frac{a}{b}.$$

*The Evaluation of the Terms Involved*

*W', P', and R'.*

These are obtained from our earlier work on primary employment.[2] Using the general ratios there obtained we have

| | *1929, 1930, 1931* | *1932, 1933, 1934, 1935, 1936* |
|---|---|---|
| $R'$ . . . . . | 0·36 | 0·25 |
| $W'$ . . . . . | 0·46 | 0·54 |
| $P'$ . . . . . | 0·18 | 0·21 |

It is to be noticed that with the exception of the ratios for $R'$ these are not strictly marginal but average ratios. Also profits here (i.e. from the Census of Production figures) are 'Rent, royalties, rates and taxes, advertisement and selling costs, and all other similar charges as well as profits', whereas the later figures for $W$, $P$, and $R$ (from the *Economic Journal*, September 1938) are 'gross profits before the deduction of depreciation, maintenance and salaries above £250'. But see page 346.

*R.*

This is the ratio

$$\frac{\text{increment of imported raw materials and unfinished goods}}{\text{increment of total retail value of home-finished goods}},$$

where exported goods, whether finished or unfinished, are regarded as finished as far as this country is concerned. This retail value of home-finished goods consists of (Home-produced or Finished Consumption Goods + Capital Goods whether consumed at home or exported); which is the same thing as (Home Consumption + Investment + All

[1] Keynes seems at least in part aware of this: 'For there is no necessary presumption that the shapes of the relevant portions of the aggregate supply functions for different types of industry are such that the ratio of the increments of employment in the one set of industries to the increment in demand which has stimulated it will be the same as in the other set of industries.' (*General Theory*, chap. x, pp. 115–16.)

[2] See previous chapter.

Exports—Imports of Finished Goods); which is the same thing as Home Consumption + Investment + All Exports—(All Imports—Imports of Unfinished Goods). But Gross National Income is Home Consumption + Investment + All Exports—All Imports + the 'Invisibles'. Hence Retail Value of Home-finished Goods equals Gross National Income—the 'Invisibles' + Imports of Unfinished Goods. However,

(*a*) Of the Invisibles, Shipping Income is derived from the Home-produced Services and should therefore be included in the Retail Value of Home-finished Goods and Services.

(*b*) Changes in the value of Stock held due to *Price* changes rather than actual movements of physical stock form no part of the Retail Value of Home-Finished Goods. For this reason the item—Changes in Working Capital—which forms part of Investment should perhaps be excluded. Two tables are given overleaf on the assumption that we exclude or include this item.

We have then finally, Retail Value of Home-finished Goods equals:

| (*a*) Gross National Income minus | *or* | (*b*) Gross National Income minus |
|---|---|---|
| The Invisibles less Shipping Income | | The Invisibles less Shipping Income |
| plus | | plus |
| Imports of Unfinished Goods | | Imports of Unfinished Goods |
| | | minus |
| | | Changes in Working Capital |

equals:

| (*a*) Gross National Income | *or* | (*b*) |
|---|---|---|
| plus | | |
| Shipping Income | | as (*a*) |
| plus | | |
| Imports of Unfinished Goods | | minus |
| minus | | Changes in Working Capital |
| The Invisibles | | |

We have then from C. G. Clark, *National Income and Outlay*, and the Board of Trade Returns the tables overleaf:

Our ratio $R$ is the ratio of increments in column 3 to those in columns 6 and 7, and to obtain this we construct a scatter-diagram of these terms. The slope of the line of closest fit will be $R$. We obtain as we should expect, two distinct sets of points for the years preceding and following the tariff changes of 1932.

| Year | Gross National Income (1) | Shipping Income (2) | Imports of Unfinished Goods (3) | Invisibles (4) | Changes in Working Capital (5) | Retail value of Home-finished Goods (a) (6) | Retail value of Home-finished Goods (b) (7) |
|---|---|---|---|---|---|---|---|
| 1929 | 4,994 | 130 | 617 | 483 | −40 | 5,258 | 5,298 |
| 1930 | 4,754 | 105 | 491 | 413 | −80 | 4,937 | 5,017 |
| 1931 | 4,361 | 80 | 380 | 303 | −16 | 4,518 | 4,534 |
| 1932 | 4,335 | 70 | 313 | 259 | −65 | 4,459 | 4,524 |
| 1933 | 4,440 | 65 | 326 | 265 | −86 | 4,566 | 4,652 |
| 1934 | 4,755 | 70 | 374 | 293 | 0 | 4,906 | 4,906 |
| 1935 | 5,052 | 75 | 385 | 299 | 40 | 5,213 | 5,173 |
| 1936 | 5,380 | 95 | 457 | 303 | 40 | 5,639 | 5,589 |

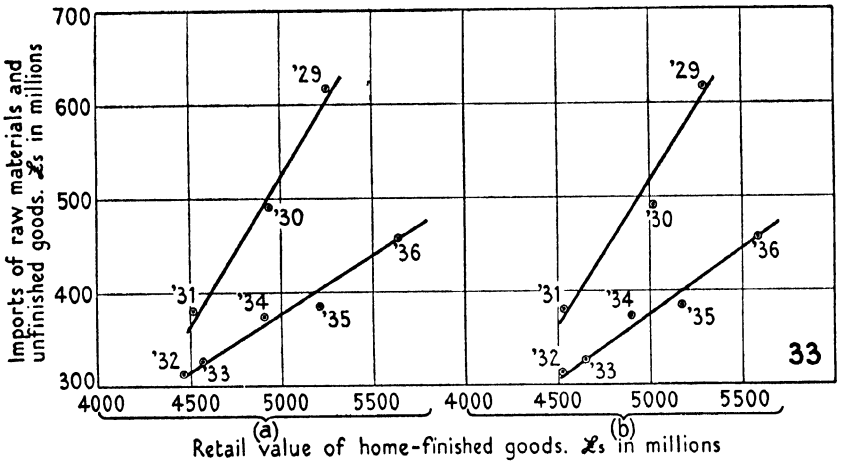



FIG. 33.

| | (a) | (b) |
|---|---|---|
| 1929–31 . . . . | 0·3175 | 0·3002 |
| 1932–6 . . . . | 0·1164 | 0·1319 |
| $r$ (correlation . . . . | 0·9936 | 0·9784 |
| coefficient) . . . . | 0·9873 | 0·9876 |

If we take the following values it is clear that no great error will be involved:

1929–31 . . . $R = 0·31$
1932–6 . . . $R = 0·12$

*W and P*

We have the relation $W+P+R = 1$, so that, having calculated $R$, the *ratio* of $W$ to $P$ is all that is now needed.

C. G. Clark gives figures in the *Economic Journal* of September 1938 of Wages and Salaries, Profits and Indirect Taxation. This latter item

we have treated as a form of Government Income and in our analysis included in the general heading of Non-Labour Income. At a later stage 'Consumption Goods and Services purchased by Government' is included in Non-Labour Income Recipients' Consumption.

A scatter-diagram is constructed of Labour Income and Non-Labour Income. The slope of the regression line(s) fitted to the 36 points available then should give us the marginal value of the ratio $W/(W+P)$.

It is clear that we have not one line but two at least. Clark, dealing with the complementary figures of Profits, makes the break between the two curves at the first quarter of 1933; but examination of the diagram seems to show that there is little or no justification for this determination, and that more truly we have one clearly defined line from 29 i to 31 ii, another from 33 iii to 37 iv, and that for the intermediate periods there is no evidence that the points lie on either line: that in fact they cluster. This judgement is strengthened by the discovery that for the quarters 32 iii, 33 i, 33 ii there appear to be errors in the tables provided by Clark, ranging from £5 millions to £10 millions, viz.

| *Quarter* | *Mean figure for national income* | *Wages and salaries below £250* | *Gross profits* | *Indirect taxation* |
|---|---|---|---|---|
| | (Table I) | | (Table II) | |
| 32 iii | 1,085 | 442 | 512 | 136 |
| 33 i | 1,069 | 475 | 475 | 137 |
| 33 ii | 1,107 | 451 | 510 | 136 |

The errors probably lie in the second and third columns, but it is impossible to determine in which. The general effect of this is to make it unsafe to decide on which line these points, from the end of 31 to the middle of 33, actually lie.

For the remaining periods we have for the marginal values of $W/(W+P)$

1929 and 1930 . . . . . 0·19
1934, 1935, 1936, and 1937 . . . . 0·37

This gives us finally:

| | *W* | *P* | *R* |
|---|---|---|---|
| 1929 . . . . | 0·131 | 0·559 | 0·31 |
| 1930 . . . . | 0·131 | 0·559 | 0·31 |
| 1931 . . . . | 0·131 | 0·559 | 0·31 |
| 1932 . . . . | .. | .. | 0·12 |
| 1933 . . . . | .. | .. | 0·12 |
| 1934 . . . . | 0·326 | 0·554 | 0·12 |
| 1935 . . . . | 0·326 | 0·554 | 0·12 |
| 1936 . . . . | 0·326 | 0·554 | 0·12 |
| 1937 . . . . | 0·326 | 0·554 | 0·12 |

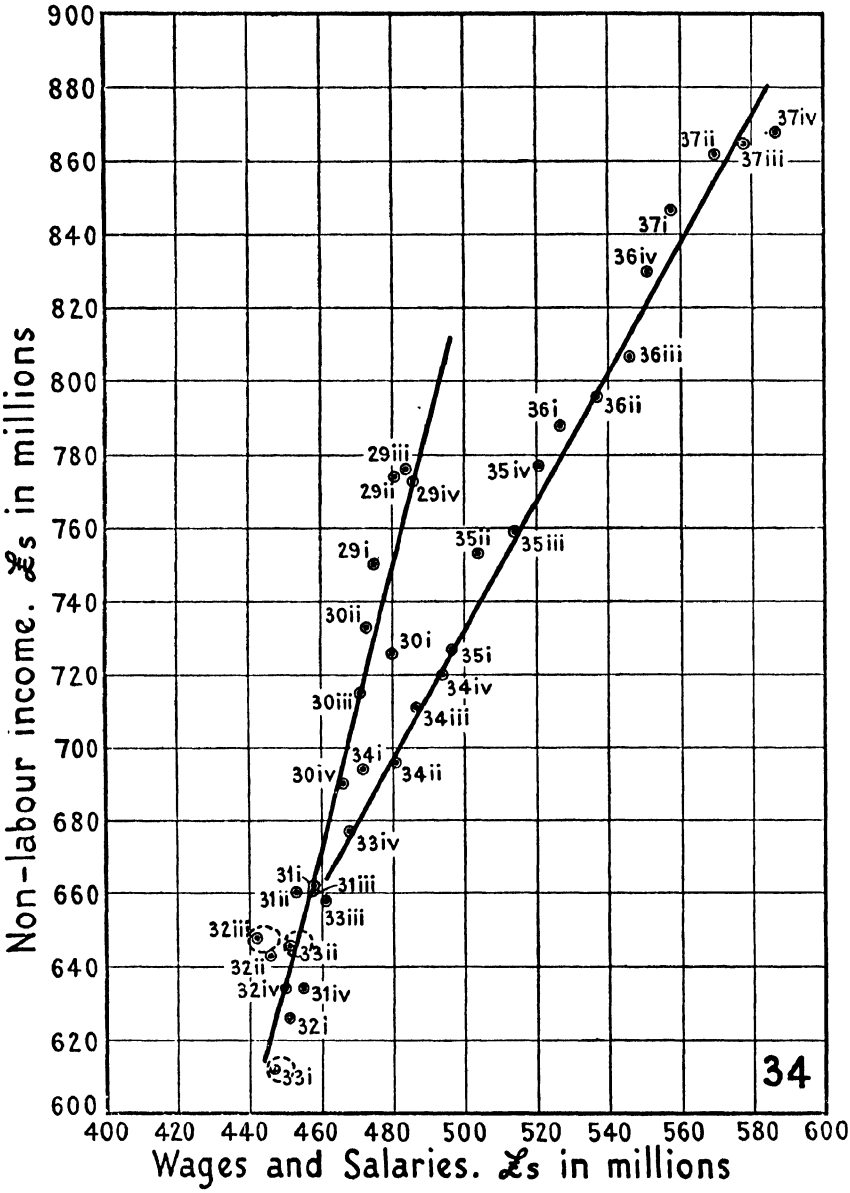



FIG. 34. *W and P*. Quarterly Figures

Source: *Economic Journal*, September 1938

1929 i–1931 iv

$W = 0{\cdot}2260P + 308{\cdot}98$

$r = 0{\cdot}9602$.

Marginal Value of $\frac{W}{W+P} = 0{\cdot}190$.

1933 iii–1937 iv

$W = 0{\cdot}5715P + 80{\cdot}30$

$r = 0{\cdot}9936$.

Marginal Value of $\frac{W}{W+P} = 0{\cdot}365$.

*m*

To evaluate *m* we have to remember that the unemployed man has already an income from Unemployment Insurance or Poor Relief. Let this be *U*. Then, if the proportion *m'* that he spends of the *increase* of his income when he becomes employed is spent on home-produced consumption we have:

$$mW = m'(W - U),$$
$$m = m'(1 - U/W),$$

which introduces two new quantities $U/W$ and $m'$.

*U/W*

This can be determined from the figures of payments out of the Unemployment Insurance Fund (*Stat. Abstract*), Poor Law Outrelief (*Local Taxation Returns* and elsewhere), and figures of numbers registered at the exchanges as unemployed, together with those in receipt of poor relief and not registered. This enables one to calculate *U* for the period 1929–36 when the L.T.R. figures end.

*W*, the average wage, is taken from Clark's *National Income and Outlay*, Table 28. In previous work we have taken the figure of £150, but in the case of secondary employment, female labour is likely to be a substantial proportion of the whole and these figures, which include it, are more suitable.

| *Year ending 31 March* | *Total payments to the unemployed persons, £000's* * | *Total number of unemployed persons (thousands)* † | *U* | *U C.C. Table 28* | $\frac{U}{W}$ | *Date* | *Single man (16–64)* | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Weekly rate* | *Full yearly rate* |
| 1928 | 43,169 | 1,068 | 40·42 | 116·4 | 0·347 | | | £ |
| 1929 | 51,924 | 1,301 | 39·91 | 115·3 | 0·346 | 19 Apr. 1928 | 17*s.* | 42·20 |
| 1930 | 50,410 | 1,314 | 38·36 | 113·9 | 0·337 | | | |
| 1931 | 95,581 | 2,219 | 43·07 | 114·2 | 0·377 | | | |
| 1932 | 116,200 | 2,776 | 41·86 | 112·7 | 0·371 | 8 Oct. 1931 | 15*s.* 3*d.* | 39·65 |
| 1933 | 111,075 | 2,846 | 39·03 | 111·4 | 0·350 | | | |
| 1934 | 96,145 | 2,443 | 39·36 | 111·1 | 0·354 | | | |
| 1935 | 96,756 | 2,209 | 43·80 | 112·2 | 0·390 | 1 July 1934 | 17*s.* | 42·20 |
| 1936 | 93,303 | 2,043 | 45·67 | 114·2 | 0·400 | | | |
| 1937 | | | | | | | | |

* That, is Outrelief to persons ordinarily engaged in some occupation plus Payments from Unemployment Fund direct and through Associations.

† That is, Persons registered at Exchanges plus persons receiving Outrelief and not registered at Exchanges.

*m'*

The value of *m'*—the proportionate increment of expenditure on Home-produced Consumption Goods—depends upon the character of goods bought. In general, it seems safe to assume that the effect of *unemployment* on the family budget is to reduce or annihilate expenditure on the consumer's durable goods. That is, the unemployed family devotes the major part of its income to food, while household utensils, furniture, and clothing are allowed to become worn out. The effect of *employment* therefore will be to provide funds for the purchase or renewal of these durable or semi-durable goods: changes in the food standard will not be so large or so immediate, changes in housing standards probably negligible. Expenditure on drink, tobacco, and entertainment will also probably be slow to react. We have then:

$$1 = i''_w + s_w + m', \quad \text{where } i''_w =$$

$$\frac{\text{extra imports of finished household utensils, furniture and clothing}}{\text{extra income available}}$$

and $s_w$ = proportion of extra income saved by the newly employed worker. Very few workers neglect to put aside small sums for the rainy day of unemployment. If unemployment does not in fact occur, such savings are frequently spent on holidays or other special services, and this does not in fact represent a net saving over the period containing both the saving and the spending. But over any shorter period they are certainly withdrawals of purchasing power. Certainly, too, at any *given* time there are savings taking place for *future* holidays, &c.

Clark is, however, quite correct in saying that it is extremely difficult to make any estimate of these savings. But he provides the basis for an estimate of their magnitude in his Table 86[1] Working and Middle Class Savings, which is composed of Post Office Savings Bank Deposits, Life Insurance, and Repayments to Building Societies. Since the figures also include middle-class savings, the figure of Wages used against this are those of Wages and all Salaries as obtained from his Table 39.[2]

If this ratio of normal saving of the employed worker to his aggregate income be $S$, then the ratio of the newly employed worker's saving to the increment in his income, assuming that he saved nothing when unemployed, is given by $\frac{S}{1-U/W}$. From this analysis we obtain the following values of $S$:

| *1928* | *1929* | *1930* | *1931* | *1932* | *1933* | *1934* |
|---|---|---|---|---|---|---|
| 0·031 | 0·026 | 0·035 | 0·032 | 0·046 | 0·047 | 0·045 |

[1] C. G. Clark: *National Income and Outlay*, page 189.
[2] Ibid., page 94.

The ratio $i_w$ needs careful examination.

It is

$$\frac{\text{extra imports of certain finished consumption goods}}{\text{extra income due to employment}}$$

$$= \frac{\text{extra imports of certain finished consumption goods}}{\text{extra income devoted to the consumption of such goods whether home-produced or imported}} \times$$

$$\times \frac{\text{extra income devoted to consumption, etc.}}{\text{total extra income}}$$

$$= \frac{\text{total imports of such goods}}{\text{total retail turnover of such goods}} \times (1 - S).$$

The retail sales of the goods specified can be obtained from the figures published in the *Bank of England Summary* and elsewhere as an index; and Feaveryear's estimates for the absolute figures are available from 1930. Imports are obtainable by summing the required articles in the Board of Trade's annual figures. The scatter-diagram in this case is very indeterminate and we are forced to assume the average values. This is therefore undoubtedly the weakest link in the determination. We get then the following table:

*Certain consumption goods*

| *1930* | *1931* | *1932* | *1933* | *1934* | *1935* | *1936* | |
|---|---|---|---|---|---|---|---|
| 504·5 | 484·0 | 464·0 | 475·0 | 494·0 | 519·0 | 537·0 | Retail Sales |
| 30·7 | 29·4 | 12·9 | 12·6 | 12·8 | 12·5 | 14·1 | Imports |
| 0·0609 | 0·607 | 0·0278 | 0·265 | 0·259 | 0·0241 | 0·0263 | Ratio |
| 0·059 | 0·059 | 0·027 | 0·025 | 0·025 | 0·023 | 0·023 | $i_w$ |
| 0·906 | 0·909 | 0·927 | 0·928 | 0·928 | 0·932 | 0·932 | $m' = 1 - i'_w - s_w$ |
| 0·663 | 0·623 | 0·629 | 0·650 | 0·646 | 0·610 | 0·600 | $1 - U/W$ |
| 0·601 | 0·566 | 0·583 | 0·603 | 0·600 | 0·569 | 0·561 | $m$ |

$n$

From the figures provided by Clark in the *Economic Journal* of September 1938 it is possible to make an estimate of the value of this.

Clark's figures need some adjustment, for the figure of Consumption on the part of the recipients of Non-Labour Income is obtained by subtraction from Total Consumption of all the Wages and Small Salaries and the Unemployment Benefit, &c., received by these classes. This assumption that the wage-earner does not save is one that we have earlier rejected. From the figures given by Clark a corrected series can now be derived. The Marginal Consumption *of all goods* per extra £1 going to Non-Labour Incomes, i.e. $(n + i_p)$, can then be calculated

from the slope of the regression line of the scatter-diagram constructed from Consumption of Non-Labour Income Recipients and their Income. The value obtained is, over the whole period, 0·434. The Marginal Imports of Consumption Goods, $i_p$, can also be obtained by

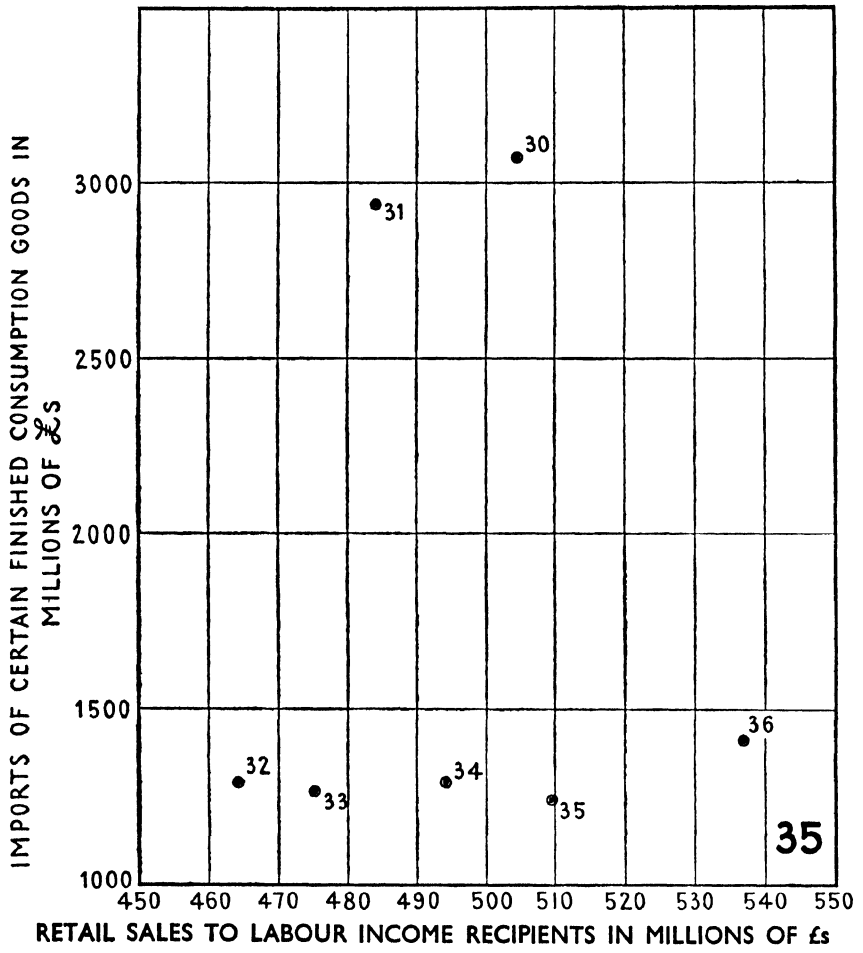



FIG. 35

the methods used previously for other similar cases. From the scatter-diagram of imports and income we get again the usual two sets for the periods before and after tariff changes:

| | |
|---|---|
| 1929–32 . . . . . | 0·0105 |
| 1933–7 . . . . . | 0·0085 |

The differences between these two gives us the marginal increment

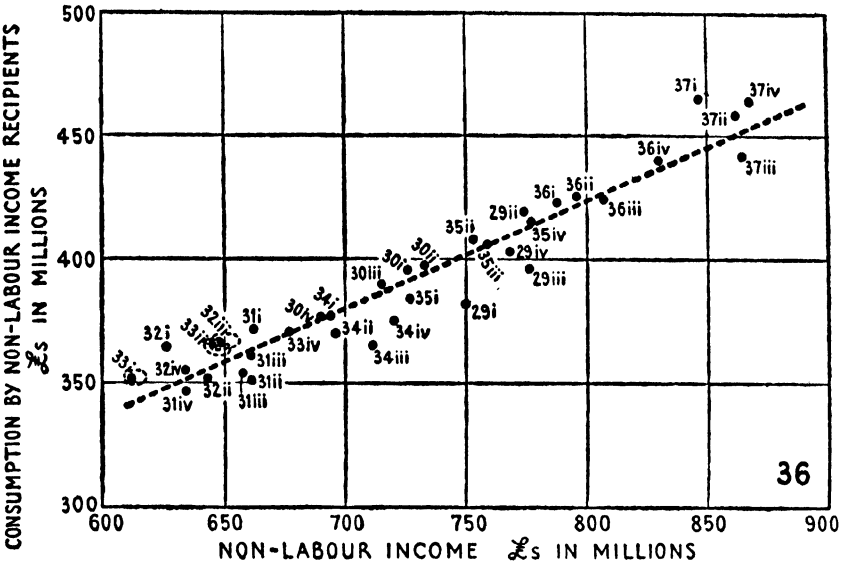

CONSUMPTION BY NON-LABOUR INCOME RECIPIENTS £s IN MILLIONS
NON-LABOUR INCOME £s IN MILLIONS
500
450
400
350
300
600
650
700
750
800
850
900
36
37i
37iv
37ii
36iv
37iii
36i
36ii
29ii
36iii
35ii
35iv
29iv
30ii
35iii
30iii
29iii
30i
35i
29i
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33iv
31i
32i
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32ii
31iv
31iii

FIG. 36

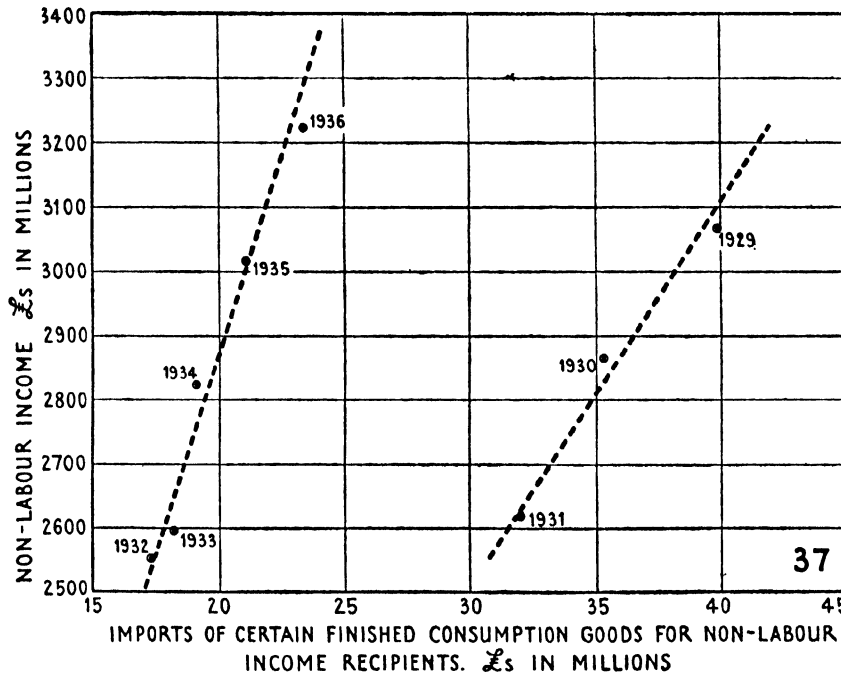

NON-LABOUR INCOME £s IN MILLIONS
IMPORTS OF CERTAIN FINISHED CONSUMPTION GOODS FOR NON-LABOUR INCOME RECIPIENTS. £s IN MILLIONS
3400
3300
3200
3100
3000
2900
2800
2700
2600
2500
15
20
25
30
35
40
45
37
1936
1935
1934
1933
1932
1930
1931
1929

FIG. 37

spent on home-produced consumption goods by the Non-Labour Income Recipient, per unit increment of Income.

$n$ therefore equals 0·4235. 1929–31.
0·4255. 1932–7.

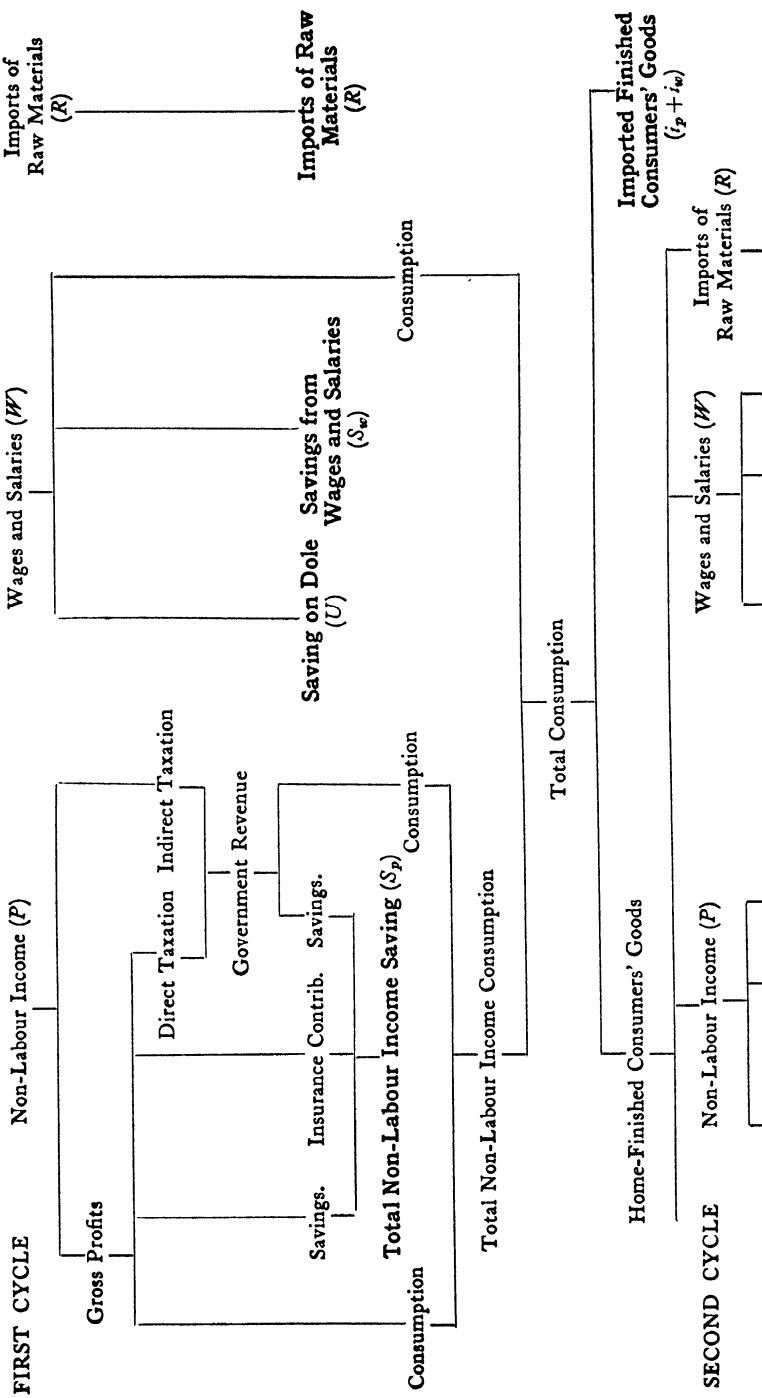
$a$, $b$

$a$ following C. G. Clark we take to be £150.[1]

$b$ is taken from C. G. Clark, *National Income and Outlay*, Table 28.

We have now available all the information required for the final calculation of the Multiplier. But it may be necessary to secure our statistical 'set-up' against some objections which may be raised. We have treated 'saving on the dole' as a leakage but apparently we have not made similar allowances for contributions to health insurance. Colin Clark's figures of wages and salaries which we have used are exclusive of workers' contributions to social insurance funds. Where these contributions do appear in Clark's division of the national income is nowhere made clear. But it seems probable that they are included with other government income under gross profits. It is less likely that these payments on the part both of employers and employees are included in indirect taxation. But even if that were the case they are covered by our treatment. For we determined savings out of gross profits by calculating the marginal proportion of an increment of non-labour income that is not devoted to consumption. It is clear that this includes all leakages due to contributions to social insurance funds as well as to increments in tax yields. Since indirect taxation figures, which include customs and excise, are part of the non-labour income in our analysis, and since we calculated the marginal propensity to consume for the whole of this non-labour income, all leakages through 'savings' on the part of the State have been completely taken care of. The following diagram shows in a schematic way where the various leakages occur and how they are taken into account in our calculation.

[1] See also pp. 302–3 of Chapter VI for a discussion of this figure and reference.


FIRST CYCLE
Non-Labour Income (P)
Gross Profits
Direct Taxation
Indirect Taxation
Government Revenue
Savings.
Insurance Contrib.
Savings.
Total Non-Labour Income Saving ($S_p$)
Consumption
Consumption
Total Non-Labour Income Consumption
Wages and Salaries (W)
Saving on Dole (U)
Savings from Wages and Salaries ($S_w$)
Consumption
Imports of Raw Materials (R)
Imports of Raw Materials (R)
Total Consumption
SECOND CYCLE
Home-Finished Consumers' Goods
Non-Labour Income (P)
Wages and Salaries (W)
Imports of Raw Materials (R)
Imported Finished Consumers' Goods ($i_p + i_w$)

The final results of our re-calculation of the Multiplier are given in the following table.

| *Year* | $W'$ | $P'$ | $W$ | $P$ | $m$ | $n$ | $k'=mW'+nP$ | $k=mW+nP$ | $a/b$ |
|---|---|---|---|---|---|---|---|---|---|
| 1929 | 0·46 | 0·18 | 0·131 | 0·559 | .. | 0·4235 | .. | .. | .. |
| 1930 | 0·46 | 0·18 | 0·131 | 0·559 | 0·601 | 0·4235 | 0·352 | 0·316 | 1·317 |
| 1931 | 0·46 | 0·18 | 0·131 | 0·559 | 0·566 | 0·4235 | 0·336 | 0·311 | 1·313 |
| 1932 | 0·54 | 0·21 | .. | .. | 0·583 | 0·4255 | 0·404 | .. | 1·331 |
| 1933 | 0·54 | 0·21 | .. | .. | 0·603 | 0·4255 | 0·415 | .. | 1·346 |
| 1934 | 0·54 | 0·21 | 0·326 | 0·554 | 0·600 | 0·4255 | 0·413 | 0·432 | 1·350 |
| 1935 | 0·54 | 0·21 | 0·326 | 0·554 | 0·569 | 0·4255 | 0·396 | 0·421 | 1·337 |
| 1936 | 0·54 | 0·21 | 0·326 | 0·554 | 0·560 | 0·4255 | 0·391 | 0·419 | 1·313 |

| *Year* | $1+\frac{1-k'}{k}$ | $1+\frac{(W+P)\frac{k'}{1-k}}{W'+P'}$ (*the income multiplier*) | $(W'+P')+(W+P)\frac{k'}{1-k}$ (*The expenditure multiplier*) | $1+\frac{W}{W'}\frac{a}{b}\frac{k'}{1-k}$ (*The employment multiplier*) |
|---|---|---|---|---|
| 1930 . | 1·5146 | 1·6367 | 1·0475 | 1·1932 |
| 1931 . | 1·4877 | 1·6020 | 1·0253 | 1·1825 |
| 1932 . | .. | .. | .. | .. |
| 1933 . | .. | .. | .. | .. |
| 1934 . | 1·7271 | 1·8522 | 1·3891 | 1·5847 |
| 1935 . | 1·6839 | 1·8024 | 1·3518 | 1·5522 |
| 1936 . | 1·6730 | 1·7897 | 1·3422 | 1·5337 |

# VIII

## THE FINANCE OF PUBLIC INVESTMENT

### I

A PROPER choice of financial methods must have almost first place in any plan for the use of public investment as an instrument for the control of the trade cycle. First, it must largely determine whether an expansion of public investment in depression can have effects which are stimulating to the economic system as a whole, rather than merely to particular industries at the expense of others. Second, the extent to which local authorities and semi-public and private enterprises can be persuaded to co-operate in a plan of controlled investment must depend, given our present institutions, mainly on the financial inducements and controls which can be operated by the central government. Third, the effect of any such plan on general business confidence is likely to depend a great deal on how it is financed. Fourth, the degree to which a large-scale public works programme must burden the future budgets of the State and local authorities, and thereby make its repetition in a later depression difficult, is also a matter of great importance and some controversy. And lastly, the problem of controlling a boom may perhaps turn almost as much on financial methods as on variations in the amounts of constructional work actually carried out by public authorities.

We have already observed that if full benefit is to be obtained from the control of public investment, its finance must be so arranged as to secure a net increase of spending in times of depression, and in times of prosperity effects which shall be steadying rather than inflationary. We will therefore first examine how these fundamental objects may be achieved.

As a general rule, it may be said that the first objective will not be achieved if in depression additional taxation is imposed to finance an increase or stabilization of expenditure upon construction. If additional taxation is paid from a reduction of taxpayers' expenditure on consumption, there

is at best a mere substitution of public for private expenditure and of demand for capital goods for demand for consumption goods. This substitution, unless it gives rise to some beneficial 'tertiary' effects, cannot constitute a net increase of spending.[1] It will probably cause some net decrease; for a rise of taxation will usually have some deterrent psychological effects on the level of private investment, and may also lead to an attempt to hold larger balances in cash or other liquid assets in order to finance the tax-payments. On the other hand, it is true that increases of taxation will be met by some taxpayers from a reduction of savings rather than of consumption. Under depression conditions this would mean a substitution of expenditure by the State for the holding of idle balances by private persons, and there would therefore be some increase of spending. This would be particularly true of a rise of income-tax and surtax on large incomes. But it is probably in these cases that the deterrent effects of the increased taxation on private investment will also be greatest: so that even here it would not be wise to count on any *net* increase of spending. We may therefore dismiss additional taxation as a source for the finance of public investment during depression. During prosperity, on the other hand, a substitution of taxation for other means of finance may properly serve as an instrument for steadying or checking the rate of growth of consumers' demand or private investment.

There remain the two other methods, of drawing on accumulated reserves, and of borrowing, either of which may be expected under depression conditions to result in a net increase of spending. In principle, the use of accumulated reserves is certainly to be preferred, because it is less likely to undermine confidence in the financial stability of the borrowing authority, and because it does not involve any troublesome aftermath of interest and repayment. But the use of reserves in depression presupposes their previous accumulation in prosperity. Therein lies the first difficulty. As will be shown later, the practice of building up reserve and repair funds already exists to some extent among local authorities and public utility enterprises, and it might con-

[1] The tertiary effects may be, almost equally easily, adverse.

ceivably be much extended by them and introduced also into the financial arrangements of the central government. This would provide a suitable means of financing anti-cyclical movements of repair work, which would waste much of their effect if they were financed out of current revenue. It would not, however, touch the question of large extensions of capital expenditure. It would be rash to assume that the accumulation of a substantial anti-slump reserve for this purpose by the central government is politically impossible; for the experiment has never been tried in this country except in very limited measure with the Road Fund, and quite considerable reserves for other purposes than public works have in fact been so accumulated, notably by the Unemployment Insurance Fund since 1933. But clearly the political difficulties are considerable, as the history of the Road Fund shows.

A further difficulty has been suggested in the use of accumulated reserve funds. If they were held in the form of securities, their realization in time of need might both involve a considerable capital loss and have damaging deflationary effects on the level of security prices in general. On the other hand, if they were held in gold or as an idle cash balance, they would not earn any interest. These difficulties are probably not very serious. Their extent depends partly on the type of securities held, partly on the degree of co-operation of the banking system. If a wide range of national and local government securities are held, there is little danger of forcing down the price of any particular security; and, since the reserves will have been accumulated probably in prosperity, when interest rates may well have been high, a capital gain is more probable than a capital loss. The danger that realization on a large scale might force down security prices in general is parallel to the possible effects of the issue of a new loan, and is the same in both cases. It will only materialize if both the demand of the general public for securities is inelastic, and if they cannot be taken up through an expansion of bank credit. The experience of the past does not suggest that these dangers are very great.

A method of finance which is intermediate between the use of accumulated reserves and new borrowing is the

diversion in depression of the annual provision out of taxation for interest and sinking-fund payments (other than statutory annual repayments of particular loans) on national and local debt. This method was suggested, for the central government, by Professor Bowley in his evidence before the Colwyn Committee in 1927.[1] He advocated a large permanent provision for sinking fund—perhaps a £100 millions a year—a portion of which could be used instead for the finance of public works as soon as a severe depression developed. Annual payments from taxation to sinking fund must have at such a time deflationary effects. Their diversion to the finance of public works would remove these and at the same time automatically provide part of the funds necessary. The efficacy of this plan depends, of course, on the assumption that the permanent provision will be maintained when a depression develops. But in fact, after 1929 this was not done; the sinking-fund provisions were first reduced and then suspended altogether, because an actual increase of taxation would have been necessary to maintain them. In the case of local authorities, as we shall see in a moment, sinking-fund payments from revenue were rigidly maintained while fresh borrowing was being incurred; and the effect of this was to reduce to small proportions the amount of *net* borrowing actually undertaken, and thus to reduce the net addition to spending which resulted from public works,[2] since most of it merely offset the deflationary effects of the amortisation operations.

In fact, it is likely that any considerable extension of public works expenditure in depression would have to be financed largely by borrowing, and would therefore add immediately to national and local debt. It is often objected that this is a decisive objection because, unless amortisation can be accomplished very rapidly, a cumulative expansion of debt, and of the revenue burdens of interest and sinking-

[1] *Report of Committee on National Debt and Taxation*, 1927, pp. 323 ff.

[2] As compared with a situation in which amortisation was suspended: i.e. an equivalent increase of spending might have been achieved by suspending amortisation without expanding public works; but public works with suspension in addition would have had a much greater effect than was actually achieved. The third possibility—amortisation, but no public works—would, of course, have been the worst of all.

fund payments, must take place over several depressions until the credit of the borrowing authorities is finally undermined. However, if interest and amortisation payments are commenced at once, they will involve an increase of taxation, which must have deflationary effects. These objections require careful examination.

In the first place, it must be noticed that the extent of the burden on future budgets depends on the nature of the assets created. Borrowing to finance public works differs from borrowing for current expenditure or for expenditure on war or armaments, in that the assets created increase to a greater or smaller degree the productive power of the community and its ability to pay more in taxes. Moreover, as we have already seen, a considerable part of public investment is self-liquidating in the strict budgetary sense that the prices which consumers may be expected to pay for the services it renders are sufficient to cover running charges and interest and amortisation of capital invested. This is broadly true of investment in the Post Office, in the trading services of local authorities, and in the Central Electricity Board and the London Passenger Transport Board.[1] In addition, with other types of public investment, such as local authority housing, the construction of swimming-baths, and the like, non-tax receipts contribute a substantial portion of the annual charges. These are all cases where the net burden on future budgets is necessarily small, irrespective of the phase of the trade cycle in which the investment is done. If the depression phase is chosen, rather than prosperity, there may be some immediate loss of revenue: but against this there will be certainly lower interest charges and construction costs.

Second, it is claimed that if public investment, whether self-liquidating or not, is carried out in times of heavy unemployment, there is an additional financial saving. This comes, in so far as the investment constitutes a net increase of spending, and not otherwise, from the saving to public

[1] Of the £660 millions of capital expenditure by local authorities in England and Wales between 1929 and 1936, £180 millions was on the trading services, another £180 on housing, and about £20 millions on other partly self-liquidating investment. £78 millions of the £191 millions of constructional work aided by the U.G.C. was described as 'revenue-producing'.

authorities of the cost of maintenance of the unemployed, and from the increased yields of taxation at the ordinary rates which will result from the increase of national income. Thus, not only is it financially much more advantageous to carry out ordinary investment in depression rather than in prosperity, but additional public works may be justifiable in depression and will not really be very burdensome to future budgets. This is, of course, one of the favourite arguments of the proponents of public works,[1] and it deserves some critical examination in the light of the actual structure of unemployment relief and taxation in this country.

Estimation of the savings on the maintenance of the unemployed is a fairly straightforward task. It has, indeed, already been done implicitly in Chapter VII, where such savings were treated, from the point of view of the Multiplier, as a leakage. In the terminology there used the amount of such savings is given by the formula

$$U \times \text{number of men employed}$$

$$U \times \left( \frac{W'}{a} + \frac{k'}{1-k} \frac{W}{b} \right).$$

If we take $U$ as £40, $a$ as £150, $b$ as £112, and $k'/(1-k)$ as 0·70, this gives the result that saving of maintenance of the unemployed is equal to 22·6 per cent. of the initial outlay.[2] It should be observed that, if the Employment Multiplier were higher, the proportion of the original outlay recovered in this way would be greater. But of course one of the reasons for the low value of the Multiplier is the very fact that this 'leakage' is considerable, and that therefore a large part of the primary and secondary income generated does not add to the amount spent on consumption. If the other leakages are given, the greater the amount per man employed which is recovered by the State, the lower must be the value of the Multiplier.

An estimate of the probable additions to public revenue through the increase of tax-yield is necessarily rather more

[1] For example, J. M. Keynes, *The Means to Prosperity*.

[2] This is lower than many previous estimates, partly because a low figure has been taken for the Multiplier, but also because, in arriving at $U$, full account was taken of reductions of standard rates of benefit by the Means Test, low rates for juveniles, and so on. £50 and £60 have been given by other authorities for $U$.

complicated. It is sometimes made by estimating the proportion which the yield of taxes bears to national income at some base date, and then assuming that any increment to national income resulting from an increment of investment will give a proportionate increase in the yield of taxes at their existing rates.[1]

This method is open to the objection that a ratio obtained from total taxation and total national income cannot properly be applied to a marginal increment of income. We have therefore attempted, instead, to find historically the relation between movements of national income and movements of the yield of the more important groups of taxes, after making such corrections as are possible for changes in their rates or basis during the period which is being examined.[2] There is, of course, still the unavoidable difficulty that the recovery in national income and taxation which we shall examine were in fact associated with an autonomous revival of private investment, and not with a public works programme. It *may* not be fair to assume that either the value of the Multiplier or the additional tax-yields would have been the same in a recovery generated or assisted by large-scale public investment.

The results of this inquiry may be summarized as follows. In our previous analysis it was concluded that a unit addition to expenditure on public works would cause an increase of national income of about 1·37 times the original expenditure.[3] The increment in the yield of the taxes we have examined (some 95 per cent. of the total tax receipts of the central government) amounts to 6·70 per cent. of the initial expenditure in the case of indirect taxes, and 8·07 per cent. in the case of direct taxes. The additional yield of indirect taxation is likely to accrue within a year of the initial expenditure, that of direct taxation for the most part after a year's lag; so that, even excluding local rates and certain minor indirect taxes, the State would benefit over two years to the extent of nearly 15 per cent. of the initial outlay. In addition, there will be increased contributions payable to the Health

[1] J. M. Keynes, *The Means to Prosperity*.
[2] See Appendix to this chapter.
[3] See Chapter VII, Final Table: 'Expenditure Multiplier.'

and Unemployment Insurance Funds, which may be put at 2·17 per cent. of the total outlay.[1]

The final result may be shown as follows:

*Proportion of Public Works Expenditure recovered by Public Authorities*

| | *Total recovery* per cent. | *Recovery attributable to primary employment only** per cent. |
|---|---|---|
| Saving of unemployment relief, &c. . | 22·64 | 14·42 |
| Indirect taxation . . . . . | 6·70 | 3·68 |
| Direct taxation . . . . . | 8·07 | 4·43 |
| Additional insurance contributions . . | 1·94 | 1·23 |
| | 39·35 | 23·76 |

* Obtained roughly from the total by dividing tax receipts by the Income Multiplier (1·820), and insurance contributions and savings on unemployment relief by the Employment Multiplier (1·57).

These figures cannot lay claim to any great accuracy: in particular, a great deal depends on the value of the Multiplier. But certain tax receipts and local rates have been omitted, the value given to $U$ is certainly a minimum, and no account has been taken of the influence on the revenue of possible tertiary effects. It therefore seems to be a cautious conclusion that at least one-third, and possibly as much as one-half, of expenditure on public investment carried out in depression will 'come back' to public authorities within about two years; whereas, if the investment were carried out in times of full employment—and was merely substituted for private investment—no such financial gain would result.

It must be observed, however, that this return does not, under the present financial arrangements in this country, show itself at all fully as a *budgetary* relief to the authorities which are actually responsible for making the expenditure. Saving of the cost of maintenance of the unemployed only relieves the central budget in so far as the re-employed persons were previously maintained by the Unemployment Assistance Board, rather than by the Insurance Fund or local public assistance authorities; and it relieves the local budget of a particular spending authority only in so far as its

[1] 1·21 per cent. and 1·57 per cent. respectively.

expenditure on public assistance is reduced, which may be very little indeed. Again, the increased tax-yields which we have discussed accrue wholly to the central government, and not to the local authorities and public corporations who carry out and, apart from grants, finance the greater part of public investment other than armaments. This morcelization of financial responsibility serves to hide the 'cheapness' of public works in depression, because it obscures the fundamental financial characteristic which distinguishes the State from a private individual: that it is large enough to take account of the effects of its own expenditure on its own income.

But if these administrative difficulties can be overcome, it is clear that no new taxation need be imposed to meet the charges on loans incurred in this way; for the additional yield of existing taxes induced by the expenditure itself—and continued by private investment as general recovery takes place—must be amply sufficient to cover the interest charge and to allow of pretty rapid repayment as well, if that is desired. In fact, in a recovery period, public authorities have the choice between reducing the rates of taxation, expanding current expenditure, and repaying debt (or accumulating balances and reserve funds). Admittedly, they are all too prone to choose the first two methods rather than the third: but it is clear that rapid amortisation is in fact desirable if interest charges on past debt are not to become burdensome again in a future depression. But the process of debt repayment in itself must require careful operation. It seems natural to assume that, because borrowing is expansionary in depression, repayment will be deflationary in boom. This is not at all necessarily the case; for repayment in prosperity provides funds for investment by private industry at a time when the demand for them is brisk, and therefore runs some risk of over-stimulating the constructional trades. This danger can only be avoided if repayment is accompanied by a suitable banking and monetary policy.

## II

We may now pass to a more detailed discussion of the means which have been used to finance public investment in this country in the past.

The duties of the central government are twofold: to finance its own constructional works, and to co-ordinate and arrange the financial assistance which it gives to expenditure by local authorities and by semi-public or private enterprise. It ought to be possible for it to pursue a coherent policy, whether of loan-finance, of the accumulation and use of reserves, or of finance by taxation, over the whole field. There is little point, for instance, in encouraging local authorities to borrow for capital works in depression, if at the same time the central government is pursuing a policy of deflation which will offset most of their effects.

We have seen that investment carried out by the central government has consisted mainly of defence works, civil works, and expenditure on the Post Office. During the whole of the post-War period until the full development of the rearmament programme, no deliberate attempt was made to use either accumulated reserves or borrowing as a means to finance constructional work in any of these spheres, except in the case of new capital expenditure by the Post Office. The orthodox tradition has been that all expenditure, including provision for the redemption of debt, ought to be met annually from current revenue; and the Chancellor's budget is only considered to be balanced if this is done. But this ark of the covenant, the Chancellor's budget, is a somewhat curious thing.[1] It makes no distinction between what would normally be called expenditure on capital account and ordinary current expenditure: in this it differs completely from, for instance, the budget of a local authority. On the other hand, it does not cover the whole field of central government expenditure: for the Unemployment Insurance and Health Insurance Funds and, until recently, the Road Fund, are only indirectly connected with it. Moreover, there may often appear on the income side non-recurrent items which are really of the nature of capital reserves, and on the outgo side there is normally a provision for repayment of debt. It is therefore useless to associate the final balance of the central government's own activities, whether expansionary or deflationary, directly with movements of its expenditure

[1] For a good discussion of the British budget system and of possible reforms in it, see U. K. Hicks, *Finance of British Government*, 1938, chap. 17.

on investment. It is necessary to look at the whole result. Because of the equivocal nature of the budget and the complexity of its relations with the various separate funds, this is not easy to show at all clearly; but a summary has been attempted in Table 59.

From this it appears that the net effect of the central government's own operations was not great at any stage of the depression or recovery until the rearmament programme commenced. The maximum excess of total expenditure over revenue from taxation and other current receipts was only some £42 millions in the 'crisis year' 1931; and the combined excesses for the three depression years amounted to only about £70 millions, of which the major part was due to the overspending of the Unemployment Fund rather than to the finance of public works. This was, of course, mainly because the course of expansionary finance, into which the Labour Government had drifted almost unawares, was so sharply reversed in the autumn of 1931. Without this reversal of policy, the total excess might well have been £80 or £100 millions for 1931 and, except in so far as the excess spending might have itself supported the revenue, a similar or greater amount for 1932. On the other hand, though no great deficit was actually developed during the depression, there was also a conspicuous failure to develop any considerable surplus for reduction of debt or the building up of balances in years of relative prosperity such as 1929 and 1936; and in 1937 began the era of large-scale borrowing for rearmament. Our estimates of 'hypothetical' tax-yields, on the basis of 1932 rates, show a total downward swing of about £120 millions from 1929 to 1932 and, after one year of stagnation, an upward swing (uncompleted) of about £86 millions to 1936. But actual tax yields rose, as a result of increases of rates, by £56 millions from 1929 to 1931, fell back by £24 millions in the next two years, and finally rose again by some £70 millions to 1936. Increased expenditure in the depression was met mainly by increases of taxation; the fruits of recovery were used at first to reduce these somewhat, but later to finance a rapid increase of current expenditure. Redemption of debt received very scant attention in any phase. During the downswing, one

Chancellor showed the will for it (in his budget provisions), but lacked the means. In recovery, another was fairly well endowed with the means, but lacked the will.

The arrangements for central government finance thus do not seem to be very suitable in their present form for a policy of trade-cycle control through variations of public spending. The strict canon of budgetary orthodoxy, which requires the annual equating to current revenue of *all* expenditure, except entirely self-liquidating investment by the Post Office, appears to be much too restrictive. It makes it difficult to find money at all for an expansion of central or centrally assisted investment when current revenue is declining, and it prevents such expansion as does take place from causing a net increase of spending by the community as a whole. It is true that some relief has been found from the full rigour of this canon through the operation of extra-budgetary funds, such as the Insurance Fund, by the occasional bringing in of capital reserves to balance the budget, by the reduction or suspension of sinking-fund payments, and, in the most recent years, by open borrowing for rearmament. But the contradiction between these practices and the principles on which the budget is based undoubtedly creates an impression of financial incompetence which, as in 1931, may have disastrous effects on business confidence, although the actual increase of spending which can be generated by these means is not large enough to have, except in the case of rearmament, appreciable effects.

Two types of reform have been most usually suggested. The first is to substitute for the annual balance the objective rather of a long-term balance over the length of a trade cycle. This would allow, within the existing framework of the accounts, for a considerable deficit in bad years, to be balanced by a considerable surplus in good. It would also imply an attempt to maintain more stable tax-rates than at present, additional taxation being imposed only when there was a development of fresh services implying a permanent increase of expenditure. Proposals of this kind are, however, open to the very serious objection that the length of the trade cycle is far from regular or capable of exact forecast; nor can the amount of temporary expenditure in depression,

or of increased tax-yields in prosperity, be exactly foreseen. The result might be the abandonment in practice of the concept of a balanced budget altogether, and consequent confusion and deterioration in the management of public finances.

A less radical proposal is that for a reorganization of the present budget into a capital budget and an ordinary budget, and the recognition that, for the central government as for local authorities, it is perfectly legitimate to finance the creation of durable assets, even if they are not self-liquidating, from borrowed monies. There is, after all, a clear distinction, recognized in every other field of finance, between borrowing to create assets and borrowing for regular current expenditure. The fact that such expenditure is not self-liquidating in the narrowest sense is not important if it increases the productive or consumptive power of the community or if, as we have argued is the case with public investment in depression, it raises the national income and increases the yield of the ordinary tax-system. The ordinary budget should include certainly all the ordinary running expenses of the government, interest on outstanding debt, and possibly annual payments to repairs funds for durable assets. Whether rigid annual provision for amortisation ought to be included is more doubtful. Probably from a trade-cycle point of view it would be wiser to exclude it from the conception of the 'balance', treating it instead as an item for which extensive provision must be made in times of prosperity by a transfer of funds from revenue to the capital budget. In the capital budget should be shown, on the expenditure side, the outlay on durable works by the central government, on capital grants to local authorities and on the redemption of debt; on the revenue side would be shown amortisation payments from the ordinary budget, receipts from loans, and any other miscellaneous non-recurring receipts. To balance the ordinary budget would be a minimum criterion of sound financial policy at all times. The capital budget would show a deficit, a balance, or a surplus, according to whether amortisation of debt fell short of, equalled, or exceeded fresh borrowing. Which result should be aimed at would depend, partly on the long-term policy of debt redemption, partly on the immediate phase of the trade cycle.

A reform of this kind would involve a somewhat drastic reorganization of the national accounts, but the results which might be achieved are of great importance. In the first place, it would make very much clearer than in the present system the net effect of changes in the financial position of the State. In the second place, by disentangling deficits on ordinary current expenditure from borrowing for the creation of durable assets, it would make it much easier to meet charges of unsound or incompetent finance such as were so freely made in the great depression. Finally, it would provide the central government with simple and intelligible means of financing public investment in an expansionary way when this is necessary and in a neutral or deflationary way when it is not necessary. By adopting an expedient of this kind, Great Britain would only be following the example of certain other countries, notably Sweden and Denmark, which have made successful use of the instrument of public investment for the control of the trade cycle.

The same principle of finance from revenue is applied to central assistance to investment by local authorities, but for a rather different reason. With the exception of grants towards the construction and improvement of roads and one or two other minor grants, central assistance does not take the form of a payment of a part of the capital cost of works executed by local authorities,[1] but of an annual contribution towards interest and amortisation charges on the loans the local authorities have themselves raised. The central government thus encourages the local authority to borrow money, but does not incur any capital charge itself, though the undertaking to make annual contributions towards the local loan charges has a similar effect on future budgets, burdening the central government and relieving the local authority.

These annual grants-in-aid take very various and complicated forms. A large part of them are not specifically connected with constructional work at all, and very few are

[1] Unemployment Grants Committee grants-in-aid of relief schemes which the executant authorities were themselves financing from revenue were capital grants; but their amount was always small. The grants offered since 1937 by the Physical Training Grants Committees towards the cost of playing-fields, gymnasia, and baths were also on a capital basis.

capable in their present form of being used as flexible instruments for control of the timing of local investment. Since the beginning of 1930 rather more than one-third of the total grants-in-aid have been allocated by means of the General Exchequer Grant. The total amount of this is fixed for a five-year period, and its distribution among local authorities is based on their population, weighted by certain factors designed to measure their general need for assistance. The distribution formula takes no account of the amount or character of the authority's expenditure, and is therefore not related to the scale or timing of its investment activity. Receipts from this grant are merely added to general revenues. They may enable poorer authorities to incur heavier loan charges by extending investment in depression more than they could otherwise afford; but they give them no direct incentive to do so. It has, however, been argued that a fixed grant may have rather more expansionary effects than specific grants which vary with expenditure, if, as after 1931, the central government is itself inclined towards economy; for it leaves the local authority freer to spend if it wishes to do so, and relieves the Ministry of Health of any direct interest in preaching economy.

The second main type of grant is the percentage grant-in-aid of 'approved' annual expenditure on particular services. This applies to education, police, agricultural, and some public health services, and so on. Here again, there is no direct connexion with capital expenditure, except in so far as the appropriate central department may be more or less willing to approve it as fit to rank for grant on its loan charges. On one or two occasions attempts have been made, particularly by the Board of Education, to speed up the construction of new schools by threatening to refuse grant on the loan charges of schools not completed by a stated date, but this does not appear ever to have been done as a part of trade-cycle policy, nor does it seem to have been very effective. Housing grants, the working of which has already been discussed in some detail,[1] stand on rather a different footing, in that they arise wholly out of capital expenditure. But they too take the form of annual payments and not a

[1] See pp. 133–8.

capital sum, and, as we have shown, have not in the past been regulated much by trade-cycle considerations.

Considerable changes would be necessary to make the percentage grant a suitable instrument for trade-cycle control. In the first place, it would be necessary to give separate grants towards capital expenditure, and to vary the rate of grant very considerably as between years of prosperity and depression, coupling this with a time-limit condition for the completion of work which was to earn grant at increased rates. Further, if really considerable results were to be achieved, it would probably be necessary to adjust the rate of grant to the revenue resources of particular authorities, offering higher rates both to those areas where the rateable value per head of population is permanently low, and to those which were suffering particularly severely from the onset of depression. From an administrative point of view, this would be difficult to do without causing considerable delay, as the making of each grant would be subject to an additional process of bargaining between the appropriate department and the local authority.

Direct capital grants are made towards local expenditure on new construction and improvement of roads; their amount has varied from a maximum of £7·4 millions in 1931 to a minimum of £2·1 millions in 1934. Together with the percentage grants towards the cost of maintenance of classified roads and (since 1930) a contribution towards the General Exchequer Grant, they have been paid from the Road Fund. Until 1937 the Road Fund enjoyed an autonomous revenue of its own from the growing yield of the motor vehicle duties. It stood until then outside the Chancellor's budget, and there was in theory nothing to prevent it from underspending its income in some years and accumulating a balance to be used at some future time in addition to its current income, to finance anti-cyclical works. This was, indeed, the intention of its originator, Mr. Lloyd George, in 1909; and during the post-War period the rapid growth of its autonomous income seemed to place it in a favourable position to do this. It would then have been able, without recourse to borrowing, to generate directly a net increase of spending in depression. But in practice it was never allowed

to do this on any considerable scale, because first its balances and later a regular proportion of its income were appropriated by the Chancellor to balance the ordinary budget; and in 1937 its autonomous revenue was abolished and a Parliamentary grant substituted for it. Thus, though even the diminished receipts of the Road Fund exceeded its expenditure in every year from 1923 to 1929, it had in April 1930 an accumulated balance of only £6 millions. In the next three years, 1930 to 1932, it overspent its current income by £12·5 millions in all: this was financed, after the balance was exhausted, by the issue of Treasury Bills—a procedure which received bitter criticism from the May Committee. This operation represented the only deliberate attempt by the central government to overspend its own income on public works; and it was firmly reversed in the autumn of 1931. In the next two years, 1933 and 1934, the fund was underspent by a total of nearly £12 millions, but in 1935 it suffered from further depredations by the Exchequer, and again no very considerable balance could accumulate. Most of it was finally used up in 1937, when the fund overspent its new Parliamentary grant by nearly £4 millions. For the future, its expenditure will apparently be closely matched with its income, in the same way as in other government departments.

The merits and demerits of a separate Road Fund, of the various 'raids' made upon it, and of the final abolition of its autonomous revenue, have been much debated. From the point of view of trade-cycle policy, its abolition must be regretted, especially at the moment when the central government took over direct responsibility for many of the main roads of the country. It was potentially a useful instrument, whose edge was turned in the past by faults of general financial policy.

It seems probable that the capital grant—provided that it be financed from accumulated reserves or from borrowing—is a more suitable instrument for trade-cycle control over local authorities than the annual grant-in-aid of loan charges. It makes necessary a smaller increase in the nominal indebtedness of local authorities and removes the fear, often expressed locally about annual grants, that the rate of grant may be

subsequently reduced and the local authority left to bear an unforeseen burden. It makes unnecessary some of the time-consuming formalities involved in borrowing by local authorities; and, in so far as the central government can borrow on better terms than the local authority, it is cheaper.

The grants offered by the Unemployment Grants Committee between 1920 and 1932 stood outside the general system. They were, of course, directly designed for the encouragement of constructional work in relief of unemployment. The form of these grants was, with the small exception already mentioned, that of payments towards annual loan charges; and they were provided for out of the proceeds of taxation and involved no loan finance by the central government. Thus, though the Unemployment Grants Committee during its life approved for grant works of an estimated capital cost of £191 millions, which will involve final payments by the Exchequer of £85 millions,[1] the maximum annual payment was under £4·5 millions in 1934.

The committee was mainly concerned with making grants to local authorities. From 1923 to 1929 it also dealt with applications from public utility companies, universities, and voluntary hospitals, but this duty was taken over in 1929 by the Public Utility Development Advisory Committee. The Unemployment Grants Committee was wound up in 1932. Its assistance was limited to schemes which were not eligible for grants from other sources. This meant that a very large part of the field of local investment was outside its influence, and it was forced to concentrate mainly on sewerage schemes, secondary roads and foot-paths, and the trading services.[2] Other conditions on which grants could be made also proved very restrictive. No grants were available for maintenance and repair work; and capital works had to be 'substantially accelerated' in order to qualify, though at the same time they had to satisfy the appropriate government department that they were of substantial public utility. Stress was laid on obtaining the maximum 'direct' employ-

[1] The capital value of these grants at the time they were made was, of course, much smaller: it was estimated at £67 millions, or about 35 per cent. of the total capital outlay by local authorities.

[2] For further details, see *Final Report of the Unemployment Grants Committee*, 1933, p. 33.

ment effect, and until 1930 high rates of grant were only payable on schemes in specially distressed areas or employing a high proportion of men transferred from such areas. The rates of grant varied from time to time. Until July 1930 they were sometimes as high as 50 per cent. of the annual loan charges in the case of revenue producing works, and 75 per cent. in others, for fifteen years. From July 1930 to September 1931 more generous rates of grant were combined with considerable relaxation of the other conditions; but in the last four months, from September 1931 to January 1932, the rates were reduced to 25 per cent. for a loan period of thirty years. The amount and timing of the schemes approved is shown in Table 60.[1] The dates given are those of approval of schemes, not of expenditure of the money by the executant authorities. Though precise information is lacking, it is certain that many of the schemes took a long time to 'get going' and that expenditure on them was spread over many years: the large volume of approvals in the depression periods 1920–2 and September 1929 to December 1931 caused considerable expenditure only much later.

In general, the stimulus afforded by the committee's grants seems to have been disappointing.[2] The total expenditure caused was large. But it was spread over more than twelve years, and in no one year was the actual expenditure really considerable. It seems to be pretty certain that in early years the conditions were too restrictive and the rates of grant possibly too small to have much effect on poor authorities in depressed areas, for whom they were then primarily designed. On the other hand, in 1930 and 1931 some of the work which was grant-aided would probably have been undertaken in any case. Both in 1921 and in 1930 the work of the committee failed to do much for general cyclical unemployment, because (like the Road Fund schemes) it had been too much concentrated on the problem of localized 'structural' unemployment, for which public works are in any case a highly doubtful remedy. Anti-cyclical control of the main body of ordinary local authority

[1] Ibid., p. 22.

[2] For a careful account of the work of the committee, see U. K. Hicks, *The Finance of British Government*, 1938, chap. 12.

investment was not considered to be its business and was quite outside its powers.

The Unemployment Grants Committee no longer exists; and since its decease the only grants made by the central government to local authorities avowedly for the cure of unemployment have been those administered by the Special Areas Commissioners under the Special Areas (Development and Amendment) Act of 1934 and similar subsequent legislation. These have been restricted very narrowly to authorities within the 'certified' Special Areas and, like the Unemployment Grants Committee grants, they may be only given to assist work which is not otherwise grant aided. Their total amount has not been very large, and their objective is explicitly the remedy of non-cyclical unemployment and the development of resources in areas whose finances have been permanently crippled by prolonged poverty. Their only cyclical significance appears to be that, in so far as they achieve their object, they may enable authorities in these areas later to develop a more extensive normal constructional programme, which may be capable of cyclical manipulation.

It does, however, seem to be likely that success in any attempt to expand local investment in depression, or even to secure considerable anti-cyclical variation of the timing of the ordinary programme, could only be achieved if greater assistance were given by the central government than in the past, and, in particular, if the degree of assistance given were made to vary more according to the financial circumstances of particular authorities. In spite of the piecemeal introduction of the weighted formula method of distributing the General Exchequer Grant and of certain other special assistance to the distressed areas, very wide differences continue to exist between the financial resources of different authorities. In 1929, for example, the average rate levied in the five most highly rated county boroughs was 20*s.* 8*d.*, and in the five lowest 8*s.*[1] For the same boroughs in 1937 the figures were 19*s.* 1*d.* and 8*s.* 10*d.*; and for the five highest

[1] The mostly highly rated in 1929 were Merthyr Tydvil, Norwich, Barnsley, Stoke-on-Trent, Gateshead: the lowest, Blackpool, Eastbourne, Oxford, Southport, Brighton. In 1937 the groups were Merthyr, West Ham, Hull, Barnsley, Wakefield; Bournemouth, Eastbourne, Southport, Blackpool, Darlington.

and lowest of that year, 20*s.* 10*d.* and 8*s.* 4*d.* The highly rated boroughs are usually, though not always, those on which the impact of cyclical depression has been most severe; and its effect appears to have been to make the rate-burden intolerable and to enforce reductions through drastic economies in current expenditure and the abandonment of programmes of capital works. The low-rated boroughs, on the other hand, for the most part felt little embarrassment from the depression, and the poundage of rates levied in them remained constant or even rose. It seems to be quite clear that a financial stimulus from the centre which would be effective in the case of the one group would have little or no effect on the other.

An especially large measure of central assistance to local investment carried out in depression can also be defended on the ground that the beneficial effects on employment and public revenue are, in degrees which vary with the type of work done, more national than local in their scope. Expenditure on new machinery for an electric power station in a country town, for example, might cause practically no addition to employment on the spot, the effect being spread over distant centres of electrical engineering. The benefits of having new machinery instead of old would, indeed, redound to the locality, but it would not share in any direct way in the general stimulus to industry, though under the present arrangements it would have to bear the whole cost of it. Too meagre an offer of central assistance is likely both very much to reduce the total amount of expenditure which local authorities can be persuaded to incur in depression, and to direct their attention too exclusively to those kinds of work which give the largest amount of direct employment on the spot, even though their general utility may be low. It has been already argued that this is undesirable from the point of view of smoothing out the activity of the constructional trades or promoting general trade recovery. In the case of many works at present carried out by local authorities, such as large road works, the building of hospitals and technical colleges to serve a wide area, and probably most forms of cyclical public works in depressed areas, there may be a case for the assumption of full financial responsibility

by the central government. That would necessarily carry administrative and planning responsibility with it, though local authorities might be used as executive agents, as is already done in the case of the trunk roads taken over by the Ministry of Transport since 1937. But in any case it is clear that, if the scope of central assistance to local authorities or local works in depression is to be increased, it is all the more important that it be financed in an expansionary way.

III

The budgetary arrangements of local authorities differ greatly from those of the central government, because a sharp distinction is drawn between capital and current expenditure, and because some use is made of accumulated funds for the finance of repair work. All current expenditure, including loan charges, must legally be met from current receipts, that is, from charges for services rendered, from the proceeds of government grants, and from the levy of a local rate to cover the remainder, though a small degree of flexibility comes from the possibility of varying the size of the working balances carried over from one year to another. Thus the 'balance' of a local budget is quite different from that of the Chancellor's budget.

By far the greater part of capital expenditure is normally met from the proceeds of loans, both in good times and in bad. The other sources consist of the proceeds of the sale of land and other capital assets, transfers from reserve funds, direct contributions from revenue, and capital grants from central government. In 1935–6, to take a typical year, the capital receipts of all English and Welsh authorities amounted to £102·7 millions. Of this, loans accounted for £82·2 millions, sales and repayments £11·1 millions, government grants £2·5 millions, and transfers from revenue and reserve £6·8 millions. The proceeds of sales and repayments of loans made to private individuals, usually a small item in any case, are generally paid into sinking funds rather than used to finance fresh capital works. Local authorities have no general power to establish reserve funds for the general rate services, though a fair number of the larger boroughs have taken power to do so in Local Acts. Finance of capital

expenditure from reserves is almost restricted to certain of the trading services, notably electricity supply. The value of making regular contributions from revenue has been impressed on local authorities by the May Committee and by a succession of circulars from the Minister of Health. But few have been willing to face the initial increase in the level of rates which this practice would make necessary. In the general rate services, as a rule, only particular items of capital expenditure of small amount, excesses above the estimated and sanctioned cost of works, and, occasionally, the cost of capital works for which sanction to borrow has been refused, are charged to revenue. In the trading services the practice is rather more important. If anything, there appears to have been more tendency to finance capital expenditure from revenue in bad times than in good, particularly in 1932 and 1933: this was probably due to greater unwillingness of the central departments to sanction loans for expenditure which local authorities considered important. But hardly any authorities have tried to pursue a regular policy of 'pay as you go', such as has been aimed at by many American cities.

It has already been mentioned that in almost all cases a proposal by a local authority to borrow for capital works requires the sanction of a central government department or, in the case of electricity loans, of the Electricity Commissioners. The power to refuse sanction is used, partly as an administrative control over the character of the works proposed, partly as a safeguard for the finances of the borrowing authority, and partly, as during the economy campaign, as an instrument of national financial policy. A rigid period for the amortisation of the loan is attached to the sanction. This period is determined conventionally by reference to the expected durability of the asset—which, however, it usually underestimates. Some samples of loan repayment periods are given below; the weighted mean period is between twenty-five and thirty years.

But a sharp distinction must be drawn between the period of loan sanction, over which annual provision for interest and sinking fund must be made, and the actual form and period of the loan raised by the local authority concerned. This

may be by an issue of stock, redeemable at a definite date or by instalments; by a mortgage on the security of the rates, repayable at will; by a loan, repayable usually in annual instalments, from the Public Works Loans Board; by short-term bills (this is only allowed under Local Acts to a few large cities); or by a bank overdraft. Apart from a certain

| *Service* | *Years for repayment* | *Service* | *Years for repayment* |
|---|---|---|---|
| Housing: land | 80 | Sewerage | 30 |
| „ houses | 60 | Street lighting | 10 |
| „ sewers | 30 | Education: land | 60 |
| „ roads | 20 | „ school buildings | 30–50 |
| Electricity: buildings | 30 | „ furniture | 10 |
| „ mains | 25 | Street improvement: works | 15 |
| „ plant | 20 | By-pass road: works | 20 |

Source: Corporation of Oxford Accounts.

control exercised by the Treasury over the issue of stock, the form, duration, and source of loan is left to the discretion of the borrowing authority. The London and other county councils are empowered to lend money to smaller authorities within their boundaries, and the Public Works Loans Fund —a revolving fund chiefly derived in the past from Local Loans Stock issued by the central government—also enables small authorities to borrow on rather better terms than they might be able to do on their own credit. This freedom on the whole works well, though in the immediate post-War years some authorities saddled themselves with long-term obligations at high rates of interest.[1]

The specification of a certain repayment period in a particular loan thus merely means that every year a certain sum must be provided for amortisation out of current revenue.[2] In many cases this sum will be transferred to a sinking fund and invested, instead of passing at once into the hands of the lender. On 1 April 1930 the amount of such sinking funds in the hands of local authorities was £66·8 millions; by April 1937 it had risen to £81·6 millions. Authorities can, subject to certain safeguards, borrow from

[1] See U. K. Webb, 'Local and Public Debt in England and Wales' (*Economica*, May 1935).

[2] The expected interest charge is usually spread over the whole length of the loan, so that the combined annual loan charge remains constant until the debt is extinguished.

their own sinking funds, and also from accumulated superannuation and pension funds, when this is more convenient than raising loans from outside.[1]

These methods of loan finance have secured one great advantage for British local authorities—a high level of credit worthiness. There have been very few cases since the War in which even the most poverty-stricken authorities have found difficulty in borrowing for capital works when they wished to do so, and on terms more favourable than those obtainable by private business. But from a point of view of trade-cycle policy, these methods have serious defects, which it ought to be possible to remedy without damage to credit. Any expansion of capital works in depression must lead, within a period of one or two years from the initiation of expenditure, to the need for raising current revenue to meet the increase of loan charges, in addition in most cases to new maintenance and running costs. Because of the smallness of most local authority areas and the extent of 'leakages' outside them, and also because of the usually small cyclical sensitivity of rates, an expansion of expenditure by a particular authority cannot be expected to raise its own revenue by very much. Consequently, unless general recovery quickly takes place, an increase in rate poundage will be necessary to meet increased loan charges. Fear of this is likely in any case to act as a powerful deterrent to expansion at such times; and if expansion none the less takes place and the fear is justified, increased rates may have deflationary effects offsetting part of the benefits of increased expenditure. On the other hand, under the present system there is no incentive to speed up amortisation in times of prosperity, and a legacy of heavy loan charges from one depression may last through three or four successive cycles. It therefore seems that some relaxation of the present rigid rules about annual amortisation is very desirable. One device would be to maintain the present amortisation periods, but to allow suspension of payments to sinking funds in some years, and acceleration in others, with the consent or at the behest of the Ministry of Health. Amortisation would thus be

[1] For the extent of this practice, see E. L. Long and E. Maxwell, *Use of Sinking Funds for Capital Purposes* (Institute of Public Administration, 1936).

completed as quickly as at present, but its timing would be no longer regular. An alternative way of achieving the same result would be for the Treasury to advance to local authorities from monies it had itself borrowed the amount of the amortisation charges in years of heavy unemployment, subject to repayment in prosperous years.

On the other hand, it is very desirable to provide a more effective check on the tendency of local borrowing to expand rapidly in good times. This could in principle be achieved by a rigorous use of the ministerial power to refuse sanction to loans. But the result might be more flexibly arrived at by giving to the Ministry of Health general power to insist that, when national unemployment was small, some definite proportion—say 20 per cent.—of the capital cost of any project must be met out of current revenue. Such a rule would not prevent the carrying out of works of real urgency, but would prevent their execution from having general inflationary effects at the wrong time; and it would certainly effectively check the execution of less urgent capital works and enable them to be reserved for a depression.

Something could also be done to encourage the accumulation of general reserve funds, which would be available either for the finance of capital expenditure, of accelerated work on repairs, or of ordinary current expenditure in depression, without an increase in the level of rates. Some local authorities have already interested themselves in this question with a view to avoiding the need for frequent changes in the rate poundage.[1] Housing repair funds are already compulsory for subsidized houses, and have certainly proved very useful; plant reserve funds, lands funds, and general reserve funds have been established by some local authorities under private Acts; but they do not appear to be very common, and the maximum amount which they may accumulate is usually rather strictly limited. Apart from these special cases, it appears to be illegal for a local authority at any time to levy a rate which is more than sufficient to cover its estimated expenditure in the coming year, together with any deficit on the previous year, a provision for contingencies, and a

[1] See E. J. D. Lloyd, *Stabilisation of Rates* (Institute of Public Administration, 1935).

working balance. This is generally held to prevent the accumulation of considerable general reserves with a view to rate stabilization[1] or contingencies of such a general nature as a trade depression. But the legal changes required would be simple and probably uncontroversial.

Changes in the system of local authority loan finance along these lines would do much to secure a more anti-cyclical timing of local expenditure on construction. The case for them is further strengthened by an examination of the financial effects of the operations of local authorities regarded as a whole. Attention is usually concentrated on the annual amounts of new borrowing by local authorities—the gross addition to their indebtedness. These sums reached £100 millions in 1930, and remained above £60 millions even after the economy campaign. They are often treated as an indication of the considerable net additions to the spending power of the community made by local investment during the depression. But this approach is very misleading, for it leaves out of account not only amortisation of past borrowing, but also other accumulative features of the present financial arrangements, which in times of depression largely offset the effects of new borrowing. The whole complex, so far as it is ascertainable, has been summarized in Table 61.

Amortisation payments from revenue and capital accounts combined were already nearly £38 millions in 1929, and had risen by another £7 millions by 1932.[2] Large and rapidly increasing amounts were paid from revenue into special funds (largely superannuation funds) whose receipts in the past have largely exceeded their outgoings, as they are likely to continue to do for some time. Further, there was a strong tendency, particularly in 1932 at the bottom of the depression, to increase the ordinary working balances both of rate funds and trading accounts. If the net total of these accumulations is set against the amount of the borrowings, the latter are very much reduced. The net excess of effective expenditure over current revenue

[1] This was the decision implied or stated in several recent cases in the courts: see especially *Morgan* v. *The Cardiff Rating Authority*, 1933.

[2] The exceptionally heavy figure for 1933 was accounted for mainly by the payment to sinking funds of the proceeds of the sale of tramways to the London Passenger Transport Board.

was in fact at its maximum of only £51 millions in 1929; by 1932 it had fallen to £15 millions, and in the following year it was actually negative, before it began to rise again in recovery. From a general financial point of view the expansionary influence exercised by English local authorities during the last depression was really very small, even before the economy campaign, because their expenditure out of borrowed money (borrowed in fact largely from themselves) was so largely offset by their simultaneous repayments and accumulations out of revenue. Under conditions when such accumulations and repayments will not be otherwise put into active circulation, a considerable amount of capital expenditure is necessary if local authority operations are not to be actually deflationary.

IV

Financial assistance to private industries and semi-public bodies, like that to public authorities, is not often specially connected with constructional works. It mainly takes the form of general subsidies towards the output of goods and to the operation of services, or of tariffs, import restrictions, preferential treatment, and similar protectionist measures. These general measures have some effects on the constructional activity of the industries to which they apply, particularly during the initial stage when a subsidy is introduced or increased; and they are in some cases intended to increase or to preserve the productive capacity of an industry. But their positive investment effects on the assisted industries may be partly offset by negative effects on employment and investment in other industries. Their net effect on investment is rather uncertain. Besides, they do not seem to be very capable of being changed with the phases of the trade cycle. Though it is likely that subsidies and tariffs are more frequently introduced during a depression, when international competition increases, it is unlikely that they will relax correspondingly when business activity improves again. Flexible subsidies varying inversely to the trade cycle would perhaps be useful, but on the other hand, they would be of doubtful value for the subsidized industries, because the element of uncertainty which they introduce might

discourage investment. Like general grants-in-aid to local authorities these operational subsidies which have no direct connexion with capital expenditure fall outside the scope of our investigation; but it may be suggested that to convert some of these 'operational' subsidies into 'constructional' subsidies or to couple the two kinds of subsidies would not only increase their usefulness for public works policy but also in many cases promote the efficiency of the assisted industry.

Specific State assistance to constructional works has been granted mainly in three ways. The outstanding form is loan guarantees, next in importance come annual grants towards loan charges, and, finally, direct capital grants. It is evident that loan guarantees have no place in the relation of central and local government. The rates at which local authorities can borrow are, under the present system of central supervision, so near to the rates obtained by the central authority that a formal Treasury guarantee would not appreciably reduce the cost of the loan. Industrial borrowers are usually paying a higher rate of interest because of the greater risk involved and are, on the whole, more sensitive to changes in the rate of interest. For the ordinary manufacturer, indeed, the level of interest rates may be a minor element in any investment decisions, because expected changes in demand or in prices, obsolescence rates, and other factors which affect his profit expectations carry usually so much more weight in determining the rate of expansion. But in case of really durable goods such as buildings, ships, railways, or public utility assets the effective economic life is usually long enough to make the rate of interest a major factor in computing the annual cost. Capital expenditure on this kind of capital goods may be appreciably stimulated by a lower, and much retarded by a higher, rate of interest. Treasury guarantees which reduce the ordinary market rate for such constructional works are likely to encourage investment which would otherwise not have been profitable or would not have been undertaken at that particular time.

Loan guarantees with a view to assisting industries or to promoting employment have been offered under various Acts since the War. Under the Trade Facilities Act various public

utilities and industries received loan guarantees during the period 1921 to 1926, and new guarantees were given after 1934 to loans for the redemption of those originally guaranteed. Between 1921 and March 1927 162 guarantees were given for an aggregate amount of £74·25 millions, distributed as follows:

*Sums guaranteed under the Trade Facilities Acts, 1921 to 1926*

| *Object* | *No. of guarantees* | *Amount £ millions* |
|---|---|---|
| Ships | 47 | 20·79 |
| Shipyards | 4 | 2·64 |
| Underground railways | 5 | 12·58 |
| Overseas railways | 5 | 6·23 |
| Electricity—at home | 19 | 6·87 |
| Electricity—overseas | 11 | 8·38 |
| Canals, docks, and sewerage | 13 | 1·91 |
| Sugar factories | 8 | 2·42 |
| Miscellaneous | 50 | 12·42 |
| | 162 | 74·25 |

About one-quarter of the total concerned constructional projects overseas, but it may be presumed that the greater part of the equipment was ordered in this country and helped to stimulate home employment.

Under the Electricity (Supply) Act, 1926, a Treasury guarantee of either principal or interest or both was offered on loans of the Central Electricity Board up to £33·5 millions.[1] The Board refused to take advantage of this offer and the refusal was explained by the desire to retain the independence of the Board and to prevent political interference; but some doubts were also expressed whether the Treasury had really encouraged the Board to avail itself of the guarantee. This attitude of the Board and its actual borrowing policy were much criticized. On the assumption that the Board could have borrowed ¾ per cent. cheaper with a Treasury guarantee, the total cost of refusing the guarantee was estimated to be about £375,000 per annum,[2] a considerable sum in an annual interest charge of about £1·60

[1] The borrowing powers of the C.E.B. were later raised to £60 millions in 1933.

[2] Lincoln Gordon, *The Public Corporation in Great Britain.*

millions. It has further been argued that, considering the public corporation character of the undertaking, C.E.B. stocks have been issued at unusually heavy discounts; and the times chosen for borrowing have certainly been very unfortunate. The extra burden imposed on the Board and hence on electricity consumers by refusal of guarantee and ill-timed borrowing was very substantial.

It may be mentioned that the C.E.B. provided loans for the standardization of frequency to individual undertakers out of its own borrowings. Interest charges on this part of the Board's capital expenditure were borne neither by the Board itself nor by individual undertakings, but were recovered by a levy on the industry as a whole. In this case the C.E.B. acted as a financial agent for all undertakings, in much the same way as the Finance Corporation for the guaranteed railway loans of 1935. The Board also guarantees the costs and capital charges of extensions and additions to generating stations carried out under its direction and thus relieves the individual undertakings of much of the risk involved in the investment which under a mere loan guarantee scheme has to be borne by the applicant. But in this case the capital is raised by individual undertakings, not collectively by a semi-public corporation which would supply private companies at the same cheap rates as obtain for the public authority undertakings.

Apart from this unused guarantee to C.E.B. loans no loan guarantees were offered during the period of relative prosperity between 1926 and 1929. But in 1929 the Development (Loan Guarantees and Grants) Act was passed to assist approved schemes of constructional works. Very little use was made of the guarantee provisions under this Act, the total amount guaranteed being £210,000 in 1934. It is perhaps typical that right through the depression 1930–3 no loan was guaranteed. This may indicate that guarantees are not a sufficient inducement in times of a severe depression and widespread uncertainty.

In 1935 the main line railway companies and the L.P.T.B. obtained a Treasury guarantee for two big loans amounting to £27 millions and £41·65 millions respectively, for a large programme of constructional works. In both cases the loans

were issued by semi-public finance corporations established for this purpose which allocated the agreed amounts to the various companies. The sums borrowed from the Finance Corporation will ultimately have to be replaced by additional issues of the companies. The guarantee was intended to stimulate a large volume of additional works, which would not have been undertaken otherwise; but no stipulations were made to influence the timing of the work for trade-cycle regulation. In the same year a different procedure was adopted to assist shipbuilding. The Scrap-and-Build Scheme provided for advances to British shipowners for building new ships at a rate of interest of 3 per cent. or less. Since the principal was repayable within a period of twelve years the scheme was very similar to a loan guarantee. For trade-cycle purposes it would, of course, be essential that the advances should be made not only of State revenue but out of borrowing, which in this case would be perfectly legitimate even by purely commercial standards or from the point of view of financial orthodoxy. A similar scheme of advances, bearing a low rate of interest, was incorporated in the 1939 Shipping (Assistance) Bill. Finally, a small amount of loans was guaranteed under the Sugar Industry (Reorganization) Act, 1936. The total amount of loans guaranteed outstanding at the end of each fiscal year since 1921 is given in Table 62.

The obvious advantage of loan guarantees as an instrument of trade-cycle policy is that they create employment without involving any burden on the taxpayer unless the guaranteed firm fails to earn its interest on guaranteed debentures. Its cheapness recommends this form of investment stimulation, particularly when psychological obstacles prevent the incurring of a major deficit or an expansion of public investment. On the other hand, only industries which are especially sensitive to variations in the rate of interest are likely to respond effectively to this sort of inducement; and even they may not readily respond in depression times when profit expectations recede rapidly. Past experience is not quite conclusive in this respect because the method has not been deliberately applied as an antidote against a depression. But guarantees given in good times could evidently also be made to serve trade-cycle purposes, if it were made a condi-

tion of the guarantee that constructional work on the approved programmes be slowed down in upswing periods and be accelerated in slack times. By making guarantees conditional on anti-cyclical adjustment of the assisted works and by varying the willingness to give guarantees this method of State assistance may be made a moderately respectable instrument of public works policy within the limited area of its application.

Annual grants towards loan charges have a similar function to loan guarantees. They are more expensive from a fiscal point of view, but may be a more powerful stimulant to private borrowing and investment in depression times. This kind of financial assistance, which is the usual form of assistance to local government works, was given in the 'private' sector of the economy almost exclusively to semi-public bodies or public utilities. Interest grants of the Unemployment Grants Committee, which included prior to 1929 some assistance to semi-public works, have already been discussed. After 1929 the functions of the Unemployment Grant Committee in the field of public utilities were entrusted to the Public Utility Development Advisory Committee, which made grants towards interest on loans for development works in connexion with public utility undertakings under the Development (Loan Guarantees and Grants) Act, 1929. The main beneficiaries under this Act were the railway companies and the C.E.B. The C.E.B. applied in 1931 for interest grants towards the cost of two of its regional schemes, the South Scotland and North-East England, which the Board felt could not be carried out in the desired way without some public assistance. The total cost of these two schemes was estimated at £11 millions, and the Board had received from 1933 to 1935 £1·38 millions in interest grants towards their capital expenditure. This was about 40 per cent. of the grant payments under the Development Act up to 1935. It is probable that the greater part of the expenditure on the two schemes would have been incurred without State assistance, and that only a minor extra amount can be imputed to State aid. Moreover, it is not unlikely that the same, or even a better, result could have been achieved in this case, if the Board had accepted the

offered Treasury guarantee, and that without burdening the tax-payer.

The total cost of railway works to which interest grants were made under the Development Act amounted to about £22½ millions, together with similar grants to schemes at railway-owned docks amounting to £7¾ millions, or about £30 millions in all. In terms of their present value the grants were estimated to be worth about 22 to 23 per cent. of that cost. These grants towards railway works amount for almost half the total grants made since 1929 under the Development Act. All these assisted works of railways and the C.E.B. were, though not deliberately, well timed and helped to mitigate the 1929 and 1932 depression.

Somewhat outside the normal way of direct grants towards loan charges but closely related to them was the repeal of the Railway Passenger Duty subject to an undertaking to spend the capitalized value of the tax relief on new works which would not otherwise have been put in hand. The capital value of the relief was estimated at about £6·50 millions. If the legal distinction between tax relief and cash grants is disregarded, it could be said that by renouncing part of the revenue the Exchequer made an annual grant equal to the full interest charges towards the cost of these works.

Tax abatements or remissions have otherwise not been used in this country to stimulate investment. But it has been frequently suggested that they are capable of wider application and might supplement a policy of public works. In order to counteract the 'accumulative' tendencies of private businesses tax relief should be granted to constructional works during a depression. For instance, sums spent out of undistributed profits on capital goods could be assessed at a reduced rate for income tax; or accumulated reserves could be mobilized for capital expenditure by making rebates or remissions on income tax paid in the past on such reserves; or depreciation allowances could be increased for newly purchased capital goods. Tax relief for spending undistributed profits or reserves would apparently benefit the more prosperous firms, while increased depreciation allowance should also stimulate investment by the financially weaker firms. To what degree business will respond to such

inducements cannot be entirely foreseen; the effects may be greater in the later stages of a depression, when extensions and renewals have already been postponed for some time. From the Exchequer's point of view tax relief for investment is a rather expensive form of financial assistance, because it does not discriminate between investment which would have been undertaken in any case during a depression and 'additional' investment. Cash subsidies to induce additional investment are superior in this respect, but are certainly more cumbersome on the administrative side and may appeal less to industrialists and politicians alike.

All interest grants were made out of revenue and were thus not in themselves stimulating; but they encourage borrowing and investment by the public utilities concerned. It is obvious that theoretically the total effects would have been so much the greater if these grants had been temporarily made out of borrowed money. Actually the annual grants were so small, particularly during the period when the construction work was carried out and employment created, that the difference was almost negligible. It is one of the advantages of this method that the burden falling on the budget is very small in the initial stages compared with the employment or investment induced, and is spread over one or more full cycles. In the short run, interest subsidies are a cheaper method of stimulating investment than public works undertaken by the central or local government, for which the full capital charges and maintenance cost have to be borne. Moreover, the field to which interest subsidies could be applied is wider than that of public utilities. It might include, for instance, houses, ships, and other very durable assets, and so constitute a useful adjunct to the quantity and variety of works provided by public authorities in depression times.

Capital grants towards private constructional works have been an exception. There is only one example and that of quite recent date, namely capital grants towards the construction costs of ships under the Shipping Assistance Bill, 1939. Even these grants can hardly be regarded as a normal peace-time measure, although subsidies to shipbuilding were part of the shipowners' proposals, which were only concerned with peace-time activities. The wide plans to aid

merchant shipping were actuated by the possibility of war. They were designed to secure the maximum size of merchant fleet in the shortest possible time and some special inducements were thought to be necessary to stimulate shipbuilding at once. The total capital grants of £2·5 millions in all, to be spread over five years, must be considered as an armament measure like grants towards the costs of works of armament manufacturers which figure conspicuously in the recent Defence Accounts. To bring about a rapid expansion capital grants are presumably more effective than interest grants or loan guarantees; and they may be appropriate where it is desired not to increase the balance sheet liabilities of an industry or firm. As a trade-cycle measure they are in some respects inferior to interest subsidies, because they entail a far greater immediate burden on the budget. If this is met out of revenue it will to that extent have no stimulating effects; yet it is questionable whether payments *à fond perdu* should be charged against capital accounts.

On the whole there is no essential difference between the various financial inducements to private constructional works. Theoretically it should be possible to attain the same net effects by either of these three methods: loan guarantees, interest subsidies which bring the actual interest charges down to gilt-edged level, or capital grants which do the same thing. Business psychology and the particular character of the industries concerned must mainly determine the form of financial assistance. Capital grants may be more definitive and less subject to changes in political and economic circumstances and hence appeal more to entrepreneurs; loan guarantees may for administrative reasons not be a proper instrument to help small or medium-sized firms; interest subsidies could be applied where issues of stock or debentures are not desired, or when it is considered necessary to lower interest rates for assisted works to the level of the gilt-edged rate or below it. It seems useful to apply all three methods with discretion as tools of public works policy. Whether and to which section of the economy financial assistance should be granted is not wholly a question of public works policy; but when assistance is given, certain conditions as to the timing of the works should be imposed

unless overriding social and political reasons make it impossible.

## IV

Before the outbreak of war it would have been desirable to discuss detailed plans for public works and to suggest immediate reforms in the financial and controlling mechanism which would make them a more effective instrument for the control of the trade cycle. Such a short-term programme would have little meaning now we are at war. The economic system is likely to differ in many ways at the end of the war from what it was in 1939. Our information for the period between the two wars can offer little guide to the future magnitude of public investment. The public sector of the economy, already fairly important in our period, may grow as a result of the war, and a greater part of private investment may become amenable to public control. Methods and organs of economic policy will certainly change, and the nation's economic relations with the outside world will differ in many ways from their pre-war state.

But the immediate legacy of the war must in any case be a vast problem of readjustment. The drastic diversion of resources to war purposes must be reversed, and it is possible that the return to peace-time conditions may take place almost as quickly as the change-over to war production. Men drawn into the armed forces will wish to return to civil occupations. Abnormal defence expenditure will naturally be reduced as soon as fighting has ceased, even if the peace-time level of armaments should continue to be high. Consumption must be expanded at the expense of the production of war materials, and this will necessitate difficult adjustments within the capital goods industries. Foreign markets, if they have been neglected under the pressure of war, will require renewed attention. There may well be strong pressure to discard precipitately bureaucratic war organizations and controls, and to return at least to pre-war conditions of private enterprise.

The suddenness and magnitude of the transition is likely to distinguish these problems of demobilization and reconstruction from the more gradual changes with which economic policy has usually to deal. Yet its problems must bear a

considerable resemblance to those presented by the ending of a violent trade boom. To carry out the transition without plunging from the height of war activity into the trough of a general depression will demand a preconcerted plan.

It is, indeed, sometimes argued that a decline in government expenditure under such circumstances will be compensated automatically by a rise of private consumption and investment. The rise of private consumption can, however, hardly continue if it coincides with a sharp decrease of employment, caused by too sudden a check to government spending. In 1919 there was, it is true, a rush to buy commodities on the 'outbreak of peace', when an acute shortage of this kind of goods still persisted. The result was not an easy transition from war-time spending to a high level of private investment, but rather a serious disturbance of the price structure, a short inflationary boom, and a subsequent collapse. Only slowly and painfully in the twenties were the necessary adjustments made.

Even if economic policy again permits a commodity price inflation to take care of the immediate problem of demobilization, public works should certainly be used as a mitigating force in the ensuing slump. If, on the other hand, an attempt is made to avoid a price inflation and to keep the expansion of demand for consumption goods in line with the growth of the means of supplying them, public works will have an important part to play in the immediate problems of the demobilization period. They would not, of course, be the only remedy. But they could be used to reduce the danger of a cumulative deflationary process resulting from a sudden contraction of war expenditure and employment. By steadying employment they would facilitate the process of industrial readjustment while openings for private investment were being made elsewhere.

There will be one element in the post-war situation which will make it easy to carry out public works on a considerable scale. The restriction of public civil investment during the war, and, possibly, the destruction of property by enemy action, must create a large reserve of works whose performance would be highly useful and indeed urgent. Local authorities and public utilities and rail and road transport

cannot fail to accumulate arrears. The existence of this reserve of work, both of extension and of replacement, which is usually lacking at the end of a trade boom, should make this part of the problem simple.

But in other respects there may be unusual difficulties. In order to produce the desired effect of maintaining employment in the demobilization period, public works must be planned in advance. Our investigations have shown that it may well take several months or longer after the commencement of a programme of public works before it has appreciable effect on employment. In order that there may be at least no delay in commencement, preparatory planning must be done before hostilities cease. This is an obvious task for a Ministry of Reconstruction; but, in the changing conditions caused by the war itself and in the uncertainty as to the date of its termination, it would be idle to pretend that the task will be an easy one.

Finance also may perhaps present even more serious difficulties than usual. After several years of war-time borrowing, there may be a strong demand for economy in public expenditure and, in particular, objections to continued borrowing. It may be contended that service of the debt would devour too large a proportion of the national income, or that further borrowing would shake public confidence in the stability of the public credit. Yet these arguments do not appear to be decisive. The absolute size of the debt at the end of the war will have been already determined by past events. The alternatives which present themselves in the reconstruction period may be between maintaining the size of the national income by further borrowing, or by allowing it to diminish by way of economy drives and deflation. Either course may, indeed, increase the proportion of the debt charge to the national income; but it can hardly be doubted that even on strictly financial grounds the first alternative is preferable to the second. And the confidence factor, which in 'normal' times may be a serious matter, is likely to be of less importance in the reconstruction period after a major war. As long as foreign exchange control is continued, distrust of the government's financial policy cannot take the form of a 'flight' of capital

abroad; and a 'flight' into real assets would be less damaging, because it would stimulate home investment and would be subject to war-time controls of the capital market, if these were still retained.

Thus it appears that public works should count for much in any planned transition from war to peace, even though more extensive measures may be needed to reduce the inevitable frictions and to make the transition as smooth as possible. But the period of reconstruction must pass, and in an economy once again on a peace footing the need will surely appear again to steer society on the course of steady employment. For this task most of the general conclusions which we have drawn in previous chapters will still be relevant. The public sector of the economy will be an important and useful tool with which to counteract fluctuations in private investment. The financial relations of central and local government, if not changed by the war, will need to be reformed on the lines already indicated. The budget and borrowing policy of the State will continue to exercise a decisive influence. A substantial part of public constructional expenditure will be inevitably connected with variations in general business activity. To adapt the remainder for trade-cycle action by drawing up an elastic scheme of urgent and postponable works will still require co-ordination and advance planning. Possibly a permanent extension of the field of public investment after the war may enlarge the scope and potential effects of such a policy. But in essentials the problem of adjusting public works to the needs of the trade cycle will present itself very much in the ways which are familiar now.

This statement must be made with less confidence about that part of private investment which has been amenable to public control in the past. We have seen that few deliberate attempts have been made in the past to stimulate private investment during depression, and they have mostly taken the form of rather slight financial inducements. This method may be capable of much wider and more efficient application on more purely cyclical lines. But it is conceivable that private investment as a whole will in future be subjected to more direct State control, particularly if war-time industrial organizations remain in existence. A really considerable

increase in direct control over private investment would, of course, transform the whole nature of the trade cycle, substituting for the semi-automatic movements of the market, which public works in the narrower sense may be designed to counteract, a system of centrally directed investment in which economic initiative would rest with the State.

## Appendix

### *Proportion of Public Works Expenditure that returns to Government Funds*

We wish to evaluate the following items: (*a*) Savings on Dole; (*b*) Unemployment and National Health Contributions; (*c*) Direct and Indirect Taxation.

Let us use as the values of the determining factors,

$$W' = 0{\cdot}54 \qquad W = 0{\cdot}33 \qquad U = £40$$
$$P' = 0{\cdot}21 \qquad P = 0{\cdot}55 \qquad a = £150$$
$$\frac{k'}{1-k} = 0{\cdot}70 \qquad\qquad b = £112$$

Employment Multiplier . . 1·573
Income Multiplier . . . 1·820

Then *Savings on the dole* in the terminology of our earlier work

$$= U \times \text{number of men employed}$$
$$= U \times \frac{W'}{a} \times \text{Employment Multiplier}$$
$$= \frac{40 \times 0{\cdot}54 \times 1{\cdot}57}{150} = 0{\cdot}2264 = 22{\cdot}64 \text{ per cent.}$$

Savings on dole from primary employment

$$= \frac{U \times W'}{a} = 0{\cdot}1440 = 14{\cdot}40 \text{ per cent.}$$

*Unemployment Insurance Contribution.*

The *net receipts* of the Unemployment Fund (that is, Employer's and Employee's Contributions less the Exchequer Ordinary Contributions) and the number of insured and employed workers each July can be extracted easily from the *Statistical Abstract*. From this it appears that the average return to the Government through the Unemployment Insurance Contribution will be

$$£1{\cdot}894^* \times \text{number of men employed}$$
$$= 1{\cdot}894 \times \frac{0{\cdot}54}{150} \times 1{\cdot}57 = 0{\cdot}0108 = 1{\cdot}08 \text{ per cent.}$$

* i.e. about 8¾*d.* per week.

From Primary Employment alone there returns $\frac{1{\cdot}894 \times 0{\cdot}54}{150} = 0{\cdot}68$ per cent.

| | *Net receipts £000's* | *Insured employed workers thousands* | *Average annual payment per worker per year (£'s)* |
|---|---|---|---|
| 1932–3 . . | 18,916 | 9,951 | 1·9009 |
| 1933–4 . . | 19,554 | 10,306 | 1·8973 |
| 1934–5 . . | 20,722 | 10,786 | 1·9212 |
| 1935–6 . . | 21,490 | 11,020 | 1·9501 |
| 1936–7 . . | 20,911 | 11,602 | 1·8024 |
| | | | Average £1·8944 |

*National Health Insurance Contributions*

Here the average contribution is £1·521* per annum and returns are

Total . . 86 per cent.
Primary . . 55 per cent.

We now turn to the more complicated problem of tax returns. The method of attack is necessarily historical: we are, e.g., quite unable to say how much income-tax will be paid out of an increment of £1,000 to Non-labour Income recipients. It would be necessary to know first of all to whom this income went, at what level his previous income stood, his marital condition, and the like. Nor in the field of Indirect Taxation are we able to say what changes in his consumption of goods liable to Customs or Excise duties will be. Historically we can, however, secure figures of the following type:

| *Year* | *National Income* | *Labour income* | *Non-labour income* | *Receipts from Customs and Excise* |
|---|---|---|---|---|
| 1. | 2,000 | 1,000 | 1,000 | 100 |
| 2. | 2,100 | 1,030 | 1,070 | 108 |

Here we can say that an increment of 30 in Labour Income and of 70 in Non-labour Income meant an increment of 8 in Customs and Excise Revenue, and with data available for several years we can, by means of the usual multiple correlation analysis, finally say with confidence that if Labour Income increases by $dW$ and Non-labour Income by $dP$, then tax receipts will increase by $a.dW + b.dP$, where $a$ and $b$ are coefficients obtained from the analysis.

This analysis assumes that the tax rates and structures, dates of collection, and the like remain constant from year to year. This is

* i.e. about 7*d.* per week.

familiarly not the case, and it becomes necessary to standardize the crude figures of tax receipts for changes in rates and bases from those ruling in a year chosen as standard.

1932–3 has been chosen as the base year, though there is nothing that clearly marks one year as better than another; 1930–1 would be more consistent with other series in our work, but it suffers from the fact that the changes in that year and those immediately preceding and following it were large. The year chosen has the advantage of being central in the period and of being a year of comparative stability.

The results of this standardization are given in the table following. Some comments on the methods by which the figures are obtained is necessary.

*Income Tax.* Two different methods have been included. One is based upon the basic figures of the Inland Revenue returns,[1] the other a continuation of the method used in *Econometrica*, April 1939. The results agree very closely after 1932–3, but there are some discrepancies in the earlier years.

*Other Taxes.* Figures for Super-Tax, Estate Duties, Stamp Duty, and Customs and Excise Duties obtained by the Budget Estimate method. However, in Customs and Excise we have no budget estimate of the likely changes in revenue from the following duties: the Abnormal Importations Duty, the Horticultural Produce Duty, the Imports Duty Act, the Ottawa Agreements. Revenue from these taxes (about £30 millions per annum) has therefore been excluded throughout.

*Local Rates.* These have been excluded because of the impossibility of making the necessary corrections for changes in Tax Basis: the figures that are available for rateable values are almost completely vitiated by the Quinquennial Valuation of 1933–4 and the subsequent year. Thus the increase in rateable value on 1 April 1934 over that on the same date a year before of £11 millions is largely due to this revaluation and not to a physical change in the number of rateable tenancies. There are also a number of minor changes, e.g. the Tithes Acts and Legal Decisions regarding the De-rating on Railway Properties.

In general, too, it seems that no great error is likely to be introduced by omitting these taxes. It is only when increments in income become rateable property in the form of new houses, factories, or extensions that they are able to provide this new income to the local authorities—that is, when they become certain special investments. This necessity for the income to be invested rather than consumed before it yields local

[1] Personal and Earned Income allowances are recalculated on 1932–3 base from the assessments returned; the 'Taxable Income' is then available. It is calculated that one-third of this pays at the reduced rate; making adjustments for the *dates* of payment it is possible to calculate the hypothetical yield with the rates, exemptions, and dates of payment of the base year.

## *Treasury Net Receipts*
## *Hypothetical Yields on 1932–3 Basis*

(*£ millions*)

| | *1929–30* | *1930–1* | *1931–2* | *1932–3* | *1933–4* | *1934–5* | *1935–6* | *1936–7* |
|---|---|---|---|---|---|---|---|---|
| *Direct* | | | | | | | | |
| Income Tax (*a*) . . | 301·8 | 297·5 | 272·9 | 252·0 | 240·1 | 258·2 | 265·5 | .. |
| (*b*) . . | 315·4 | 309·6 | 304·0 | 250·6 | 239·8 | 249·8 | 265·5 | 279·5 |
| Super Tax . . . | 75·1 | 78·7 | 79·1 | 60·3 | 52·4 | 50·9 | 51·2 | 53·4 |
| Estate Duties, &c. . | 86·2 | 83·1 | 64·7 | 76·3 | 85·6 | 81·6 | 88·3 | 88·2 |
| Total—Direct (*a*) . . | 463·1 | 458·9 | 416·7 | 388·6 | 378·1 | 390·7 | 405·0 | .. |
| (*b*) . . | 476·6 | 471·4 | 447·8 | 387·2 | 377·8 | 382·3 | 405·0 | 421·1 |
| Mean . . . | 469·8 | 465·2 | 431·3 | 387·9 | 378·0 | 386·5 | 405·0 | 421·1 |
| *Indirect* | | | | | | | | |
| Customs, Excise,* and Motor Vehicles . . | 316·0 | 299·5 | 285·6 | 291·5 | 297·9 | 305·3 | 320·9 | 332·0 |
| Stamps . . . | 25·6 | 20·4 | 17·1 | 19·2 | 22·8 | 25·6 | 27·3 | 30·6 |
| Total—Indirect . . | 341·6 | 319·9 | 302·7 | 310·7 | 320·7 | 330·9 | 348·2 | 362·6 |

* Excluding: The Abnormal Importations Duty, the Horticultural Produce Duty, and the duties levied under the Import Duty Act and the Ottawa Agreements.

## *Treasury Net Receipts*
## *Actual Net Receipts*

(*£ millions*)

| | *1929–30* | *1930–1* | *1931–2* | *1932–3* | *1933–4* | *1934–5* | *1935–6* | *1936–7* | *1937–8* |
|---|---|---|---|---|---|---|---|---|---|
| Income Tax . . . | 237·9 | 255·3 | 288·4 | 250·6 | 228·6 | 229·2 | 237·4 | 257·0 | |
| Sur Tax . . . | 56·6 | 67·7 | 77·1 | 60·3 | 52·4 | 50·9 | 51·2 | 53·4 | |
| Estate Duties, &c. . . | 79·2 | 83·1 | 64·7 | 76·3 | 85·3 | 81·3 | 88·0 | 87·9 | |
| Customs, Excise,* and Motor Vehicles . . | 274·6 | 273·8 | 280·5 | 291·5 | 287·2 | 289·7 | 301·9 | 317·3 | |
| Stamps . . . | 25·7 | 20·7 | 17·1 | 19·2 | 22·7 | 24·1 | 25·8 | 29·1 | |
| Total . . . . | 674·0 | 700·6 | 709·8 | 697·9 | 676·2 | 675·0 | 704·3 | 744·7 | |
| Total Net Receipts . | 676·6 | 704·2 | 733·0 | 727·6 | 709·0 | 709·8 | 739·0 | ? | |
| Taxes and Duties not covered by analysis . | 2·6 | 3·6 | 23·2 | 29·7 | 32·8 | 34·8 | 34·7 | ? | |
| Receipts of L.A.'s from Local Rates . . | 156·3 | 149·9 | 148·3 | 146·3 | 148·6 | 154·8 | 164·9 | 171·5 | |

* Excluding: The Abnormal Importations Duty, the Horticultural Produce Duty, and the duties levied under the Import Duty Act and the Ottawa Agreements.

rates distinguishes this type of Government Income and supports the view that sensitivity of Local Rates to cyclical movements in National Income is likely to be small and delayed.

We then have the following table:

| *Fiscal year* | *Mean national income* | *Wages and salaries* | *Non-labour income* | *Adjusted tax yields* | |
|---|---|---|---|---|---|
| | | | | *Indirect* | *Direct mean* |
| 1929–30 . | 4,975 | 1,931 | 3,044 | 341·7 | 469·8 |
| 1930–1 . | 4,668 | 1,868 | 2,800 | 319·9 | 465·2 |
| 1931–2 . | 4,398 | 1,817 | 2,581 | 302·7 | 431·3 |
| 1932–3 . | 4,327 | 1,785 | 2,542 | 310·7 | 387·9 |
| 1933–4 . | 4,537 | 1,852 | 2,685 | 320·7 | 378·0 |
| 1934–5 . | 4,813 | 1,959 | 2,854 | 330·9 | 386·5 |
| 1935–6 . | 5,143 | 2,066 | 3,077 | 348·2 | 405·0 |
| 1936–7 . | 5,470 | 2,192 | 3,278 | 362·6 | 421·1 |

It is clear from inspection of Fig. 38 that Direct Taxation is connected with the Non-labour Income of the previous year, and to a lesser extent with the Labour Income of that year.

Indirect Taxation is related to the constituents of the National Income of the current year.

It should then be possible to calculate the values of $A$, $B$, $C$, and $D$, where

$$\text{Indirect Taxation} = A \times \text{Non-labour Income} + B \times \text{Labour Income of the current year,}$$

$$\text{Direct Taxation} = C \times \text{Non-labour Income} + D \times \text{Labour Income of the previous year,}$$

all measured from their respective means.

When the correlation is undertaken we find, however, that there is such a high correlation between Labour Income and Non-labour Income that for Indirect Taxation it is impossible for us to evaluate coefficients such as we have described with any validity. We are forced back to a simple correlation:

$$\text{Indirect Taxation} = 0{\cdot}04887 \text{ National Income measured from respective means.}$$

For Direct Taxation the coefficients obtained are valid.

$$\text{Direct Taxation} = 0{\cdot}02527 \text{ Labour Income} + 0{\cdot}10203 \text{ Non-labour Income of previous year.}$$

Now our previous analysis shows that a unit of public works expenditure results in an increment of Labour Income of $W' + \frac{k'W}{1-k}$ and of Non-labour Income of $P' + \frac{k'P}{1-k}$.

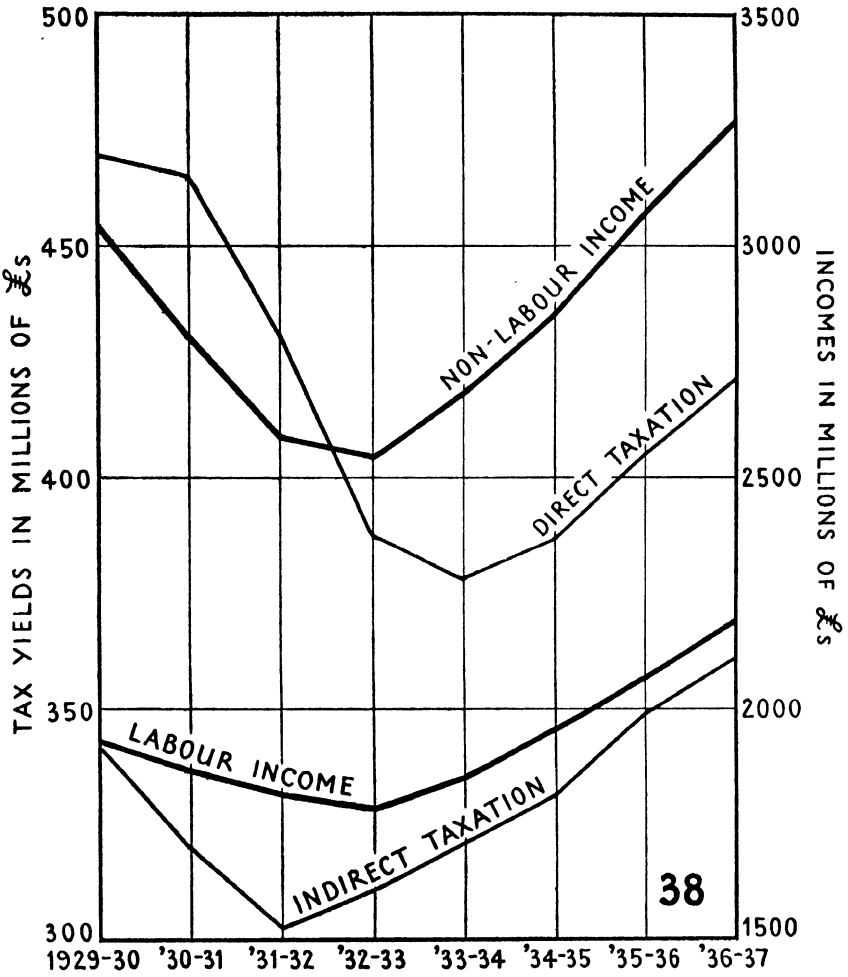



FIG. 38

Then the increment in Labour Income is 0·77 and in Non-labour Income 0·60. Thus increments in tax yields will be:

Indirect (accruing this year)

$$0{\cdot}04887 \times 1{\cdot}37 = 0{\cdot}06695 \text{ or } 6{\cdot}70 \text{ per cent.}$$

Direct (accruing next year)

$$0{\cdot}02527 \times 0{\cdot}77 + 0{\cdot}10203 \times 0{\cdot}60$$
$$= 0{\cdot}08068 \text{ or } 8{\cdot}07 \text{ per cent.}$$

There is then a total return to the Government in the form of increased taxation of 14·77 per cent. of the initial outlay, spread over two years. We have then finally:

| | *Total per cent.* | *Primary* per cent.* |
|---|---|---|
| Indirect taxation . . . . | 6·70 | 3·68 |
| Direct Taxation . . . . | 8·07 | 4·43 |
| Insurance—National Health . . | 1·08 | 0·68 |
| Insurance—Unemployment . . | 0·86 | 0·55 |
| Saving on the dole . . . | 22·64 | 14·42 |
| Total . . . . . | 39·35 | 23·76 |

* Obtained from Total by dividing (*a*) Taxation Receipts by Income Multiplier (1·820), (*b*) Health and Employment Insurance and Dole Savings by Employment Multiplier (1·57).

This figure should not be taken as having any very great accuracy. Its value depends very much upon the value of the ratio $\frac{k'}{1-k}$ and it would be a bold Chancellor of the Exchequer who based his financing of any proposed public works policy on the assurance that he would receive back somewhat less than half of his initial outlay within two years or more of his expenditure thereof. Anything which tended to reduce the value of the Income (or Employment) Multiplier would considerably alter the value we have obtained—apart from any tertiary effects that might occur. But it can at least be said that the revenue that will result from the primary employment only may be safely reckoned on. It has been shown that this amounts to 23·76 per cent. of the initial outlay. We can therefore expect that the returns will lie somewhere between one-quarter and one-half of the initial outlay, and the magnitude is then still sufficient to be a compelling argument against those who would designate all public works as 'wasteful'.

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| | Railways | 35–50 | 426 |
| | Electricity | 51–57 | 440 |
| | Miscellaneous | 58 | 447 |
| „ *VIII.* | Finance | 59–62 | 449 |

## TABLE 1

## VARIOUS ESTIMATES OF FIXED INVESTMENT

(*£ millions*)

| | *Colin Clark* | | | | | *Marschak-Lederer* | *Indices 1930 = 100* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Fixed capital (gross)* | | | *Home consumption of capital goods* | | *Internal sales of capital goods* | | | | | | |
| | *I*, *p.* 117 *A* | *O*, *p.* 185 *B* | *O*, *p.* 249 *C* | *O*, *p.* 182 *D* | *E.J.* *E* | *F* | *A'* | *B'* | *C'* | *D'* | *E'* | *F'* |
| 1924 | 589 | 576 | .. | .. | .. | 593 | 91·0 | 94·9 | .. | .. | .. | 95·0 |
| 1925 | .. | [562] | .. | .. | .. | 579 | .. | [92·7] | .. | .. | .. | 92·8 |
| 1926 | .. | [575] | .. | .. | .. | 592 | .. | [94·8] | .. | .. | .. | 94·9 |
| 1927 | 605 | [613±8] | 613 | .. | .. | 633 | 93·4 | [101·4±1·5] | 101·5 | .. | .. | 101·5 |
| 1928 | 604 | 600±4 | 597 | .. | .. | 599 | 93·3 | 98·8±0·6 | 98·9 | .. | .. | 96·1 |
| 1929 | 650 | 623 | 612 | 608 | 608 | 644 | 100·4 | 102·5 | 101·4 | 100·7 | 100·5 | 103·0 |
| 1930 | 648 | 607 | 604 | 604 | 605 | 624 | 100·0 | 100·0 | 100·0 | 100·0 | 100·0 | 100·0 |
| 1931 | 624 | 560 | 553 | 556 | 556 | .. | 96·3 | 92·3 | 91·6 | 92·1 | 91·9 | .. |
| 1932 | .. | 526 | 518 | 519 | 520 | .. | .. | 86·6 | 85·8 | 86·0 | 85·9 | .. |
| 1933 | .. | 556 | 558 | 558 | 561 | .. | .. | 91·6 | 92·4 | 92·4 | 92·7 | .. |
| 1934 | .. | 619 | 618 | 619 | 628 | .. | .. | 102·0 | 102·4 | 102·5 | 103·7 | .. |
| 1935 | .. | 662 | 662 | 660 | 689 | .. | .. | 109·0 | 109·6 | 109·4 | 113·8 | .. |
| 1936 | .. | .. | .. | [690]* | 767 | .. | .. | .. | .. | [114·2] | 126·6 | .. |
| 1937 | .. | .. | .. | .. | 838 | .. | .. | .. | .. | .. | 138·5 | .. |

* First half of 1936: $\frac{O}{345}$ $\frac{E.J.}{374}$.

TABLE 2

INVESTMENT IN WORKING CAPITAL, OVERSEAS INVESTMENT, AND TOTAL GROSS INVESTMENT. VARIOUS ESTIMATES

(*£ millions*)

| | *Working capital* | | | *Overseas investment* | | | *Total gross investment* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *I.* | *O.* | *E.J.* | *I.* | *O.* | *E.J.* | *I., p. 136* | *O., pp. 185, 204* | *O., Diagram VII* | *Commercial barometer* | *Economic Journal, Sept. 38* |
| 1924 . | +20 | +20 | .. | 74 | .. | .. | 683 | 668 | .. | .. | .. |
| 1925 . | .. | .. | .. | 54 | .. | .. | 899 | .. | .. | .. | .. |
| 1926 . | .. | .. | .. | 24 | .. | .. | 648 | .. | .. | .. | .. |
| 1927 . | +14 | .. | .. | 117 | .. | .. | 736 | .. | .. | .. | .. |
| 1928 . | +43 | .. | .. | 144 | .. | .. | 791 | .. | .. | .. | .. |
| 1929 . | −44 | −44 | −40 | 125 | 103 | 154 | 731 | 682 | 721 | 724 | 722 |
| 1930 . | −84 | −84 | −80 | 56 | 28 | 37 | 620 | 551 | 566 | .. | 562 |
| 1931 . | −40 | −40 | −20 | −102 | −104 | −94 | 482 | 416 | 451 | .. | 442 |
| 1932 . | .. | −61 | −65 | .. | −51 | −23 | .. | 414 | 447 | 440 | 432 |
| 1933 . | .. | −107 | −86 | .. | 0 | −6 | .. | 449 | 444 | 444 | 449 |
| 1934 . | .. | −2 | 0 | .. | −2 | 0 | .. | 615 | 622 | 620 | 628 |
| 1935 . | .. | 0 | +40 | .. | −37 | 16 | .. | 699 | 677 | 720 | 745 |
| 1936 . | .. | .. | +40 | .. | .. | −33 | .. | .. | .. | 725 | 774 |
| 1937 . | .. | .. | +25 | .. | .. | −71 | .. | .. | .. | .. | 792 |

TABLE 3

(£ *millions*)

| | *Consumption* | | *Net national income* | *Home-produced income** | |
|---|---|---|---|---|---|
| | | | | *Including government income* | *Excluding government income* |
| | *O, p. 165* | *I, p. 117* | *O, pp. 88, 94* | *O, p. 94* | *O, pp. 94, 112* |
| 1924 . | .. | 3,294 | 4,035 | 3,755 | 3,320 |
| 1925 . | .. | .. | 4,357 | 4,047 | 3,592 |
| 1926 . | .. | .. | 4,173 | 3,863 | 3,376 |
| 1927 . | .. | 3,565 | 4,359 | 4,046 | 3,541 |
| 1928 . | .. | 3,490 | 4,339 | 4,024 | 3,496 |
| 1929 . | 4,150† | 3,703 | 4,384 | 4,069 | 3,553 |
| 1930 . | 4,077 | 3,754 | 4,318 | 4,043 | 3,542 |
| 1931 . | 3,969 | 3,456 | 3,889 | 3,689 | 3,187 |
| 1932 . | 3,877 | .. | 3,844 | 3,669 | 3,138 |
| 1933 . | 3,880 | .. | 3,962 | 3,772 | 3,240 |
| 1934 . | 4,018 | .. | 4,238 | 4,033 | 3,479 |
| 1935 . | 4,259‡ | .. | 4,530 | 4,315 | 3,745 |
| 1936 . | 4,507‡ | .. | [4,876] | [4,650] | [4,050] |
| 1937 . | 4,806‡ | .. | .. | .. | .. |

* i.e. Net National Income minus Income from Overseas.
† Estimated from first two quarters of 1929.
‡ From *Economic Journal*, Sept. 1938.

TABLE 4

(*£ millions*)

| *Calendar year* | *Gross fixed investment* | *Annual percentage change* | *Exports of capital goods* | *Gross fixed investment including warships, &c.* | *Total output of capital goods* | *Annual percentage change* | *Home investment* | *Annual percentage change* |
|---|---|---|---|---|---|---|---|---|
| 1924 . | 576 | .. | 162 | 601 | 763 | .. | 596 | .. |
| 1925 . | [562] | −2·3 | 166 | 585 | 753 | −1·3 | .. | .. |
| 1926 . | [575] | +2·3 | 153 | 600 | 753 | ±0 | .. | .. |
| 1927 . | 613±8 | +6·6 | 174 | 638±8 | 812±8 | +7·9 | 627±8 | .. |
| 1928 . | 600±4 | −2·1±1·0 | 195 | 625±4 | 820±4 | +0·8±0·8 | 643±4 | +2·8 |
| 1929 . | 615±10 | +2·4±1·5 | 204 | 639±10 | 843±10 | +2·9±1·1 | 571±10 | −11·1 |
| 1930 . | 607 | −1·7±1·4 | 173 | 629 | 802 | −4·8 | 525 | −8·0 |
| 1931 . | 557±3 | −8·2 | 102 | 578±3 | 680±3 | −15·0 | 526±9 | +0·1 |
| 1932 . | 522±4 | −6·3 | 92 | 543±4 | 635±4 | −6·7 | 458±3 | −12·9 |
| 1933 . | 557±1 | +6·2 | 99 | 579±1 | 678±1 | +6·9 | 465±10 | +1·5 |
| 1934 . | 628 | +12·1 | 113 | 653 | 766±1 | +12·8 | 622±5 | +33·6 |
| 1935 . | 689 | +9·5 | 122 | 721±1 | 843±1 | +10·0 | 729 | +17·1 |
| 1936 . | 767 | +11·4 | 134 | 815±2 | 949±2 | +12·5 | 807 | +10·6 |
| 1937 . | 838 | +9·3 | 168 | 910 | 1,078 | +13·7 | 863 | +6·9 |

TABLE 5

| *Fiscal years* | *Gross fixed investment £ millions* | *1930=100* | *Exports of capital goods £ millions* | *Gross fixed investment including warships, &c.* | *Total output of capital goods £ millions* | *1930=100* |
|---|---|---|---|---|---|---|
| 1924–5 | 572 | 96·4 | 163 | 597 | 760 | 98·6 |
| 1925–6 | 566 | 95·3 | 163 | 591 | 754 | 97·8 |
| 1926–7 | 584 | 98·4 | 159 | 609 | 768 | 99·6 |
| 1927–8 | 610±8 | 102·7±1·3 | 179 | 639±8 | 818±8 | 106·0 |
| 1928–9 | 599±4 | 100·8±0·6 | 197 | 623±4 | 820±4 | 106·4 |
| 1929–30 | 618±10 | 104·0±1·7 | 196 | 642±10 | 838±10 | 108·7 |
| 1930–1 | 594 | 100·0 | 155 | 616 | 771 | 100·0 |
| 1931–2 | 548±6 | 92·3 | 100 | 569±6 | 669±6 | 86·8 |
| 1932–3 | 527±5 | 88·8 | 94 | 547±5 | 641±5 | 83·2 |
| 1933–4 | 574±2 | 96·5 | 102 | 597 | 699±2 | 90·6 |
| 1934–5 | 645 | 108·5 | 115 | 670 | 785 | 101·9 |
| 1935–6 | 713 | 120·0 | 125 | 747 | 872 | 113·1 |
| 1936–7 | 779 | 131·0 | 136 | 832 | 968 | 125·5 |

TABLE 6

OUTPUT OF CAPITAL GOODS CORRECTED FOR CHANGES IN WAGE-RATES

(*£ millions*)

| *Calendar years* | *Wage rates* | | *Gross fixed investment corrected by (b)* | *Warships, &c. corrected by (b)* | *Exports at 1930 prices* | *Total* |
|---|---|---|---|---|---|---|
| | *Ministry of Labour 1929=100 (a)* | *Bowley 1930=100 (b)* | | | | |
| 1924 | .. | 101·6 | 566 | 24·55 | 131·0 | 721·55 |
| 1925 | .. | 102·6 | 548 | 24·15 | 137·0 | 709·15 |
| 1926 | .. | 102·1 | 563 | 24·25 | 135·0 | 722·55 |
| 1927 | .. | 102·6 | 597±8 | 24·90 | 162·0 | 783·90±8 |
| 1928 | .. | 101·6 | 590±4 | 24·35 | 182·0 | 796·35±4 |
| 1929 | 100·0 | 101·0 | 608±9 | 23·80 | 195·0 | 826·80±9 |
| 1930 | 100·0 | 100·0 | 607 | 22·48 | 173·0 | 802·48 |
| 1931 | 97·75 | 99·0 | 563±3 | 21·37 | 113·5 | 697·87±3 |
| 1932 | 96·0 | 97·0 | 538±4 | 21·23 | 110·8 | 670·03±4 |
| 1933 | 95·25 | 95·8 | 582±1 | 23·10 | 114·0 | 719·10±1 |
| 1934 | 95·75 | 95·8 | 645 | 25·80 | 137·5 | 808·30 |
| 1935 | 96·75 | 97·0 | 710 | 32·65 | 149·2 | 891·85 |
| 1936 | 99·50 | 99·5 | 771 | 48·16 | 163·0 | 987·10 |
| 1937 | 103·00 | [103·0] | 813 | 70·20 | 195·3 | 1078·5 |

# TABLE 7

## OUTPUT OF CAPITAL GOODS

(£ millions)

| | AT 1930 PRICES (CALENDAR YEARS) | | | | | | | | AT 1930–1 PRICES (FISCAL YEARS) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calendar years | Prices of Capital goods [Colin Clark, N.I.&O.] 1930=100 (a) | Export prices [Colin Clark, N.I.&O.] 1930=100 (b) | Gross fixed investment corrected by (a) 1 | Warships, &c., corrected by (a) 2 | Exports of capital goods, corrected by (b) 3 | Total 4 | 1930=100 5 | Fiscal year | Prices of capital goods [Colin Clark, N.I.&O.] 1930–1=100 (a′) | Export prices [Colin Clark, N.I.&O.] 1930–1=100 (b′) | Gross fixed investment corrected by (a′) 1′ | Warships, &c., corrected by (a′) 2′ | Exports of capital goods, corrected by (b′) 3′ | Total 4′ | 1930=100 5′ |
| 1929 | 101·7 | 104·7 | 605±10 | 23·6 | 195·0 | 823·6±10 | 102·5±1·2 | 1929–30 | 102·9 | 107·0 | 601±9 | 23 | 183 | 807±9 | 104·7 |
| 1930 | 100·0 | 100·0 | 607 | 22·5 | 173·0 | 802·5 | 100·0 | 1930–1 | 100·0 | 100·0 | 594 | 22 | 155 | 771 | 100·0 |
| 1931 | 97·5 | 89·5 | 572 | 21·7 | 113·5 | 707·2 | 88·1 | 1931–2 | 97·7 | 89·6 | 567 | 21 | 112 | 700 | 90·8 |
| 1932 | 94·7 | 83·3 | 552 | 21·8 | 110·8 | 684·6 | 85·3 | 1932–3 | 95·3 | 84·6 | 548 | 22 | 111 | 681 | 88·3 |
| 1933 | 93·3 | 81·8 | 597 | 23·7 | 114·0 | 734·7 | 91·6 | 1933–4 | 93·8 | 84·1 | 611 | 24 | 121 | 756 | 98·1 |
| 1934 | 93·45 | 82·2 | 672 | 26·5 | 137·5 | 836·0 | 104·1 | 1934–5 | 94·7 | 83·3 | 681 | 28 | 138 | 847 | 109·9 |
| 1935 | 93·7 | 81·8 | 736 | 33·8 | 149·2 | 919·0 | 114·5 | 1935–6 | 94·7 | 84·1 | 752 | 36 | 149 | 937 | 121·5 |
| 1936 | [94·3] | 82·9 | 814 | 50·8 | 163·0 | 1,032·8 | 128·5 | 1936–7 | [95·5] | [84·8] | 816 | 55 | 160 | 1,031 | 133·8 |
| 1937 | [96·0] | [86·0] | 874 | 75·4 | 195·3 | 1,144·7 | 142·5 | 1937–8 | [96·5] | [85·5] | 856 | 82 | 198 | 1,136 | 147·0 |

## TABLE 8

## PERCENTAGE VARIATIONS BETWEEN TURNING POINTS

| | *Calendar year series* | | | |
|---|---|---|---|---|
| | *1924–9* | *1926–9* | *1929–32* | *1932–7* |
| *I. At current prices* | | | | |
| (1) Fixed investment | +6·6 | +4·0±1·5 | −15·1±1·4 | +60·5 |
| (2) Fixed investment including Warships, &c.. | +6·3 | +2·5±1·5 | −15·2±1·4 | +67·5 |
| (3) Output of Capital Goods | +10·5 | +12·0±1·2 | −24·6±1·2 | +70·0 |
| *II. At 1930 prices* | | | | |
| (1) Fixed investment | .. | .. | −8·8±1·5 | +47·5 |
| (2) Fixed investment including Warships, &c.. | .. | .. | −8·9±1·5 | +50·5 |
| (3) Output of Capital Goods | .. | .. | −16·9±1·2 | +50·8 |
| *III.* Employment in Capital Goods industries | .. | .. | −17·3 | +38·5 |
| *IV.* Est. Employment Fixed investment | .. | .. | −10·5 | +35·0 |

TABLE 9

ESTIMATED PRIMARY EMPLOYMENT EFFECTS OF INVESTMENT

| | *Number employed in certain capital goods industries* | *Estimated number employed for capital goods exported* | *Estimated number employed for home-fixed investment* | *Estimated primary employment effects of* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Gross fixed investment (excluding warships, &c.)* | *Gross fixed investment plus exports* | *Total output of capital goods* | | | | | | | |
| | *Millions of workers* | | | | | | *Indices 1930=100* | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 1*a* | 2*a* | 3*a* | 4*a* | 5*a* | 6*a* | |
| 1928 . | 2·638 | .. | .. | .. | .. | .. | 102·2 | .. | .. | .. | .. | .. | |
| 1929 . | 2·689 | 0·626 | 2·063 | 1·905 | 2·531 | 2·658 | 104·1 | 112·5 | 102·2 | 99·6 | 102·5 | 102·6 | |
| 1930 . | 2·581 | 0·556 | 2·025 | 1·914 | 2·470 | 2·588 | 100·0 | 100·0 | 100·0 | 100·0 | 100·0 | 100·0 | |
| 1931 . | 2·365 | 0·380 | 1·985 | 1·884 | 2·264 | 2·392 | 91·0 | 68·4 | 98·1 | 98·4 | 95·6 | 92·6 | |
| 1932 . | 2·225 | 0·384 | 1·841 | 1·881 | 2·265 | 2·373 | 86·2 | 69·4 | 91·0 | 98·3 | 91·7 | 91·6 | |
| 1933 . | 2·356 | 0·420 | 1·936 | 2·048 | 2·468 | 2·580 | 91·3 | 75·5 | 95·6 | 106·9 | 99·9 | 99·8 | |
| 1934 . | 2·635 | 0·476 | 2·159 | 2·304 | 2·780 | 2·904 | 102·5 | 85·4 | 107·0 | 120·3 | 112·5 | 112·0 | |
| 1935 . | 2·797 | 0·528 | 2·269 | 2·520 | 3·048 | 3·204 | 109·0 | 94·5 | 112·7 | 131·6 | 123·5 | 116·7 | |
| 1936 . | 3·080 | 0·564 | 2·516 | 2·700 | 3·264 | 3·544 | 119·3 | 101·5 | 124·5 | 144·2 | 131·8 | 136·8 | |
| 1937 . | 3·384 | .. | .. | .. | .. | .. | 131·0 | .. | .. | .. | .. | .. | |

## TABLE 10

## THE PUBLIC, SEMI-PUBLIC, AND PRIVATE DEMANDS FOR CAPITAL GOODS

(*£ millions*)

| | *1926–7* | *1927–8* | *1928–9* | *1929–30* | *1930–1* | *1931–2* | *1932–3* | *1933–4* | *1934–5* | *1935–6* | *1936–7* | *1937–8* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross fixed investment and warships, &c. . | 610 | 639 | 623 | 642 | 616 | 569 | 548 | 597 | 670 | 747 | 832 | .. |
| Total output of Capital Goods . . . | 780 | 818±8 | 820±4 | 838±10 | 771 | 669±6 | 642±5 | 699±2 | 785 | 872 | 968 | .. |
| Local Authorities Capital+Maintenance . | 222 | 228 | 198 | 202 | 206 | 211 | 170 | 165 | 173 | 194 | 210 | 224 |
| Central Government . | 62 | 64 | 61 | 61 | 59 | 55 | 52 | 54 | 61 | 80 | 125 | 192 |
| Public Utility Railways, Electricity, &c. . . | 73 | 80 | 81 | 80 | 82 | 83 | 79 | 71 | 72 | 83 | 86 | 91 |
| Total . . . | 357 | 372 | 340 | 343 | 347 | 349 | 301 | 290 | 306 | 357 | 421 | 507 |
| Output of Capital Goods for private demand | 423 | 446±8 | 480±4 | 495±10 | 424 | 320±6 | 341±5 | 409±2 | 479 | 515 | 547 | .. |
| Output of Capital Goods for private demand, less exports . . | 253 | 267 | 283 | 299 | 269 | 220 | 247 | 307 | 364 | 380 | 411 | .. |

# TABLE 11

## DEFENCE SERVICES

| | *Shipbuilding—Navy* | | *New works and buildings, &c.* | | *Technical stores* | | *Maintenance of works and buildings* | | *Total of (1), (2), (3), and (4)* | | *Exchequer issues to defence services* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ *millions* (1) | *Index* 1930–1=100 | £ *millions* (2) | *Index* 1930–1=100 | £ *millions* (3) | *Index* 1930–1=100 | £ *millions* (4) | *Index* 1930–1=100 | £ *millions* (5) | *Index* 1930–1=100 | £ *millions* (6) | *Index* 1930–1=100 |
| 1926–7 | 19·38 | 128·0 | 4·28 | 133·0 | 14·72 | 92·7 | 2·19 | 98·2 | 40·57 | 111·0 | 116·73 | 105·6 |
| 1927–8 | 20·15 | 132·8 | 4·25 | 132·0 | 15·80 | 99·5 | 2·20 | 98·6 | 42·40 | 114·1 | 117·44 | 106·2 |
| 1928–9 | 19·16 | 126·2 | 3·41 | 106·0 | 15·48 | 97·4 | 2·20 | 98·6 | 40·25 | 110·2 | 113·47 | 102·6 |
| 1929–30 | 17·82 | 117·4 | 3·71 | 115·2 | 16·13 | 101·5 | 2·27 | 101·8 | 39·93 | 104·4 | 113·00 | 102·2 |
| 1930–1 | 15·17 | 100·0 | 3·22 | 100·0 | 15·89 | 100·0 | 2·23 | 100·0 | 36·51 | 100·0 | 110·52 | 100·0 |
| 1931–2 | 14·20 | 93·6 | 3·29 | 102·0 | 15·54 | 97·8 | 2·22 | 99·5 | 35·25 | 96·5 | 107·28 | 97·0 |
| 1932–3 | 14·58 | 96·0 | 3·04 | 93·3 | 13·90 | 87·5 | 2·21 | 99·1 | 33·73 | 92·4 | 102·99 | 93·2 |
| 1933–4 | 16·92 | 111·5 | 3·02 | 93·2 | 14·54 | 91·5 | 2·20 | 98·6 | 36·68 | 100·4 | 107·79 | 97·6 |
| 1934–5 | 19·47 | 128·4 | 3·64 | 113·0 | 15·83 | 99·7 | 2·20 | 98·6 | 41·14 | 112·6 | 113·87 | 103·0 |
| 1935–6 | 24·74 | 163·2 | 6·88 | 213·8 | 25·28 | 159·0 | 2·27 | 101·8 | 59·17 | 162·6 | 136·95 | 124·0 |
| 1936–7 | 33·59 | 221·4 | 12·33 | 382·9 | 49·03 | 208·2 | 2·36 | 105·8 | 97·31 | 266·2 | 186·10 | 168·5 |
| 1937–8 | 49·22 | 324·4 | 20·61 | 640·1 | 87·85 | 452·3 | 2·47 | 110·7 | 160·15 | 342·5 | 262·13* | 237·0 |
| 1938–9 | 60·89 | 401·4 | 23·96 | 742·8 | 121·28 | 663·0 | 2·84 | 127·2 | 208·97 | 472·5 | 382·46* | 346·0 |
| 1939–40 | | | | | | | | | | | 523·05*† | 473·0 |

* Appropriations from defence loans (£millions): 64·87 in 1937–8, 128·05 in 1938–9, 304·00 in 1939–40.

† Original estimates of March 1939.

## TABLE 12

## THE NAVY: ENGINEERING AND SHIPBUILDING

(*£ millions*)

| | *Shipbuilding, repairs, and maintenance* | | | | *Naval armaments‡ Vote IX* | *Works, buildings, lands, &c.§ Vote X* | *Total* |
|---|---|---|---|---|---|---|---|
| | *Personnel* | | *Matériel† Vote VIII. ii* | *Contract work Vote VIII. iii* | | | |
| | *Home and abroad Vote VIII. i* | *Home dockyards** | | | | | |
| 1926–7 | 7·54 | 6·19 | 4·41 | 7·44 | 3·80 | 1·73 | 24·91 |
| 1927–8 | 7·08 | 5·81 | 3·69 | 9·38 | 4·66 | 1·83 | 26·64 |
| 1928–9 | 6·77 | 5·48 | 3·76 | 8·63 | 4·50 | 1·64 | 25·30 |
| 1929–30 | 6·59 | 5·29 | 3·87 | 7·36 | 4·19 | 1·91 | 23·92 |
| 1930–1 | 6·28 | 5·03 | 3·25 | 5·64 | 3·90 | 1·79 | 20·86 |
| 1931–2 | 6·38 | 5·15 | 3·06 | 4·76 | 3·63 | 1·94 | 19·75 |
| 1932–3 | 6·30 | 5·09 | 2·81 | 5·47 | 3·43 | 1·93 | 19·93 |
| 1933–4 | 6·21 | 5·00 | 2·77 | 7·94 | 3·94 | 1·80 | 22·66 |
| 1934–5 | 6·54 | 5·29 | 3·24 | 9·69 | 4·27 | 1·76 | 25·50 |
| 1935–6 | 7·20 | 5·83‖ | 4·80 | 12·74 | 5·97 | 2·02 | 32·73 |
| 1936–7 | 8·02 | 6·66 | 7·13 | 18·44 | 8·93 | 3·07 | 52·26 |
| 1937–8 | 8·62 | 7·08 | 8·54 | 32·06 | 13·30 | 5·12 | 67·64 |
| 1938–9 | 10·10 | 8·24 | 11·89 | 38·90 | 16·14 | 5·46 | 82·49 |

* Excluding Wages, &c., of Police Force.

† Excluding Fuel.

‡ Excluding Wages of Crews of Naval Armament Vessels, and Wages, &c., of Police Force.

§ Excluding Annuity, &c., in repayment of advances under Naval Works Acts, 1895–1905:

| | *£ millions* | | *£ millions* |
|---|---|---|---|
| 1926–7 . . | 0·71 | 1933–4 . . | 0·60 |
| 1927–8 . . | 0·68 | 1934–5 . . | 0·47 |
| 1928–9 . . | 0·68 | 1935–6 . . | 0·25 |
| 1929–30 . . | 0·68 | 1936–7 . . | 0·13 |
| 1930–1 . . | 0·68 | 1937–8 . . | 0·08 |
| 1931–2 . . | 0·66 | 1938–9 . . | 0·04 |
| 1932–3 . . | 0·66 | | |

‖ Including £0·328 millions for 20 trawlers bought.

## TABLE 13

## NEW CONSTRUCTION OF SHIPS

(*£ millions*)

| | *Mainly dockyard built* | | | | *Mainly contract built* | | | |
|---|---|---|---|---|---|---|---|---|
| | *Dockyard work* | | | *Total including Oncosts* | *Dockyard work* | | | *Total including Oncosts* |
| | *Personnel* | *Matériel* | *Contract* | | *Personnel* | *Matériel* | *Contract* | |
| 1927–8 . . | 0·86 | 0·47 | 1·66 | 3·54 | 0·06 | 0·11 | 5·47 | 5·89 |
| 1928–9 . . | 0·77 | 0·44 | 1·53 | 3·18 | 0·10 | 0·17 | 5·14 | 5·69 |
| 1929–30 . | 0·76 | 0·44 | 1·30 | 2·91 | 0·13 | 0·26 | 4·80 | 5·49 |
| 1930–1 . . | 0·60 | 0·35 | 0·78 | 2·06 | 0·05 | 0·05 | 3·12 | 3·27 |
| 1931–2 . . | 0·82 | 0·52 | 1·48 | 3·26 | 0·05 | 0·03 | 1·88 | 2·00 |
| 1932–3 . . | 0·97 | 0·57 | 1·56 | 3·78 | 0·04 | 0·14 | 2·71 | 2·93 |
| 1933–4 . . | 0·76 | 0·52 | 1·59 | 3·49 | 0·06 | 0·11 | 4·63 | 4·87 |
| 1934–5 . . | 0·71 | 0·42 | 0·97 | 2·67 | 0·07 | 0·29 | 7·09 | 7·53 |
| 1935–6 . . | 0·50 | 0·34 | 0·95 | 2·20 | 0·07 | 0·22 | 7·77 | 8·15 |
| 1936–7 . . | 0·50 | 0·30 | 1·29 | 2·48 | 0·08 | 0·36 | 10·75 | 11·30 |
| 1937–8 . . | 0·71 | 0·48 | 1·59 | 3·25 | 0·16 | 0·53 | 22·44 | 23·32 |
| 1938–9 . . | 0·62 | 0·45 | 1·11 | 2·61 | 0·13 | 1·00 | 29·67 | 30·98 |

## TABLE 14

## NEW CONSTRUCTION AND REPAIRS OF SHIPS: TOTAL AND CONTRACTED

(*£ millions*)

| | *New construction* | | *Repairs* | | | |
|---|---|---|---|---|---|---|
| | *Total* | *Contract* | *Total* | *Contract* | *Total* | *Contract* |
| 1927–8 . . | 9·78 | 7·56 | 7·13 | 0·67 | 16·91 | 8·23 |
| 1928–9 . . | 9·19 | 6·98 | 7·00 | 0·63 | 16·19 | 7·61 |
| 1929–30 . | 8·41 | 6·11 | 6·92 | 0·66 | 15·33 | 6·77 |
| 1930–1 . . | 5·36 | 3·91 | 6·18 | 0·60 | 11·54 | 4·51 |
| 1931–2 . . | 5·29 | 3·38 | 6·07 | 0·54 | 11·36 | 3·92 |
| 1932–3 . . | 6·77 | 4·28 | 5·07 | 0·48 | 11·84 | 4·77 |
| 1933–4 . . | 8·44 | 6·28 | 5·16 | 0·55 | 13·60 | 6·83 |
| 1934–5 . . | 10·22 | 8·07 | 6·10 | 0·85 | 16·32 | 8·92 |
| 1935–6 . . | 10·48 | 8·84 | 7·50 | 1·54 | 17·98 | 10·38 |
| 1936–7 . . | 13·94 | 12·21 | 8·10 | 1·84 | 22·04 | 14·04 |
| 1937–8 . . | 28·02 | 25·44 | 10·10 | 2·36 | 38·12 | 27·76 |
| 1938–9 . . | 34·78 | 31·94 | 13·46 | 3·48 | 48·24 | 35·42 |

## TABLE 15

## TECHNICAL STORES

(*£ millions*)

| | *Total* | *Navy* | *Army* | *Air Force* | *Thereof aeroplanes, engines, parts, &c.* |
|---|---|---|---|---|---|
| 1926–7 | 14·72 | 3·80 | 3·54 | 7·38 | 5·44 |
| 1927–8 | 15·80 | 4·66 | 3·62 | 7·52 | 5·45 |
| 1928–9 | 15·48 | 4·50 | 3·54 | 7·44 | 5·31 |
| 1929–30 | 16·13 | 4·19 | 3·75 | 8·19 | 6·08 |
| 1930–1 | 15·89 | 3·90 | 3·15 | 8·84 | 6·81 |
| 1931–2 | 15·54 | 3·63 | 3·20 | 8·71 | 6·70 |
| 1932–3 | 13·90 | 3·43 | 2·85 | 7·62 | 5·92 |
| 1933–4 | 14·54 | 3·94 | 3·11 | 7·49 | 5·75 |
| 1934–5 | 15·83 | 4·27 | 3·69 | 7·87 | 5·95 |
| 1935–6 | 25·28 | 5·87 | 6·55 | 12·76 | 9·01 |
| 1936–7 | 49·03 | 8·93 | 12·29 | 27·81 | 18·94 |
| 1937–8 | 87·85 | 13·30 | 31·01 | 43·54 | 29·68 |
| 1938–9 | 121·28 | 16·14 | 44·51 | 60·63 | 42·68 |

## TABLE 16

## ROYAL ORDNANCE FACTORIES

## CONTRACT WORK

(*£ millions*)

| | *Wages and Salaries* | *Materials* | *Machinery* | *Other* | *Miscellaneous* | *Total* |
|---|---|---|---|---|---|---|
| 1926–7 . | 1·71 | 0·71 | 0·07 | 0·11 | 0·12 | 2·71 |
| 1927–8 . | 1·80 | 0·72 | 0·14 | 0·11 | 0·12 | 2·88 |
| 1928–9 . | 1·81 | 0·74 | 0·15 | 0·07 | 0·10 | 2·88 |
| 1929–30 . | 1·72 | 0·66 | 0·12 | 0·07 | 0·08 | 2·64 |
| 1930–1 . | 1·73 | 0·60 | 0·13 | 0·05 | 0·08 | 2·57 |
| 1931–2 . | 1·56 | 0·58 | 0·07 | 0·05 | 0·07 | 2·32 |
| 1932–3 . | 1·56 | 0·64 | 0·09 | 0·08 | 0·08 | 2·45 |
| 1933–4 . | 1·75 | 0·64 | 0·14 | 0·10 | 0·08 | 2·69 |
| 1934–5 . | 2·11 | 0·78 | 0·18 | 0·10 | 0·08 | 3·24 |
| 1935–6 . | 2·81 | 1·15 | 0·30 | 0·15 | 0·09 | 4·49 |
| 1936–7 . | 3·34 | 1·55 | 0·47 | 0·23 | 0·40 | 5·99 |
| 1937–8 . | 4·67 | 2·95 | 2·37 | 0·56 | 5·61 | 16·16 |
| 1938–9 . | 6·72 | 3·77 | 2·11 | 0·76 | 6·92 | 20·28 |

## TABLE 17

## ARMY: WORKS AND BUILDINGS

(*£ millions*)

| | *Total Vote X* | *Total home stations* | *New works, additions, and alterations* | | *Maintenance* | *Purchase of stores and plant* |
|---|---|---|---|---|---|---|
| | | | *Over £2,500* | *Under £2,500* | | |
| 1926–7 . . | 4·38 | 2·25 | 1·25 | 0·29 | 1·23 | 0·22 |
| 1927–8 . . | 3·87 | 2·26 | 1·53 | 0·27 | 1·28 | 0·20 |
| 1928–9 . . | 3·19 | 2·00 | 0·90 | 0·32 | 1·29 | 0·18 |
| 1929–30 . | 3·16 | 2·05 | 0·90 | 0·31 | 1·33 | 0·18 |
| 1930–1 . . | 2·97 | 2·01 | 0·73 | 0·28 | 1·32 | 0·19 |
| 1931–2 . . | 2·77 | 1·89 | 0·58 | 0·26 | 1·31 | 0·18 |
| 1932–3 . . | 2·69 | 1·92 | 0·59 | 0·24 | 1·32 | 0·16 |
| 1933–4 . . | 2·88 | 1·98 | 0·76 | 0·21 | 1·31 | 0·17 |
| 1934–5 . . | 3·53 | 2·02 | 1·23 | 0·24 | 1·33 | 0·19 |
| 1935–6 . . | 4·04 | 2·12 | 1·73 | 0·23 | 1·35 | 0·29 |
| 1936–7 . . | 5·09 | 2·67 | 2·48 | 0·29 | 1·39 | 0·33 |
| 1937–8 . . | 10·08 | 5·50 | 5·00 | 0·27 | 1·43 | 0·63 |
| 1938–9 . . | 13·85 | 7·80 | 7·50 | 0·30 | 1·64 | 0·90 |

## TABLE 18

## NAVY: WORKS AND BUILDINGS

(*£ millions*)

| | *Works, buildings, lands, and repairs Total Vote X* | *New works, additions, alterations* | | | *Ordinary repairs† Vote X, Part III* |
|---|---|---|---|---|---|
| | | *Over £2,500 each* | | *Under £2,500* Vote X, Part II* | |
| | | *Total Vote X, Part I* | *Home Vote X, Appendix IV* | | |
| 1926–7 | 1·73 | 0·98 | 0·64 | 0·12 | 0·43 |
| 1927–8 | 1·83 | 1·03 | 0·69 | 0·13 | 0·40 |
| 1928–9 | 1·64 | 0·87 | 0·46 | 0·13 | 0·42 |
| 1929–30 | 1·91 | 1·18 | 0·45 | 0·14 | 0·42 |
| 1930–1 | 1·79 | 1·07 | 0·45 | 0·14 | 0·41 |
| 1931–2 | 1·94 | 1·20 | 0·44 | 0·14 | 0·41 |
| 1932–3 | 1·93 | 1·24 | 0·27 | 0·10 | 0·41 |
| 1933–4 | 1·80 | 1·01 | 0·27 | 0·11 | 0·41 |
| 1934–5 | 1·76 | 1·03 | 0·39 | 0·11 | 0·42 |
| 1935–6 | 2·02 | 1·18 | 0·47 | 0·11 | 0·42 |
| 1936–7 | 3·07 | 2·13 | 1·30 | 0·17 | 0·45 |
| 1937–8 | 5·12 | 3·05 | 2·22 | 0·21 | 0·47 |
| 1938–9 | 5·46 | 3·63 | 2·53 | 0·23 | 0·52 |

* Home and foreign not separately distinguished.

## TABLE 19

## AIR FORCE: WORKS AND BUILDINGS

(*£ millions*)

| | *Total* | *Total Home stations* | | *New works, additions and alterations, &c. Over £2,500* each* | | *Ordinary repairs, renewals, and maintenance Total Vote IV* |
|---|---|---|---|---|---|---|
| | | | *thereof 'new works'* | *Total Votes III and IV†* | *Total Vote IV* | |
| 1926–7 . . | 2·18 | 1·65 | 1·38 | 1·54* | 0·10 | 0·53 |
| 1927–8 . . | 1·81 | 1·23 | 0·93 | 1·18 | 0·12 | 0·52 |
| 1928–9 . . | 1·68 | 1·10 | 0·80 | 1·09 | 0·11 | 0·49 |
| 1929–30 . | 1·70 | 1·10 | 0·75 | 1·06 | 0·13 | 0·52 |
| 1930–1 . . | 1·51 | 0·99 | 0·65 | 0·87 | 0·14 | 0·50 |
| 1931–2 . . | 1·61 | 1·17 | 0·83 | 0·98 | 0·13 | 0·50 |
| 1932–3 . . | 1·35 | 1·06 | 0·73 | 0·77 | 0·10 | 0·48 |
| 1933–4 . . | 1·40 | 1·06 | 0·71 | 0·83 | 0·10 | 0·48 |
| 1934–5 . . | 1·48 | 0·97 | 0·64 | 0·93 | 0·10 | 0·45 |
| 1935–6 . . | 4·24 | 3·12 | 2·74 | 3·63 | 0·11 | 0·50 |
| 1936–7 . . | 7·78 | 6·45 | 6·07 | 7·17‡ | 0·09 | 0·52 |
| 1937–8 . . | 12·65 | 10·78 | 10·35 | 11·95‡ | 0·13 | 0·57 |
| 1938–9 . . | 19·98 | 11·49 | 10·95 | 12·18‡ | 0·12 | 0·68 |

* Over £2,000 each for 1926–7.

† See Appendix IV [for 1926–7 Appendix V] including expenditure over £2,500 on Vote III, not on Vote VIII, which is given at the same place and appears in table 15.

‡ Including Subhead H: 'Works and Lands for Factories' 1936–7, £ millions 1·23; 1937–8, 4·00; 1938–9, 1·75.

## TABLE 20

## CIVIL AND REVENUE DEPARTMENTS: EXPENDITURE ON WORKS VOTES

(*£ millions*)

| | *Land and buildings* | | | *Furniture* | | |
|---|---|---|---|---|---|---|
| | *New works* 1 | *New works minus P.O. buildings and buildings overseas* 1(*a*) | *Maintenance and repairs* 2 | *Additional equipment* 3 | *Repairs and replacements* 4 | *Total of Cols.* 1, 2, 3, 4 5 |
| 1926–7 . | 1·051 | 0·96 | 1·588 | 0·277* | .. | 2·916 |
| 1927–8 . | 0·964 | 0·92 | 1·670 | 0·272* | .. | 2·906 |
| 1928–9 . | 1·051 | 0·95 | 1·503 | 0·286* | .. | 2·840 |
| 1929–30 . | 0·727 | 0·51 | 1·501 | 0·347* | .. | 2·585 |
| 1930–1 . | 1·037 | 0·76 | 1·623 | 0·211 | 0·195 | 3·066 |
| 1931–2 . | 0·957 | 0·79 | 1·457 | 0·230 | 0·149 | 2·793 |
| 1932–3 . | 0·683 | 0·60 | 1·341 | 0·189 | 0·117 | 2·330 |
| 1933–4 . | 0·500 | 0·43 | 1·409 | 0·164 | 0·126 | 2·199 |
| 1934–5 . | 0·593 | 0·58 | 1·662 | 0·277 | 0·150 | 2·682 |
| 1935–6 . | 0·717 | 0·70 | 1·669 | 0·291 | 0·159 | 2·836 |
| 1936–7 . | 1·025 | 1·02 | 1·787 | 0·390 | 0·180 | 3·382 |

* Repairs and replacements included.

## TABLE 21

## POST OFFICE: INCOME AND EXPENDITURE

(*£ millions*)

| | *Income* | | | | *Expenditure* | | *Surplus or deficiency* | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Total* | *Telephone* | *Telegraph* | *Postal* | *Total* | *Telephone* | *Total* | *Telephone* | *Telegraph* | *Postal* |
| 1925–6 . | 61·91 | 16·16 | 5·16 | 40·59 | 55·24 | 15·62 | 6·67 | 0·55 | −1·30 | 7·42 |
| 1926–7 . | 62·60 | 17·49 | 5·05 | 40·06 | 56·81 | 17·20 | 5·79 | 0·28 | −1·35 | 6·85 |
| 1927–8 . | 66·88 | 18·87 | 5·01 | 43·00 | 59·31 | 18·77 | 7·57 | 0·11 | −1·38 | 8·84 |
| 1928–9 . | 69·04 | 20·33 | 5·13 | 43·58 | 60·02 | 19·80 | 9·01 | 0·52 | −0·76 | 9·25 |
| 1929–30 . | 71·71 | 21·89 | 4·96 | 44·87 | 62·34 | 21·38 | 9·27 | 0·51 | −0·80 | 9·66 |
| 1930–1 . | 72·38 | 22·84 | 4·44 | 45·10 | 63·20 | 22·50 | 9·19 | 0·34 | −1·01 | 9·85 |
| 1931–2 . | 72·30 | 23·57 | 4·17 | 44·57 | 61·67 | 23·00 | 10·63 | 0·57 | −0·81 | 10·87 |
| 1932–3 . | 73·25 | 24·44 | 3·90 | 44·91 | 62·21 | 24·03 | 11·06 | 0·41 | −0·84 | 11·48 |
| 1933–4 . | 74·98 | 25·92 | 3·94 | 45·12 | 62·67 | 24·53 | 12·31 | 1·39 | −0·65 | 11·57 |
| 1934–5 . | 76·42 | 27·05 | 3·87 | 45·50 | 64·48 | 25·36 | 11·94 | 1·68 | −0·65 | 10·91 |
| 1935–6 . | 80·69 | 28·93 | 3·78 | 47·98 | 68·15 | 26·80 | 12·54 | 2·13 | −0·80 | 11·21 |
| 1936–7 . | 84·98 | 30·95 | 3·96 | 50·06 | 72·67 | 29·48 | 12·31 | 1·47 | −0·64 | 11·47 |
| 1937–8 . | .. | .. | .. | .. | .. | .. | 11·23 | 0·43 | .. | .. |

## TABLE 22

## POST OFFICE: EXPENDITURE ON CAPITAL WORKS

(*£ millions*)

| | *Total capital expenditure* | *Total engineering expenditure* | *Aggregate* | *Building: expenditure on Works vote* | *Total* |
|---|---|---|---|---|---|
| 1926–7 . | 10·62 | 7·02 | 17·64 | 0·68 | 18·32 |
| 1927–8 . | 10·21 | 7·61 | 17·82 | 0·68 | 18·50 |
| 1928–9 . | 10·27 | 7·16 | 17·43 | 0·66 | 18·09 |
| 1929–30 . | 10·81 | 6·98 | 17·79 | 0·37 | 18·16 |
| 1930–1 . | 10·79 | 7·51 | 18·30 | 0·40 | 18·70 |
| 1931–2 . | 9·58 | 7·18 | 16·76 | 0·39 | 17·15 |
| 1932–3 . | 7·77 | 7·96 | 15·73 | 0·39 | 16·12 |
| 1933–4 . | 6·28 | 8·23 | 14·51 | 0·41 | 14·92 |
| 1934–5 . | 7·65 | 8·55 | 16·20 | 0·44 | 16·66 |
| 1935–6 . | 10·48 | 9·48 | 19·96 | 0·46 | 20·42 |
| 1936–7 . | 13·60 | 10·99 | 24·59 | 0·51 | 25·10 |
| 1937–8 . | 17·15 | 13·03 | 30·18 | 0·58 | 30·76 |

## TABLE 23

## POST OFFICE: CAPITAL EXPENDITURE

(*£ millions*)

| | *Total* | *Sites and buildings* | *New exchanges and exchange extensions* | *Local lines* | *Trunk lines, &c.* | *Subscribers' circuits* |
|---|---|---|---|---|---|---|
| 1926–7 . . | 10·62 | .. | .. | .. | .. | .. |
| 1927–8 . . | 10·21 | 1·07 | 3·25 | 3·00 | 0·96 | 1·93 |
| 1928–9 . . | 10·26 | 1·10 | 3·01 | 3·39 | 1·02 | 1·73 |
| 1929–30 . | 10·81* | 1·59* | 2·87 | 2·88 | 1·25 | 1·89 |
| 1930–1 . . | 10·79 | 1·65 | 2·42 | 2·76 | 1·92 | 1·69 |
| 1931–2 . . | 9·58 | 1·76 | 3·00 | 2·10 | 1·13 | 1·34 |
| 1932–3 . . | 7·77 | 1·52 | 2·24 | 1·29 | 1·29 | 1·16 |
| 1933–4 . . | 6·28 | 1·18 | 1·70 | 1·05 | 0·84 | 1·26 |
| 1934–5 . . | 7·65 | 1·74 | 1·30 | 1·05 | 1·50 | 1·76 |
| 1935–6 . . | 10·48 | 1·85 | 1·69 | 1·43 | 3·14 | 2·10* |
| 1936–7 . . | 13·60 | 2·20 | 2·67 | 1·86 | 3·54 | 2·96 |
| 1937–8 . . | 17·15 | 2·44 | 3·04 | 3·54 | 4·82 | 2·89 |

* Expenditure of a capital nature up to April 1929 met out of grants for revenue buildings and done by Office of Works, now provided out of loans raised by Post Office under the Post Office and Telegraphs Money Act 1928.

## TABLE 24

## NET ADDITIONS TO CAPITAL. P.O. COMMERCIAL ACCOUNTS: GENERAL REVENUE ACCOUNT III

(*£ millions*)

| | *Net additions to** | | | | | |
|---|---|---|---|---|---|---|
| | *Freehold land* (1) | *Freehold buildings* (2) | *Leasehold land and buildings* (3) | *Light, heat and power plant* (4) | *Telephone plant at prime cost* (5) | *Total** (2)+(4)+(5) (6) |
| 1926–7 . . | .. | .. | .. | .. | .. | .. |
| 1927–8 . . | 0·10 | 1·06 | 0·11 | 0·12 | 9·24 | 10·42 |
| 1928–9 . . | 0·26 | 1·13 | 0·06 | 0·16 | 9·29 | 10·58 |
| 1929–30 . | 0·15 | 1·10 | 0·06 | 0·15 | 8·91 | 10·17 |
| 1930–1 . | 0·19 | 1·29 | 0·07 | 0·19 | 8·77 | 10·25 |
| 1931–2 . . | 0·16 | 1·39 | 0·11 | 0·22 | 7·62 | 9·23 |
| 1932–3 . . | 0·10 | 1·11 | 0·14 | 0·22 | 6·00 | 7·33 |
| 1933–4 . . | 0·10 | 0·95 | 0·02 | 0·18 | 4·48 | 5·61 |
| 1934–5 . . | 0·22 | 1·20 | 0·22 | 0·20 | 5·63 | 7·03 |
| 1935–6 . . | 0·32 | 1·18 | 0·21 | 0·25 | 8·39 | 9·82 |
| 1936–7 . . | | | | | | |

* Does not include additions to stocks, and some minor services, e.g. printing.

## TABLE 25

## POST OFFICE: ENGINEERING EXPENDITURE

(*£ millions*)

| | *Total* (1) | *New construction* (2) | *Renewals* (3) | *Maintenance* (4) | *Repairs (P. O. factories)* (5) | *Net total* (2)+(3)+(4)+(5) (6) |
|---|---|---|---|---|---|---|
| 1926–7 . . | 7·02 | 0·25 | 2·90 | 3·40 | 0·28 | 6·84 |
| 1927–8 . . | 7·61 | 0·29 | 3·12 | 3·73 | 0·30 | 7·44 |
| 1928–9 . . | 7·16 | 0·22 | 2·81 | 3·63 | 0·30 | 6·96 |
| 1929–30 . | 6·98 | .. | 2·69 | 3·77 | 0·32 | 6·79 |
| 1930–1 . . | 7·51 | .. | 3·08 | 3·87 | 0·33 | 7·28 |
| 1931–2 . . | 7·18 | .. | 2·82 | 3·73 | 0·33 | 6·88 |
| 1932–3 . . | 7·96 | .. | 2·51 | 4·58 | 0·34 | 7·43 |
| 1933–4 . . | 8·23 | .. | 2·58 | 4·70 | 0·34 | 7·61 |
| 1934–5 . . | 8·55 | .. | 2·89 | 4·87 | 0·34 | 8·09 |
| 1935–6 . . | 9·48 | .. | 3·34 | 5·49 | 0·35 | 9·18 |
| 1936–7 . . | 10·99 | .. | 3·88 | 6·40 | 0·44 | 10·72 |
| 1937–8 . . | 13·03 | .. | 4·66 | 7·54 | 0·42 | 12·60 |

## TABLE 26

## POST OFFICE: ENGINEERING EXPENDITURE

(*£ millions*)

| | *Engineering establishment* (1) | *Engineering materials* (2) | *Engineering contract work* (3) | *Total* (1)+(2)+(3) (4) |
|---|---|---|---|---|
| 1926–7 . . . | 4·78 | 1·65 | 0·92 | 7·35 |
| 1927–8 . . . | 5·12 | 0·94 | 0·95 | 7·01 |
| 1928–9 . . . | 4·77 | 1·37 | 0·89 | 7·03 |
| 1929–30 . . . | 4·70 | 1·56 | 0·77 | 7·03 |
| 1930–1 . . . | 4·89 | 1·51 | 1·04 | 7·44 |
| 1931–2 . . . | 4·59 | 2·06 | 0·80 | 7·45 |
| 1932–3 . . . | 4·78 | 1·52 | 0·94 | 7·24 |
| 1933–4 . . . | 4·86 | 1·24 | 1·00 | 7·10 |
| 1934–5 . . . | 4·98 | 1·00 | 1·21 | 7·19 |
| 1935–6 . . . | 5·55 | 1·69 | 1·38 | 8·62 |
| 1936–7 . . . | 6·34 | 2·95 | 1·53 | 10·82 |
| 1937–8 . . . | 7·68 | 3·37 | 1·60 | 12·65 |

# TABLE 27

## CAPITAL EXPENDITURE OF LOCAL AUTHORITIES

(*£ millions*)

| | *Total capital expenditure* | | | *Effective capital expenditure* | | | | *Capital expenditure on land and other non-effectives England and Wales* | *Capital expenditure on construction England and Wales* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *England and Wales* | | *Great Britain* | | | | |
| | *England and Wales* | *Scotland* | *Great Britain* | (*a*) | (*b*) | (*a*) | (*b*) | | (*a*) | (*b*) |
| 1919–20 . . | 25·491 | 4·425 | 29·916 | 25·491 | 24·0 | 29·916 | 28·1 | 1·908 | 23·6 | 22·1 |
| 1920–1 . . | 100·477 | 10·762 | 111·239 | 100·477 | 94·5 | 111·239 | 104·6 | 7·563 | 92·9 | 86·9 |
| 1921–2 . . | 136·994 | 16·656 | 153·650 | 136·994 | 128·8 | 153·650 | 144·4 | 10·335 | 126·7 | 118·5 |
| 1922–3 . . | 82·442 | 13·034 | 95·476 | 81·603 | 77·5 | 94·637 | 89·7 | 7·354 | 74·3 | 70·1 |
| 1923–4 . . | 61·659 | 8·897 | 70·556 | 61·261 | 58·0 | 70·158 | 66·3 | 6·534 | 54·7 | 51·5 |
| 1924–5 . . | 83·589 | 10·021 | 93·610 | 83·327 | 78·6 | 93·348 | 88·0 | 13·593‡ | 69·7§ | 65·0§ |
| 1925–6 . . | 115·576 | 11·791 | 127·367 | 115·439 | 108·7 | 127·230 | 119·7 | 20·590‡ | 94·8§ | 88·1§ |
| 1926–7 . . | 132·220 | 13·296 | 145·516 | 132·063 | 124·3 | 145·359 | 136·8 | 24·994‡ | 107·1§ | 99·3§ |
| 1927–8 . . | 138·125 | 13·530 | 151·655 | 137·082 | 130·8 | 150·612 | 142·5 | 25·535‡ | 111·5§ | 105·3§ |
| 1928–9 . . | 107·420 | 13·146 | 120·566 | 104·401 | 100·4 | 117·547 | 113·3 | 20·157‡ | 82·2§ | 80·2§ |
| 1929–30 . . | 112·883 | 11·081 | 123·964 | 106·313 | | 117·394 | | 19·889‡ | 86·4§ | |
| 1930–1 . . | 116·590 | 11·292 | 127·882 | 108·868 | | 120·160 | | 14·900 | 94·0 | |
| 1931–2 . . | 123·189 | 11·796 | 134·985 | 116·130 | | 127·926 | | 14·770 | 101·4 | |
| 1932–3 . . | 90·331 | 11·455 | 101·786 | 82·436 | | 93·891 | | 10·131 | 72·3 | |
| 1933–4 . . | 94·786 | 11·835 | 106·621 | 76·232 | | 87·175 | | 10·410 | 65·8 | |
| 1934–5 . . | 87·197 | .. | .. | 78·237 | | [90·200]† | | 11·387 | 66·9 | |
| 1935–6 . . | 103·680 | .. | .. | 94·625 | | [107·100]† | | 14·037 | 80·6 | |
| 1936–7 . . | 124·781 | .. | .. | 113·731 | | [127·000]† | | .. | .. | |
| 1937–8 . . | .. | .. | .. | [120·600]* | | [134·000]† | | .. | .. | |
| 1938–9 . . | .. | .. | .. | [ ]* | | [ ]† | | .. | .. | |

(*a*) Total capital expenditure less balances repaid where available.
(*b*) Up to 1927–8 total capital expenditure less balances repaid estimated at 6 per cent, 1927–8, 1928–9 net figures as given in table of summary, L.T.R., for 1935–6 plus transfers from revenue.
* Estimated from loans sanctioned—see Appendix.
† Scottish figures estimated.
‡ Less small dwellings (balances repaid): these have already been removed.
§ Plus small dwellings (balances repaid): these have already been removed.

# TABLE 28

## MAINTENANCE EXPENDITURE OF A CAPITAL NATURE ON CERTAIN LOCAL GOVERNMENT SERVICES: ENGLAND AND WALES

(*£ millions*)

| | *1929–30* | *1930–1* | *1931–2* | *1932–3* | *1933–4* | *1934–5* | *1935–6* | *1936–7* |
|---|---|---|---|---|---|---|---|---|
| RATE-FUND SERVICES | | | | | | | | |
| Education | 5·163 | 5·038 | 4·786 | 4·136 | 4·584 | 5·189 | 5·542 | .. |
| Highways and bridges* (*a*) | .. | 32·475 | 31·220 | 28·293 | 28·416 | 28·837 | 29·071 | .. |
| (*b*) | 37·296 | 37·806 | 36·649 | 32·078 | 31·235 | 33·068 | 34·283 | .. |
| Private street works | 2·228 | 2·130 | 2·249 | 2·063 | 2·015 | 2·380 | 2·206 | 2·568 |
| Sewers and sewerage disposal | 5·135 | 5·275 | 5·184 | 5·013 | 5·169 | 5·257 | 5·406 | 5·457 |
| Housing | 1·596 | 1·766 | 1·878 | 2·009 | 2·309 | 3·085 | 3·476 | 3·635 |
| Hospitals (*a*) General† | 0·500‖ | 0·519 | 0·418 | 0·488 | 0·656 | 0·574 | 0·699 | .. |
| (*b*) Mental | 1·081 | 1·206 | 1·278 | 1·325 | 1·329 | 1·405 | 1·543 | 1·628 |
| Poor relief‡ | 1·500‖ | 1·497 | 1·288 | 0·998 | 1·281 | 1·417 | 1·249 | .. |
| Police and Police Stations | 0·500‖ | 0·488 | 0·429 | 0·343 | 0·564 | 0·609 | 0·735 | .. |
| Land drainage | 0·733 | 0·753 | 0·842 | 0·897 | 1·128 | 1·182 | 1·279 | 1·412 |
| Total—Main rate-fund services§ | 55·700‖ | 56·478 | 55·001 | 49·350 | 50·270 | 54·166 | 56·418 | .. |
| TRADING SERVICES | | | | | | | | |
| Water | 2·470 | 2·167 | 2·093 | 1·964 | 1·982 | 2·075 | 2·271 | 2·278 |
| Gas | 3·826 | 3·556 | 3·380 | 3·233 | 3·394 | 3·520 | 3·548 | 3·706 |
| Transport | 4·386 | 4·489 | 4·344 | 3·941 | 4·121 | 4·178 | 4·278 | 4·242 |
| Electricity | 5·107 | 5·501 | 5·723 | 5·941 | 6·156 | 6·655 | 7·212 | 7·807 |
| Docks, piers, and harbours | 1·632 | 1·759 | 1·487 | 1·273 | 1·260 | 1·288 | 1·419 | 1·500‖ |
| Total—Main trading services | 17·421 | 17·472 | 17·027 | 16·352 | 16·913 | 17·446 | 18·728 | 19·533 |
| GRAND TOTAL—MAIN SERVICES§ | 73·100‖ | 73·950 | 72·028 | 65·702 | 67·183 | 71·612 | 75·146 | .. |

* Excluding Scavenging. † Including Poor Law Hospitals, but excluding Infectious Diseases. ‡ Excluding Poor Law Hospitals.
§ Using Highways and Bridges (*b*). ‖ Estimated.

*Sources:* Highways and Bridges (*a*): ***Road Fund Reports.*** Hospitals—General, Mental: Poor Law from *Local Taxation Returns*; the rest by *Sample from Costing Returns.* Electricity: *Electricity Commissioners* adjusted for England and Wales figures. Education, Housing, Police and Police Stations, Water, Gas, Transport, Docks, &c.: *Sample from Local Authority Accounts.* Highways and Bridges (*b*), Private Street Works, Sewers &c., Poor Relief, Land Drainage: *Local Taxation Returns.*

## TABLE 29

## TOTAL EXPENDITURE ON CONSTRUCTION LOCAL AUTHORITIES ENGLAND AND WALES

(*£ millions*)

| | *Capital* | *Maintenance* | *Total* | *Index 1930–1=100* |
|---|---|---|---|---|
| 1929–30 . . . | 86·4 | 73·1 | 159·5 | *94·9* |
| 1930–1 . . . | 94·0 | 74·0 | 168·0 | *100·0* |
| 1931–2 . . . | 101·4 | 72·0 | 173·4 | *103·2* |
| 1932–3 . . . | 72·3 | 65·7 | 138·0 | *82·2* |
| 1933–4 . . . | 65·8 | 67·2 | 133·0 | *79·4* |
| 1934–5 . . . | 66·9 | 71·6 | 138·5 | *82·5* |
| 1935–6 . . . | 80·6 | 75·1 | 155·7 | *92·7* |

## TABLE 30

## LOCAL AUTHORITIES: CAPITAL EXPENDITURE BY SERVICES

(*£ millions*)

| | *England and Wales* | | | | | *Great Britain* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Housing** | *Roads* | *Education and libraries* | *Public health and mental services* | *Trading† services* | *Housing** | *Roads* | *Education and libraries* | *Public health and mental services* | *Trading† services* |
| 1919–20 | 4·845 | 1·509 | 0·865 | 1·556 | 10·844 | 5·640 | 1·687 | 0·983 | 1·803 | 13·600 |
| 1920–1 | 52·038 | 6·137 | 2·318 | 4·828 | 23·955 | 55·967 | 6·534 | 2·714 | 5·283 | 29·080 |
| 1921–2 | 81·666 | 9·278 | 2·282 | 7·197 | 28·323 | 90·594 | 10·089 | 2·711 | 7·939 | 33·459 |
| 1922–3 | 31·369 | 12·569 | 2·120 | 7·814 | 24·318 | 37·370 | 13·356 | 2·418 | 8·307 | 29·116 |
| 1923–4 | 11·954 | 13·117 | 1·250 | 8·536 | 21·663 | 14·739 | 14·096 | 1·540 | 8·952 | 25·380 |
| 1924–5 | 20·291 | 15·366 | 1·945 | 9·192 | 25·651 | 24·076 | 16·325 | 2·315 | 9·722 | 29·322 |
| 1925–6 | 38·832 | 15·958 | 3·855 | 10·323 | 29·069 | 44·049 | 17·074 | 4·372 | 11·165 | 32·596 |
| 1926–7 | 53·958 | 15·147 | 4·906 | 8·880 | 27·982 | 61·405 | 16·142 | 5·375 | 9·767 | 30·740 |
| 1927–8 | 55·926 | 14·783 | 6·282 | 8·433 | 30·753 | 63·984 | 15·529 | 6·832 | 9·363 | 33·412 |
| 1928–9 | 31·639 | 13·036 | 7·159 | 8·034 | 29·954 | 39·184 | 13·832 | 7·923 | 8·950 | 32·682 |
| 1929–30 | 33·195 | 17·085 | 6·544 | 9·554 | 28·825 | 38·390 | 18·386 | 7·546 | 10·364 | 31·079 |
| 1930–1 | 29·680 | 20·152 | 8·518 | 13·384 | 27·811 | 33·968 | 21·180 | 10·184 | 14·507 | 30·636 |
| 1931–2 | 32·420 | 20·624 | 10·674 | 15·702 | 27·866 | 37·644 | 21·803 | 11·831 | 17·020 | 30·274 |
| 1932–3 | 21·196 | 11·096 | 6·288 | 13·721 | 21·936 | 27·507 | 11·834 | 7·044 | 14·771 | 23·786 |
| 1933–4 | 21·164 | 9·510 | 4·462 | 10·578 | 21·838 | 28·860 | 10·055 | 5·050 | 11·503 | 23·468 |
| 1934–5 | 18·912 | 8·083 | 5·027 | 11·161 | 24·384 | | | | | |
| 1935–6 | 25·569 | 9·128 | 6·540 | 12·479 | 28·025 | | | | | |
| 1936–7 | 32·948 | 10·810 | 8·948 | 14·756 | 32·766 | | | | | |
| 1937–8 | [35·100]‡ | [12·600]§ | [11·662]§ | [14·618]§ | .. | | | | | |
| 1938–9 | | [14·367]§ | [16·892]§ | [16·382]§ | .. | | | | | |

* Excluding small dwellings. † Excluding 'Balances Repaid'. ‡ Estimated. § Estimated from Loan Sanctions.

## TABLE 31

## CAPITAL EXPENDITURE ON FIVE MAIN TRADING SERVICES

(*£ millions*)

| | *Water* | *Gas* | *Electricity* | *Transport** | *Harbours* |
|---|---|---|---|---|---|
| 1919–20 | 2·030 | 1·046 | 4·073 | 1·463 | 1·859 |
| 1920–1 | 4·208 | 2·140 | 8·808 | 2·921 | 3·580 |
| 1921–2 | 5·663 | 3·058 | 12·638 | 3·715 | 2·634 |
| 1922–3 | 5·488 | 2·909 | 10·527 | 2·779 | 1·873 |
| 1923–4 | 5·355 | 1·406 | 9·379 | 2·614 | 2·123 |
| 1924–5 | 6·847 | 1·696 | 10·683 | 2·861 | 2·460 |
| 1925–6 | 6·466 | 2·104 | 12·679 | 2·869 | 2·390 |
| 1926–7 | 5·639 | 3·100 | 12·975 | 2·996 | 2·130 |
| 1927–8 | 5·182 | 2·674 | 14·708 | 2·926 | 3·864 |
| 1928–9 | 5·014 | 1·770 | 15·381 | 2·918 | 3·051 |
| 1929–30 | 5·225 | 1·742 | 16·166 | 2·575 | 1·720 |
| 1930–1 | 5·080 | 1·921 | 15·401 | 2·811 | 1·762 |
| 1931–2 | 5·666 | 1·712 | 14·762 | 2·848 | 2·046 |
| 1932–3 | 4·334 | 1·469 | 12·211 | 1·759 | 1·532 |
| 1933–4 | 3·921 | 1·478 | 12·767 | 1·885 | 1·425 |
| 1934–5 | 4·239 | 1·548 | 14·298 | 2·250 | 1·076 |
| 1935–6 | 4·994 | 1·648 | 17·058 | 2·131 | 0·994 |
| 1936–7 | 6·104 | 2·095 | 19·476 | 2·920 | 1·232 |

* Including balances repaid—except transactions over L.P.T.B. 1933–4.

## TABLE 32

## EXPENDITURE ON ROADS AND BRIDGES, GREAT BRITAIN, OTHER THAN LOAN CHARGES

(*£ millions*)

| | *1930–1* | *1931–2* | *1932–3* | *1933–4* | *1934–5* | *1935–6* | *1936–7* |
|---|---|---|---|---|---|---|---|
| Maintenance, repair, and minor improvements | 36·036 | 34·764 | 31·646 | 31·416 | 31·869 | 32·118 | 31·851 |
| | *100·0* | *96·5* | *87·8* | *87·1* | *88·4* | *89·1* | *88·4* |
| Major improvements | 14·335 | 15·122 | 6·960 | 5·457 | 6·177 | 8·577 | 10·668 |
| | *100·0* | *105·5* | *48·6* | *38·1* | *43·3* | *59·9* | *74·4* |
| New construction | 5·053 | 7·346 | 4·454 | 3·137 | 2·329 | 2·118 | 2·910 |
| | *100·0* | *145·4* | *88·1* | *62·1* | *46·1* | *41·9* | *57·6* |
| Recoverable expenditure [other than included elsewhere] | 3·286 | 3·970 | 3·194 | 2·976 | 3·262 | 3·460 | 4·145 |
| | *100·0* | *120·8* | *96·9* | *90·6* | *99·3* | *105·3* | *126·1* |
| Total on construction | 58·710 | 61·202 | 46·254 | 42·986 | 43·637 | 46·273 | 49·574 |
| | *100·0* | *104·3* | *78·8* | *73·2* | *74·3* | *78·8* | *84·4* |
| Administrative and general | 3·066 | 3·099 | 3·246 | 3·392 | 3·548 | 3·795 | 4·131 |
| | *100·0* | *101·1* | *105·8* | *110·7* | *115·7* | *121·0* | *134·7* |
| Cleansing and watering | 4·597 | 4·486 | 4·453 | 4·378 | 4·316 | 4·681 | 4·823 |
| | *100·0* | *97·6* | *96·9* | *95·2* | *93·9* | *101·8* | *104·8* |
| GRAND TOTAL | 66·373 | 68·787 | 53·953 | 50·756 | 51·501 | 54·749 | 58·528 |
| | *100·0* | *103·7* | *81·3* | *76·5* | *77·6* | *82·5* | *88·2* |

Source: Road Fund Reports.

Figures in italics are percentages of 1930–1 figures.

TABLE 33

CAPITAL EXPENDITURE PER HEAD OF POPULATION IN VARIOUS REGIONS

| Region | 1925–9 | | 1930–4 | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Capital expenditure by C.B.s* £000's | *Per head of 1931 population* £ | *Capital expenditure by C.B.s* £000's | *Per head of 1931 population* £ | *Capital expenditure of M.B.s and U.D.s over 30,000 population* £000's | *Per head of 1931 population* £ | *Capital expenditure by county councils* £000's | *Total capital expenditure by large local authorities* |
| I . . . | 1,441 | 25·2 | 942 | 16·5 | .. | .. | 331 | 1,273 |
| II . . . | 14,107 | 13·5 | 11,408 | 10·9 | 2,969 | 11·9 | 2,576 | 16,953 |
| III . . . | 74,207 | 20·3 | 62,206 | 18·0 | 5,974 | 9·9 | 7,207 | 75,387 |
| IV . . . | 40,146 | 20·4 | 31,605 | 16·1 | 2,530 | 9·3 | 3,368 | 37,503 |
| V . . . | 46,364 | 23·2 | 33,055 | 16·5 | 4,781 | 14·5 | 2,610 | 40,446 |
| VI . . . | 15,267 | 25·4 | 11,978 | 20·0 | 1,008 | 13·0 | 2,005 | 14,991 |
| VII . . . | 8,854 | 17·2 | 9,784 | 19·9 | 337 | 10·0 | 821 | 10,942 |
| VIII . . . | 6,816 | 20·2 | 5,435 | 16·1 | 1,391 | 9·2 | 2,270 | 9,096 |
| IX . . . | 15,866 | 13·4 | 20,219 | 17·1 | 38,518 | 11·5 | 19,622 | 88,359 |
| IX(*a*) . . . | .. | .. | 43,433 | 9·9 | .. | .. | .. | 43,433 |
| X . . . | 24,525 | 17·3 | 21,632 | 15·3 | 3,905 | 11·3 | 5,851 | 31,388 |
| XI . . . | 10,533 | 19·2 | 10,256 | 18·4 | .. | .. | .. | .. |
| XII . . . | 62,870* | .. | .. | .. | .. | .. | .. | 58,380† |

* All local authorities in Scotland.

† Expenditure for 1933–4 estimated.

## TABLE 34

## CAPITAL EXPENDITURE OF GROWING AND DECLINING COUNTY BOROUGHS

| | | *Total capital expenditure* £000's | *Total capital expenditure per head of 1931 population* £ | *Housing* £000's | *Roads* £000's | *Trading* £000's | *Other capital expenditure* £000's |
|---|---|---|---|---|---|---|---|
| All County Boroughs | 1925–9 | 258,331 | 19·2 | 99,036 | 29,551 | 86,632 | 43,112 |
| Pop. 1931: 13,407,000 | 1930–4 | 218,513 | 16·3 | 53,400 | 26,215 | 74,483 | 64,415 |
| | % change | −16·5 | .. | −46·0 | −11·3 | −14·0 | +49·4 |
| 9 growing C.B.s | 1925–9 | 20,651 | 19·4 | 6,970 | 2,555 | 6,462 | 4,664 |
| Pop. 1931: 1,063,400 | 1930–4 | 19,902 | 18·7 | 3,410 | 2,750 | 6,649 | 7,093 |
| | % change | −3·6 | .. | −51·0 | +7·6 | +2·9 | +52·8 |
| 9 declining C.B.s | 1925–9 | 11,758 | 11·6 | 3,090 | 1,383 | 5,507 | 1,778 |
| Pop. 1931: 1,010,200 | 1930–4 | 9,174 | 9·1 | 1,681 | 1,097 | 3,940 | 2,456 |
| | % change | −22·0 | .. | −45·1 | −20·6 | −28·5 | +38·1 |

The growing C.B.s are Bournemouth, Croydon, Oxford, Southend-on-Sea, Coventry, Wakefield, Exeter, Ipswich, and Wolverhampton, in that order. They show percentage growths of population between 1921 and 1931 ranging from 22·0 to 9·8. Doncaster, which should be in this list, had to be excluded because it became a C.B. only in 1927.

The Declining C.B.s are Merthyr Tydvil, Barrow-in-Furness, Burnley, Wigan, Salford, South Shields, Newport, Blackburn, and Oldham, with declines ranging from 11·2 to 3·2 per cent. Eastbourne and Great Yarmouth, which show moderate declines, have been excluded from the list as being watering places, whose nominal population was affected by the fact that the Census of 1921 was taken in June and that of 1931 in April.

# TABLE 35

## RAILWAY EXPENDITURE AND RECEIPTS

(*£ millions*)

| | *Expenditure* | | | | *Gross receipts* | | | | *Net receipts* | | | | *Net revenue for the year* | | *Available for appropriation* | | *Interest and dividends on capital* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Total* | | *Railway* | | *Total* | | *Railway* | | *Total* | | *Railway* | | | | | | | |
| | | (*c*) | | (*c*) | | (*c*) | | (*c*) | | (*c*) | | (*c*) | | (*c*) | | (*c*) | | (*c*) |
| 1923 | | 181·53 | | 165·98 | | 224·44 | | 205·81 | | 42·91 | | 39·84 | | 51·23 | | 54·01 | | 50·00 |
| 1924 | | 182·93 | | 166·88 | | 221·93 | | 203·42 | | 39·00 | | 36·53 | | 47·18 | | 54·02 | | 50·07 |
| 1925 | | 181·01 | | 165·02 | | 217·74 | | 199·65 | | 36·74 | | 34·63 | | 44·77 | | 53·16 | | 49·32 |
| 1926 | | 169·14 | | 153·98 | | 188·29 | | 171·85 | | 19·16 | | 17·87 | | 26·55 | | 44·91 | | 41·96 |
| | (*a*) | | (*a*) | | (*a*) | | (*a*) | | (*a*) | | (*a*) | | (*a*) | | (*a*) | | (*a*) | |
| 1927 | 184·86 | 176·94 | 160·59 | 161·01 | 227·41 | 219·42 | 202·42 | 200·85 | 42·55 | 42·48 | 41·83 | 39·84 | 46·74 | 49·33 | 46·90 | 49·71 | 46·44 | 46·45 |
| | | (*b*) | | (*b*) | | (*b*) | | (*b*) | | (*b*) | | (*b*) | | (*b*) | | (*b*) | | (*b*) |
| 1928 | 177·26 | 172·90 | 153·50 | 149·14 | 218·31 | 211·24 | 194·00 | 186·88 | 41·11 | 38·33 | 40·51 | 37·74 | 45·19 | 41·79 | 45·52 | 41·81 | 44·87 | 41·57 |
| 1929 | 175·36 | 170·94 | 151·31 | 146·94 | 220·43 | 213·21 | 195·41 | 188·20 | 45·07 | 42·27 | 44·10 | 41·25 | 49·32 | 45·82 | 49·74 | 45·96 | 48·36 | 44·99 |
| 1930 | 170·83 | 166·50 | 147·60 | 143·28 | 208·88 | 201·74 | 184·84 | 177·71 | 38·04 | 35·24 | 37·24 | 34·43 | 42·01 | 38·52 | 44·25 | 40·42 | 43·75 | 40·37 |
| 1931 | 158·27 | 153·95 | 136·86 | 132·61 | 191·90 | 184·88 | 170·16 | 163·14 | 33·63 | 30·93 | 33·30 | 30·53 | 37·56 | 34·16 | 38·78 | 35·07 | 38·35 | 35·09 |
| 1932 | 149·23 | 145·06 | 129·28 | 125·23 | 176·05 | 169·40 | 156·29 | 149·65 | 26·82 | 24·34 | 27·00 | 24·42 | 30·40 | 27·19 | 32·46 | 28·91 | 31·94 | 28·84 |
| 1933 | | 142·65 | | 123·12 | | 169·58 | | 149·64 | | 26·93 | | 26·52 | | 29·59 | | 30·99 | | 30·83 |
| 1934 | | 147·15 | | 126·78 | | 176·56 | | 155·58 | | 29·40 | | 28·80 | | 32·25 | | 33·25 | | 33·11 |
| 1935 | | 148·20 | | 127·41 | | 179·23 | | 157·71 | | 30·93 | | 30·30 | | 33·70 | | 34·60 | | 34·35 |
| 1936 | | 152·18 | | 130·57 | | 186·47 | | 163·98 | | 34·29 | | 33·41 | | 36·53 | | 36·70 | | 36·44 |
| 1937 | | 158·97 | | 136·14 | | 195·43 | | 171·39 | | 36·46 | | 35·26 | | 38·68 | | 38·62 | | 38·25 |

NOTES: (*a*) Including } figures relating to undertakings transferred to L.P.T.B. as from 1 July 1933.
(*b*) Excluding }
(*c*) Including L.P.T.B. undertakings but returned on a different method. Not comparable with (*a*). Cf. Railway Returns, 1928.

## TABLE 36

## RAILWAY TRAFFIC (*excluding L.P.T.B.*)

| | *Net ton-miles* | | *Passenger-miles* | | *Wagon-miles* | | *Engine-miles* | | *Engine-miles per engine* |
|---|---|---|---|---|---|---|---|---|---|
| | *Millions* | *Index 1930=100* | *Millions* | *Index 1930=100* | *Millions* | *Index 1930=100* | *Millions* | *Index 1930=100* | |
| 1928 . . | 17·725 | 99·5 | 1·771 | 106·8 | 4·473 | 94·0 | 572 | 99·7 | 24·21 |
| 1929 . . | 18·846 | 106·0 | 1·805 | 108·9 | 4·963 | 104·5 | 586 | 102·0 | 25·00 |
| 1930 . . | 17·784 | 100·0 | 1·658 | 100·0 | 4·751 | 100·0 | 574 | 100·0 | 25·26 |
| 1931 . . | 16·313 | 91·6 | .. | .. | 4·461 | 93·9 | 550 | 95·9 | 24·65 |
| 1932 . . | 14·933 | 83·8 | 1·486 | 89·8 | 4·142 | 87·1 | 534 | 93·0 | 24·80 |
| 1933 . . | 15·018 | 84·3 | .. | .. | 4·186 | 88·1 | 536 | 93·4 | 25·52 |
| 1934 . . | 16·210 | 91·0 | 1·754 | 105·8 | 4·443 | 91·2 | 559 | 97·4 | 27·25 |
| 1935 . . | 16·402 | 92·0 | .. | .. | 4·493 | 92·4 | 566 | 98·6 | 27·85 |
| 1936 . . | 17·430 | 97·6 | .. | .. | 4·728 | 99·5 | 585 | 102·0 | 29·20 |
| 1937 . . | 18·384 | 103·2 | .. | .. | 4·842 | 102·0 | 598 | 104·2 | 30·11 |

## TABLE 37

## RAILWAY UNDERTAKINGS: GREAT BRITAIN, *including* L.P.T.B. CAPITAL AND MAINTENANCE EXPENDITURE

(*£ millions*)

| | *'Net' capital expenditure* | | | | | *Maintenance expenditure* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Railway* | *Non-railway excluding subscriptions* | *Subscriptions to non-railway companies* | *Total minus subscriptions* | *Total* | *Ways and works* | *Rolling stock* | *Total railway* | *Non-railway* | *Total* |
| 1923 | .. | .. | .. | .. | 6·84 | 24·38 | 28·49 | 52·87 | .. | .. |
| 1924 | 7·97 | 1·28 | .. | 9·25 | 9·25 | 24·13 | 31·37 | 55·50 | .. | .. |
| 1925 | 7·62 | 0·46 | −0·01 | 8·08 | 8·07 | 25·24 | 33·73 | 58·97 | .. | .. |
| 1926 | 6·63 | 1·00 | −0·15 | 7·73 | 7·58 | 21·57 | 27·37 | 48·93 | 5·90 | 54·83 |
| 1927 | 7·40 | −2·59* | −0·04 | 4·81 | 4·77 | 23·38 | 30·30 | 53·68 | 6·05 | 59·73 |
| 1928 | 4·49 | 0·67 | 0·00 | 5·16 | 5·17 | 23·97 | 28·19 | 52·16 | 6·19 | 58·35 |
| 1929 | 2·90 | 2·58 | +1·14 | 5·46 | 6·62 | 23·17 | 28·27 | 51·44 | 5·84 | 57·28 |
| 1930 | 4·75 | 2·10 | +4·34 | 6·85 | 11·19 | 22·15 | 27·37 | 49·52 | 6·00 | 55·52 |
| 1931 | 8·37 | 1·40 | +1·97 | 9·77 | 11·74 | 21·50 | 23·22 | 44·72 | 5·37 | 50·09 |
| 1932 | 6·62 | 2·64 | +0·48 | 9·26 | 9·72 | 19·86 | 20·08 | 39·94 | 5·32 | 45·26 |
| 1933 | 3·22 | .. | −0·08 | 5·96 | 5·88 | 18·33 | 19·51 | 37·84 | .. | .. |
| 1934 | 1·52 | .. | +2·00 | 3·24 | 5·24 | 19·00 | 23·31 | 42·31 | .. | .. |
| 1935 | 2·95 | .. | −0·13 | 4·88 | 4·75 | 19·75 | 26·01 | 45·75 | .. | .. |
| 1936 | 6·59 | .. | +0·32 | 7·93 | 8·25 | 20·73 | 27·33 | 48·05 | .. | .. |
| 1937 | 10·66 | −0·89 | +0·12 | 9·77 | 10·89 | 21·29 | 26·01 | 47·30 | .. | .. |

* Special Items dropped by 3·05, Steamboats by 0·73; presumably transfer to Railway Accounts of 3·05 in respect of Mersey Railway, previously unallocated but now shown by the Company under appropriate headings.

## TABLE 38

## EXPENDITURE ON NEW WORKS CHARGED TO CAPITAL ACCOUNT OF THE FOUR MAIN LINE RAILWAY COMPANIES

(£000's)

| | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ |
| Rolling-stock . . | 412 | 1,698 | 2,353 | 1,947 | 1,003 | 968 | 955 | 923 | 306 | 142 | 75 | 99 | 905 | 2,440 | 3,452 |
| Permanent way and otherrailwayequipment | 1,924 | 2,248 | 3,274 | 1,993 | 2,498 | 2,493 | 2,123 | 2,932 | 3,957 | 4,115 | 1,971 | 2,049 | 2,195 | 2,231 | 3,198 |
| Workshop machinery and plant . . | 112 | 280 | 380 | 397 | 216 | 202 | 334 | 314 | 137 | 183 | 151 | 67 | 136 | 149 | 160 |
| Road vehicles . . | 60 | 52 | 117 | 109 | 168 | 378 | 269 | 285 | 225 | 252 | 234 | 284 | 119 | 239 | 400 |
| Steamboats . . | —1 | 339 | 239 | 15 | 25 | 3 | 253 | 667 | 94 | 115 | 111 | 43 | 55 | 12 | 43 |
| Docks, harbours, and wharves . . . | 107 | 341 | 403 | 348 | 412 | 430 | 1,096 | 825 | 1,483 | 2,109 | 1,475 | 1,209 | 595 | 312 | 281 |
| Hotels . . . | 294 | 386 | 85 | 91 | 118 | 245 | 136 | 104 | 198 | 23 | 78 | 88 | 110 | 163 | 252 |
| Electric power stations | 131 | 99 | 111 | 37 | 13 | 15 | 23 | 34 | 16 | 65 | 67 | 10 | 4 | .. | 7 |
| Other expenditure . | 169 | 126 | 244 | 106 | 79 | 87 | 73 | 218 | 346 | 181 | 263 | 141 | 37 | 12 | 110 |
| Total . . . | 3,208 | 5,569 | 7,206 | 5,043 | 4,532 | 4,821 | 5,262 | 6,302 | 6,762 | 7,185 | 4,425 | 3,990 | 4,156 | 5,558 | 7,903 |

## TABLE 39

## EXPENDITURE ON NEW WORKS CHARGED TO REVENUE ACCOUNT OF THE FOUR GROUP COMPANIES

(£000's)

| | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ |
| Rolling-stock . . | 6,956 | 9,879 | 12,937 | 8,979 | 10,562 | 9,377 | 8,460 | 8,288 | 5,654 | 4,500 | 4,255 | 7,384 | 9,365 | 9,804 | 9,557 |
| Permanent way and other railway equipment | 5,553 | 5,992 | 6,842 | 5,780 | 6,107 | 6,752 | 6,146 | 6,329 | 6,702 | 5,885 | 4,757 | 4,971 | 5,335 | 6,230 | 6,358 |
| Workshop machinery and plant . . | 107 | 294 | 399 | 141 | 193 | 155 | 101 | 187 | 175 | 182 | 121 | 233 | 275 | 269 | 208 |
| Road vehicles . . | 8 | 11 | 19 | 73 | 105 | 177 | 62 | 117 | 136 | 176 | 119 | 332 | 257 | 212 | 153 |
| Steamboats . . | .. | 230 | 709 | 131 | 69 | 766 | 211 | 363 | 551 | 664 | 269 | 229 | 487 | 218 | 38 |
| Docks, harbours, and wharves . . . | 112 | 414 | 405 | 275 | 174 | 248 | 239 | 341 | 469 | 262 | 196 | 266 | 228 | 300 | 264 |
| Hotels . . . | 50 | 31 | 32 | 34 | 45 | 84 | 91 | 48 | 40 | 59 | 107 | 53 | 119 | 183 | 261 |
| Electric power stations | .. | 113 | 45 | 54 | 14 | 32 | 1 | 7 | 6 | 51 | 78 | 16 | 12 | 46 | 35 |
| Other expenditure . | .. | 4 | 28 | −19 | 16 | 16 | 44 | 41 | 67 | 15 | 11 | −5 | 1 | .. | 82 |
| Total . . . | 12,786 | 16,968 | 21,416 | 15,448 | 17,285 | 17,607 | 15,355 | 15,721 | 13,800 | 11,794 | 9,913 | 13,479 | 16,079 | 17,262 | 16,956 |

## TABLE 40

## RAILWAY MAINTENANCE (*excluding* L.P.T.B.)

| | (£ *millions*) | | | | | *Indices 1930=100* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Way and works* | *Rolling-stock* | *Total railway* | *Non-railway* | *Total* | *Way and works* | *Rolling-stock* | *Total railway* | *Non-railway* | *Total* |
| 1928 . . | 23·410 | 27·463 | 50·875 | 5·787 | 56·662 | 108·5 | 103·1 | 105·5 | 102·7 | 105·2 |
| 1929 . . | 22·610 | 27·185 | 49·795 | 5·519 | 55·314 | 102·0 | 101·4 | 103·2 | 98·5 | 102·6 |
| 1930 . . | 21·552 | 26·675 | 48·227 | 5·615 | 53·842 | 100·0 | 100·0 | 100·0 | 100·0 | 100·0 |
| 1931 . . | 20·865 | 22·622 | 43·487 | 5·119 | 48·606 | 96·9 | 84·7 | 90·1 | 91·0 | 90·3 |
| 1932 . . | 19·300 | 19·500 | 38·799 | 5·031 | 43·830 | 89·7 | 78·0 | 78·8 | 89·2 | 81·4 |
| 1933 . . | 17·820 | 18·909 | 36·730 | 4·543 | 41·273 | 82·7 | 70·9 | 76·0 | 80·6 | 76·7 |
| 1934 . . | 18·483 | 22·874 | 41·357 | 4·778 | 46·135 | 86·8 | 85·6 | 85·1 | 84·9 | 86·7 |
| 1935 . . | 19·197 | 25·580 | 44·777 | 4·898 | 49·675 | 89·2 | 95·9 | 93·0 | 87·0 | 92·3 |
| 1936 . . | 20·177 | 26·887 | 47·063 | 4·748 | 51·811 | 93·7 | 101·0 | 97·6 | 84·2 | 96·3 |
| 1937 . . | 20·723 | 25·536 | 46·259 | 4·919 | 51·178 | 95·1 | 95·5 | 96·0 | 96·1 | 95·1 |

# TABLE 41

## MAINTENANCE OF WAY AND WORKS

| | *Super-intendence* | *Earthworks, bridges, roads, &c.* | *Signals, tel. lines, el. track* | *Stations and buildings* | *Permanent way* | *Indices 1930=100* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 1927 . . | 1·31 | 3·15 | 2·65 | 3·65 | 12·62 | 108·1 | 110·0 | 107·8 | 123·7 | 104·0 |
| 1928 . . | 1·29 | 3·07 | 3·41 | 3·26 | 13·01 | 106·7 | 107·5 | 138·6 | 110·0 | 107·0 |
| 1929 . . | 1·27 | 3·22 | 2·87 | 3·31 | 12·71 | 105·0 | 112·5 | 116·6 | 112·0 | 105·0 |
| 1930 . . | 1·21 | 2·86 | 2·46 | 2·95 | 12·14 | 100·0 | 100·0 | 100·0 | 100·0 | 100·0 |
| 1931 . . | 1·17 | 2·61 | 2·53 | 2·88 | 11·68 | 96·5 | 91·0 | 103·1 | 99·3 | 96·1 |
| 1932 . . | 1·14 | 2·34 | 2·48 | 2·56 | 10·79 | 94·2 | 81·7 | 100·7 | 86·5 | 89·0 |
| 1933 . . | 1·14 | 2·19 | 2·34 | 2·11 | 10·04 | 94·2 | 76·5 | 95·4 | 71·5 | 82·8 |
| 1934 . . | 1·17 | 2·18 | 2·38 | 2·56 | 10·19 | 96·5 | 76·1 | 96·9 | 81·1 | 83·9 |
| 1935 . . | 1·18 | 2·23 | 2·54 | 2·83 | 10·40 | 97·6 | 78·0 | 103·6 | 96·0 | 85·5 |
| 1936 . . | 1·21 | 2·33 | 2·75 | 3·16 | 10·73 | 100·0 | 81·6 | 112·2 | 106·6 | 88·2 |
| 1937 . . | 1·21 | 2·42 | 2·76 | 3·19 | 11·15 | 100·0 | 84·6 | 112·1 | 108·2 | 92·0 |

(*£ millions*)

# TABLE 42

## MAINTENANCE—ROLLING-STOCK (*excluding* L.P.T.B.)

(*£ millions*)

| | | *Locomotives, Tenders [steam and electric]* | | | | | | *Rail Motor Vehicles* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Complete renewals* | | | | | | *Complete renewals* | | | | | |
| | *Superintendence* | *Cos'. shops* | *Contract* | *Repairs* | *Total** | *Transfers to or from Renewals A/c.* | *Net expenditure†* | *Cos'. shops* | *Contract* | *Repairs* | *Total** | *Transfers to or from Renewals A/c.* | *Net expenditure†* |
| 1928 | 0·956 | 1·414 | 0·948 | 10·472 | 12·834 | −0·814 | 11·507 | .. | 0·290 | 0·497 | 0·787 | −0·197 | 0·608 |
| 1929 | 0·949 | 1·729 | 0·428 | 10·313 | 12·471 | −0·162 | 11·795 | .. | 0·314 | 0·411 | 0·725 | −0·110 | 0·638 |
| 1930 | 0·963 | 1·392 | 0·692 | 9·890 | 11·974 | −0·304 | 11·157 | 0·005 | 0·131 | 0·465 | 0·601 | +0·048 | 0·661 |
| 1931 | 0·915 | 1·154 | 0·353 | 8·928 | 10·435 | +0·132 | 10·166 | 0·093 | 0·118 | 0·399 | 0·610 | +0·044 | 0·665 |
| 1932 | 0·894 | 0·902 | 0·011 | 8·224 | 9·137 | +0·466 | 9·184 | 0·023 | 0·372 | 0·383 | 0·778 | −0·174 | 0·614 |
| 1933 | 0·865 | 0·959 | 0·003 | 7·984 | 8·946 | +0·345 | 8·889 | 0·002 | 0·068 | 0·358 | 0·428 | +0·151 | 0·590 |
| 1934 | 0·917 | 1·223 | 0·595 | 8·591 | 10·409 | −0·425 | 9·563 | 0·003 | 0·082 | 0·436 | 0·552 | +0·069 | 0·591 |
| 1935 | 0·873 | 1·557 | 1·000 | 8·416 | 10·973 | −1·182 | 9·353 | 0·002 | 0·399 | 0·465 | 0·866 | −0·230 | 0·645 |
| 1936 | 0·883 | 1·363 | 1·543 | 8·526 | 11·433 | −1·031 | 9·933 | 0·107 | 0·157 | 0·454 | 0·718 | −0·093 | 0·638 |
| 1937 | 0·866 | 1·061 | 0·991 | 8·632 | 10·685 | −0·041 | 10·121 | 0·036 | 0·074 | 0·450 | 0·559 | +0·095 | 0·653 |

* Includes
† Excludes } engine power supplied to and by the Company (balance).

| | *Coaching Vehicles* | | | | | | *Merchandise and Mineral Vehicles* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Complete renewals* | | | | | | *Complete renewals* | | | | | |
| | *Cos'. shops* | *Contract* | *Repairs* | *Total* | *Transfers to or from Renewals A/c.* | *Net expenditure* | *Cos'. shops* | *Contract* | *Repairs* | *Total* | *Transfers to or from Renewals A/c.* | *Net expenditure* |
| 1928 | 2·054 | 0·329 | 4·380 | 7·763 | −0·517 | 7·246 | 2·551 | 0·109 | 4·051 | 6·712 | −0·202 | 6·509 |
| 1929 | 2·256 | 0·513 | 4·499 | 7·268 | −0·500 | 6·768 | 2·431 | 0·271 | 3·834 | 6·536 | −0·139 | 6·397 |
| 1930 | 2·379 | 0·337 | 4·352 | 7·068 | −0·709 | 6·359 | 2·405 | 0·367 | 3·900 | 6·672 | −0·654 | 6·018 |
| 1931 | 1·889 | 0·182 | 3·757 | 5·827 | −0·176 | 5·651 | 1·681 | 0·012 | 3·583 | 5·275 | −0·096 | 5·180 |
| 1932 | 1·535 | 0·032 | 3·418 | 4·985 | −0·024 | 4·961 | 0·847 | 0·008 | 3·259 | 4·114 | +0·592 | 4·706 |
| 1933 | 1·627 | 0·112 | 3·282 | 5·021 | +0·268 | 5·289 | 0·709 | 0·056 | 3·276 | 4·041 | +0·440 | 4·482 |
| 1934 | 2·447 | 0·318 | 3·471 | 6·236 | −0·785 | 5·452 | 1·451 | 0·354 | 3·406 | 5·211 | −0·049 | 5·162 |
| 1935 | 2·535 | 0·837 | 3·619 | 6·990 | −1·334 | 5·656 | 2·303 | 0·577 | 3·428 | 6·307 | −1·228 | 5·078 |
| 1936 | 2·628 | 0·948 | 3·753 | 7·330 | −1·752 | 5·578 | 2·472 | 1·042 | 3·465 | 6·980 | −1·386 | 5·594 |
| 1937 | 1·999 | 0·556 | 3·815 | 6·371 | −0·501 | 5·870 | 2·135 | 1·798 | 3·633 | 7·565 | −1·655 | 5·910 |

## TABLE 43

## MAINTENANCE OF ROLLING-STOCK

(*Indices 1930=100*)

| | *Locomotives* | *Rail motor vehicles* | *Coaching vehicles* | *Merchandise vehicles* |
|---|---|---|---|---|
| 1928 . . | 107·2 | 131·0 | 109·7 | 100·7 |
| 1929 . . | 104·1 | 121·0 | 102·8 | 97·9 |
| 1930 . . | 100·0 | 100·0 | 100·0 | 100·0 |
| 1931 . . | 87·3 | 101·4 | 82·4 | 79·0 |
| 1932 . . | 76·4 | 129·4 | 70·6 | 61·6 |
| 1933 . . | 74·9 | 71·3 | 71·0 | 60·6 |
| 1934 . . | 87·1 | 87·0 | 88·1 | 78·1 |
| 1935 . . | 91·5 | 144·1 | 99·0 | 94·5 |
| 1936 . . | 95·5 | 119·5 | 103·8 | 104·8 |

## TABLE 44

## MAINTENANCE OF NON-RAILWAY WORKS AND EQUIPMENT

(*£ millions*)

| | *Docks, harbours, &c.* | *Canals* | *Electric power* | | *Hotels* | *Steam-boats* | *Road transport* | *Delivery of parcels and goods* |
|---|---|---|---|---|---|---|---|---|
| | | | *Generation* | *Distribution* | | | | |
| 1928 . | 1·86 | 0·18 | 0·103 | 0·065 | 0·50 | 0·69 | 0·11 | 0·84 |
| 1929 . | 1·87 | 0·19 | 0·105 | 0·036 | 0·49 | 0·56 | 0·09 | 0·78 |
| 1930 . | 1·90 | 0·18 | 0·073 | 0·040 | 0·44 | 0·87 | 0·10 | 0·78 |
| 1931 . | 1·79 | 0·17 | 0·061 | 0·034 | 0·38 | 0·85 | 0·11 | 0·71 |
| 1932 . | 1·72 | 0·15 | 0·081 | 0·076 | 0·37 | 0·94 | 0·10 | 0·68 |
| 1933 . | 1·60 | 0·15 | 0·190 | 0·130 | 0·44 | 0·45 | 0·11 | 0·64 |
| 1934 . | 1·46 | 0·15 | 0·092 | 0·047 | 0·48 | 0·74 | 0·11 | 0·85 |
| 1935 . | 1·50 | 0·15 | 0·045 | 0·036 | 0·51 | 0·85 | 0·12 | 0·86 |
| 1936 . | 1·62 | 0·16 | 0·061 | 0·028 | 0·58 | 0·49 | 0·11 | 0·87 |
| 1937 . | 1·60 | 0·18 | 0·067 | 0·049 | 0·69 | 0·44 | 0·11 | 0·92 |

## TABLE 45

## MAINTENANCE—RENEWALS AND REPAIRS (*excluding* L.P.T.B.)

(*£ millions*)

| | *Renewals* | | | | *Repairs* | | | | | *Renewals as percentage of* | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Permanent way* | *Rolling stock* | *Ships* | *Total* | *Permanent way* | *Rolling stock* | *Ships* | *Total* | *Grand total* | *Grand total* | *Repairs* |
| 1928 . . | 3·42 | 7·61 | 0·27 | 11·38 | 9·59 | 19·40 | 0·42 | 29·41 | 40·79 | 27·9 | 38·7 |
| 1929 . . | 3·46 | 7·94 | 0·16 | 11·56 | 9·25 | 19·06 | 0·40 | 28·71 | 40·27 | 28·7 | 40·4 |
| 1930 . . | 3·59 | 7·71 | 0·48 | 11·78 | 8·55 | 18·61 | 0·39 | 27·55 | 39·33 | 29·9 | 42·8 |
| 1931 . . | 3·51 | 4·78 | 0·50 | 8·79 | 8·18 | 16·67 | 0·35 | 25·20 | 33·99 | 27·8 | 34·9 |
| 1932 . . | 3·16 | 3·73 | 0·56 | 7·45 | 7·64 | 15·28 | 0·38 | 23·30 | 30·75 | 23·5 | 32·0 |
| 1933 . . | 2·80 | 3·54 | 0·14 | 6·48 | 7·23 | 14·90 | 0·30 | 22·43 | 28·91 | 20·5 | 28·9 |
| 1934 . . | 2·85 | 6·47 | 0·44 | 9·76 | 7·33 | 15·90 | 0·30 | 23·53 | 33·29 | 30·8 | 41·5 |
| 1935 . . | 3·03 | 9·21 | 0·56 | 12·80 | 7·37 | 15·93 | 0·29 | 23·59 | 36·39 | 35·2 | 54·2 |
| 1936 . . | 3·25 | 10·26 | 0·18 | 13·69 | 7·48 | 16·20 | 0·31 | 23·99 | 37·68 | 36·3 | 57·0 |
| 1937 . . | 3·41 | 8·66 | 0·08 | 12·15 | 7·73 | 16·53 | 0·36 | 24·62 | 36·77 | 33·2 | 49·4 |

## TABLE 46

## CONSTRUCTION AND MAINTENANCE OF ROLLING-STOCK

| | Locomotives | Rail motor vehicles | | Passenger carriages | Other coaching vehicles | Merchandise and mineral vehicles |
|---|---|---|---|---|---|---|
| | | Steam, petrol | Electric | | | |
| CAPITAL ACCOUNT | | | | | | |
| 1928 . . | 2 | 44 | 12 | 80 | 0 | 18 |
| 1929 . . | 2 | 38 | 11 | 100 | 6 | 29 |
| 1930 . . | 1 | 5 | 3 | 24 | 11 | 143 |
| 1931 . . | 2 | 2 | 24 | 52 | 0 | 54 |
| 1932 . . | 0 | 3 | 8 | 22 | 0 | 148 |
| 1933 . . | 2 | 2 | 8 | 44 | 0 | 136 |
| 1934 . . | 1 | 7 | 0 | 0 | 0 | 113 |
| 1935 . . | 0 | 3 | 0 | 53 | 5 | 63 |
| 1936 . . | 2 | 7 | 0 | 90 | 20 | 80 |
| 1937 . . | 0 | 1 | 204 | 400* | 0 | 7,731 |
| RENEWALS ACCOUNT | | | | | | |
| 1928 . . | 664 | 1 | 0 | 1,258 | 764 | 23,838 |
| 1929 . . | 551 | 0 | 11 | 1,219 | 718 | 22,463 |
| 1930 . . | 506 | 0 | 0 | 1,313 | 699 | 19,835 |
| 1931 . . | 380 | 0 | 0 | 1,008 | 565 | 9,398 |
| 1932 . . | 271 | 0 | 112 | 837 | 373 | 6,770 |
| 1933 . . | 220 | 1 | 0 | 906 | 403 | 6,339 |
| 1934 . . | 391 | 4 | 0 | 1,479 | 411 | 14,985 |
| 1935 . . | 568 | 0 | 44 | 1,630 | 427 | 21,351 |
| 1936 . . | 581 | 3 | 0 | 2,011 | 525 | 27,039 |
| 1937 . . | 567 | 0 | 59 | 1,214† | 606 | 28,732 |

* Includes
† After deducting
} 175 vehicles included under the number of renewals in 1936 but transferred in 1937 to capital account.

## TABLE 47

## SHOP AND ARTISAN STAFF EMPLOYED (G.B.)

(*Thousands*)

| March | Loco, carriage, and wagon department | Civil Eng. department: permanent way Section | Total shop and artisan staff |
|---|---|---|---|
| 1927 . . . | 104·3 | 22·3 | 137·2 |
| 1928 . . . | 102·6 | 23·3 | 136·7 |
| 1929 . . . | 93·4 | 20·3 | 124·3 |
| 1930 . . . | 98·7 | 22·5 | 132·2 |
| 1931 . . . | 82·9 | 21·3 | 114·8 |
| 1932 . . . | 79·3 | 21·3 | 111·6 |
| 1933 . . . | 72·4 | 18·3 | 100·9 |
| 1934 . . . | 79·7 | 19·7 | 110·2 |
| 1935 . . . | 81·6 | 21·4 | 114·4 |
| 1936 . . . | 82·6 | 22·0 | 116·2 |
| 1937 . . . | 83·2 | 22·6 | 117·9 |
| 1938 . . . | 83·5 | 23·8 | 120·0 |

## TABLE 48

## MAINTENANCE—PERMANENT WAY (*excluding* L.P.T.B.)

(*£ millions*)

| | *Complete renewals* | | | | *Repairs* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Wages* | *Materials* | *Engine power, &c.* | *Total* | *Wages* | *Materials* | *Engine power, &c.* | *Total* | *Total wages* | *Total materials* | *Total engine power* | *Grand Total* |
| 1927 . . | 0·889 | 2·282 | 0·170 | 3·341 | 6·922 | 2·052 | 0·303 | 9·277 | 7·811 | 4·334 | 0·473 | 12·618 |
| 1928 . . | 0·902 | 2·365 | 0·156 | 3·423 | 7·024 | 2·290 | 0·276 | 9·590 | 7·926 | 4·655 | 0·432 | 13·013 |
| 1929 . . | 0·940 | 2·361 | 0·156 | 3·457 | 6·774 | 2·205 | 0·270 | 9·249 | 7·714 | 4·566 | 0·426 | 12·706 |
| 1930 . . | 0·920 | 2·508 | 0·164 | 3·592 | 6·395 | 1·904 | 0·248 | 8·547 | 7·315 | 4·412 | 0·412 | 12·139 |
| 1931 . . | 0·798 | 2·555 | 0·153 | 3·506 | 5·882 | 2·068 | 0·227 | 8·177 | 6·680 | 4·623 | 0·380 | 11·683 |
| 1932 . . | 0·708 | 2·312 | 0·135 | 3·155 | 5·581 | 1·830 | 0·226 | 7·637 | 6·289 | 4·142 | 0·361 | 10·792 |
| 1933 . . | 0·638 | 2·022 | 0·143 | 2·803 | 5·411 | 1·620 | 0·202 | 7·233 | 6·049 | 3·642 | 0·345 | 10·036 |
| 1934 . . | 0·686 | 2·024 | 0·145 | 2·855 | 5·473 | 1·657 | 0·201 | 7·331 | 6·159 | 3·681 | 0·346 | 10·186 |
| 1935 . . | 0·721 | 2·161 | 0·150 | 3·032 | 5·480 | 1·680 | 0·206 | 7·366 | 6·201 | 3·841 | 0·356 | 10·398 |
| 1936 . . | 0·819 | 2·263 | 0·168 | 3·250 | 5·551 | 1·668 | 0·257 | 7·476 | 6·370 | 3·931 | 0·425 | 10·726 |
| 1937 . . | 0·883 | 2·359 | 0·172 | 3·414 | 5·845 | 1·630 | 0·259 | 7·734 | 6·728 | 3·989 | 0·431 | 11·148 |

## TABLE 49

## LONDON PASSENGER TRANSPORT BOARD

| *Year ending July* | *1934* | *1935* | *1936* | *1937* | *1938* |
|---|---|---|---|---|---|
| Route miles of railways open for traffic | 174 | 174 | 174 | 174 | 174* |
| *Passenger vehicles:* | | | | | |
| Railways | 3,156 | 3,167 | 3,148 | 3,154 | 3,263 |
| Buses and coaches | 5,976 | 5,975 | 6,298 | 6,454 | 6,386 |
| Trams | 2,560 | 2,473 | 2,323 | 2,060 | 1,668 |
| Trolley buses | 61 | 63 | 300 | 594 | 1,026 |
| *Other vehicles:* | | | | | |
| Railway | 849 | 820 | 825 | 852 | 552† |
| Road | 542 | 481 | 544 | 512 | 498 |
| *Number of:* | | | | | |
| Stations | 186 | 186 | 186 | 181 | 181 |
| Lifts | 127 | 116 | 116 | 116 | 116 |
| Escalators | 124 | 137 | 137 | 141 | 143 |
| Garages | 89 | 86 | 85 | 84 | 82 |
| Depots | 32 | 32 | 31 | 31 | 31 |

* 16 miles under construction.

† As from 1 Nov. 1937 the L.N.E.R. took over 18 steam locomotives, 252 goods wagons, 13 brake vans.

# TABLE 50

## LONDON PASSENGER TRANSPORT BOARD

(*£ thousands*)

| *Year ending 1 July* | *1934* | *1935* | *1936* | *1937* | *1938* |
|---|---|---|---|---|---|
| NET CAPITAL EXPENDITURE | | | | | |
| Railways | 969 | 535 | 770 | 2,595 | 4,750 |
| Buses and coaches | 406 | 705 | 1,258 | 1,282 | 636 |
| Trams | 11 | −38 | −43 | −127 | −189 |
| Trolley buses | 10 | 49 | 1,162 | 1,381 | 1,628 |
| Electric power supply | 174 | 132 | 263 | 378 | 433 |
| Land and buildings | −104 | −72 | 99 | 19 | −33 |
| Interest during the construction of new works | 48 | 0 | 63 | 141 | 215 |
| Miscellaneous | 10 | 26 | 53 | 53 | 75 |
| [Assets displaced and not to be replaced] | 0 | 52 | 591 | 815 | 967 |
| Total [including discounts, legal expenses, subscriptions to other undertakings, &c.] | 1,684 | 1,427 | 3,725 | 5,743 | 7,514 |
| MAINTENANCE EXPENDITURE | | | | | |
| *Railways* | | | | | |
| Way and works | 488 | 545 | 554 | 553 | 577 |
| Rolling-stock | 434 | 446 | 431 | 467 | 489 |
| Total railway | 922 | 991 | 985 | 1,020 | 1,066 |
| *Buses and Coaches* | | | | | |
| Rolling-stock | 1,538 | 1,568 | 1,720 | 1,831 | 1,709 |
| Buildings | 34 | 54 | 69 | 59 | 55 |
| Total | 1,572 | 1,622 | 1,789 | 1,890 | 1,764 |
| *Trams and Trolley Buses* | | | | | |
| Rolling-stock | 685 | 663 | 688 | 610 | 633 |
| Way | 532 | 488 | 478 | 426 | 373 |
| Electrical equipment of routes | 118 | 117 | 114 | 113 | 128 |
| Buildings | 30 | 41 | 49 | 28 | 90 |
| Total | 1,365 | 1,300 | 1,329 | 1,177 | 1,224 |
| Total road transport | 2,937 | 2,931 | 3,118 | 3,067 | 2,988 |
| Electric generation and distribution | 128 | 138 | 151 | 143 | 144 |
| GRAND TOTAL | 3,987 | 4,060 | 4,254 | 4,230 | 4,198 |

# TABLE 51

## ELECTRICITY: UNITS GENERATED, PURCHASED, AND SOLD

(*1,000 million units*)

| | *Units generated* | *Purchased from outside sources* | *Public supply* | | *Sold to Consumers* | | | | | *Units lost and unaccounted for* | *Capacity of generating plant installed* | *Number of generating stations* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Gross** | *Net** | *Lighting and domestic* | *Power* | *Public lighting* | *Traction* | *Total net sales* | | | |
| 1925–6 | 6·62 | 0·31 | 6·93 | 6·49 | 1·24 | 3·76 | 0·09 | 0·51 | 5·61 | 0·88 | 4·42 | 491 |
| 1926–7 | 6·99 | 0·26 | 7·25 | 6·79 | 1·44 | 3·77 | 0·10 | 0·56 | 5·87 | 0·92 | 4·68 | 482 |
| 1927–8 | 8·45 | 0·18 | 8·63 | 8·10 | 1·71 | 4·54 | 0·11 | 0·64 | 7·00 | 1·10 | 5·26 | 490 |
| 1928–9 | 9·32 | 0·23 | 9·55 | 8·98 | 2·04 | 4·93 | 0·13 | 0·71 | 7·80 | 1·18 | 5·80 | 485 |
| 1929–30 | 10·40 | 0·22 | 10·62 | 9·98 | 2·34 | 5·41 | 0·14 | 0·77 | 8·67 | 1·31 | 6·60 | 500 |
| 1930–1 | 10·95 | 0·19 | 11·14 | 10·49 | 2·74 | 5·37 | 0·16 | 0·79 | 9·07 | 1·42 | 6·95 | 485 |
| 1931–2 | 11·53 | 0·16 | 11·69 | 10·99 | 3·07 | 5·44 | 0·18 | 0·81 | 9·50 | 1·49 | 7·20 | 464 |
| 1932–3 | 12·35 | 0·17 | 12·52 | 11·79 | 3·47 | 5·69 | 0·20 | 0·85 | 10·21 | 1·58 | 7·37 | 451 |
| 1933–4 | 13·91 | 0·18 | 14·09 | 13·29 | 3·92 | 6·39 | 0·22 | 0·94 | 11·47 | 1·82 | 7·84 | 437 |
| 1934–5 | 15·59 | 0·19 | 15·78 | 14·88 | 4·53 | 7·28 | 0·24 | 0·97 | 13·03 | 1·85 | 7·79 | 421 |
| 1935–6 | 17·97 | 0·22 | 18·19 | 17·18 | 5·50 | 8·25 | 0·27 | 1·02 | 15·05 | 2·13 | 8·10 | 398 |
| 1936–7 | 20·52 | 0·24 | 20·76 | 19·60 | 6·45 | 9·31 | 0·30 | 1·08 | 17·15 | 2·45 | 8·40 | 395 |
| 1937–8 | 23·01 | 0·17 | 23·18 | 21·89 | 7·35 | 10·42 | 0·34 | 1·15 | 19·26 | 2·62 | 8·91 | 385 |

* Gross includes 'Units used on works': it is not equivalent to Gross Public Supply of Table 8 in *Eng. and Financial Statistics* which also includes 'Excess of Interpurchases over Intersales'.

## TABLE 52

## ELECTRICITY: CAPITAL EXPENDITURE

| | *Central electricity board* | | *Public authorities* | | *Company undertakings* | | *Total* | |
|---|---|---|---|---|---|---|---|---|
| | *£ millions* | *1930–1=100* | *£ millions* | *1930–1=100* | *£ millions* | *1930–1=100* | *£ millions* | *1930–1=100* |
| 1925–6 . . | .. | .. | 13·89 | 86·1 | 9·13 | 84·1 | 23·02 | 69·0 |
| 1926–7 . . | .. | .. | 13·77 | 85·3 | 7·92 | 72·8 | 21·69 | 65·0 |
| 1927–8 . . | .. | .. | 16·41 | 101·4 | 13·87 | 127·6 | 30·28 | 90·8 |
| 1928–9 . . | 0·28 | 3·9 | 15·35 | 95·0 | 13·31 | 122·5 | 28·94 | 86·8 |
| 1929–30 . . | 2·56 | 40·1 | 15·55 | 96·3 | 13·85 | 127·5 | 31·96 | 95·7 |
| 1930–1 . . | 6·38 | 100·0 | 16·15 | 100·0 | 10·86 | 100·0 | 33·39 | 100·0 |
| 1931–2 . . | 10·82 | 170·0 | 15·16 | 93·8 | 11·11 | 102·2 | 37·09 | 111·0 |
| 1932–3 . . | 12·57 | 196·0 | 12·56 | 77·7 | 10·64 | 98·0 | 35·71 | 107·0 |
| 1933–4 . . | 8·19 | 125·5 | 12·47 | 72·2 | 9·33 | 86·0 | 30·01 | 90·5 |
| 1934–5 . . | 5·33 | 83·6 | 14·40 | 89·1 | 9·03 | 83·1 | 28·68 | 86·0 |
| 1935–6 . . | 4·48 | 70·25 | 16·57 | 102·7 | 15·30 | 141·0 | 36·34 | 108·8 |
| 1936–7 . . | 2·46 | 37·8 | 21·42 | 132·6 | 14·60 | 134·4 | 38·42 | 115·1 |
| 1937–8 . . | 2·10 | 33·1 | 21·37 | 132·2 | 15·44 | 142·2 | 38·92 | 116·5 |

Source: *Engineering and Financial Statistics.*

# TABLE 53

## ELECTRICITY CAPITAL EXPENDITURE

| | *Company undertakings* | | | | | | | | *Public authorities* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Land, buildings, and other permanent works* | | *Plant and machinery* | | *Transmission* | | *Total [including other items]* | | *Land, buildings, and other permanent works* | | *Plant and machinery* | | *Transmission* | | *Total [including other items]* | |
| | £ *millions* | *1930–1 = 100* | £ *millions* | *1930–1 = 100* | £ *millions* | *1930–1 = 100* | £ *millions* | *1930–1 = 100* | £ *millions* | *1930–1 = 100* | £ *millions* | *1930–1 = 100* | £ *millions* | *1930–1 = 100* | £ *millions* | *1930–1 = 100* |
| 1925–6 | 1·20 | 69·5 | 2·65 | 109·5 | 4·52 | 73·1 | 9·13 | 84·1 | 1·43 | 101·3 | 5·67 | 123·6 | 6·22 | 76·2 | 13·89 | 86·1 |
| 1926–7 | 3·05 | 177·0 | 1·64 | 67·8 | 5·26 | 85·2 | 7·92 | 72·8 | 1·56 | 110·6 | 5·16 | 112·5 | 7·45 | 91·3 | 13·77 | 85·3 |
| 1927–8 | 3·60 | 208·1 | 5·00 | 206·1 | 4·94 | 80·0 | 13·87 | 127·6 | 1·75 | 124·0 | 6·41 | 140·0 | 7·81 | 95·5 | 16·41 | 101·4 |
| 1928–9 | 2·83 | 163·5 | 4·43 | 182·9 | 5·51 | 89·4 | 13·31 | 122·6 | 2·02 | 143·0 | 5·33 | 116·4 | 7·35 | 90·0 | 15·35 | 95·1 |
| 1929–30 | 2·92 | 168·9 | 4·44 | 183·4 | 6·36 | 103·1 | 13·85 | 127·6 | 1·66 | 117·5 | 5·75 | 125·5 | 7·41 | 90·7 | 15·55 | 96·3 |
| 1930–1 | 1·73 | 100·0 | 2·42 | 100·0 | 6·17 | 100·0 | 10·86 | 100·0 | 1·41 | 100·0 | 4·58 | 100·0 | 8·17 | 100·0 | 16·15 | 100·0 |
| 1931–2 | 2·28 | 131·9 | 2·57 | 106·1 | 5·94 | 96·2 | 11·11 | 102·4 | 0·79 | 56·0 | 3·95 | 86·2 | 8·31 | 101·6 | 15·16 | 93·9 |
| 1932–3 | 1·68 | 97·1 | 4·34 | 179·0 | 4·34 | 71·2 | 10·64 | 97·8 | 0·58 | 41·1 | 5·69 | 122·0 | 7·08 | 86·6 | 12·56 | 77·8 |
| 1933–4 | 1·58 | 91·4 | 2·51 | 103·6 | 5·40 | 87·5 | 9·33 | 86·0 | 0·91 | 64·6 | 4·20 | 91·8 | 6·47 | 79·2 | 12·47 | 77·2 |
| 1934–5 | 0·70 | 40·4 | 1·54 | 63·6 | 5·87 | 95·1 | 9·03 | 83·4 | 1·20 | 85·2 | 4·89 | 106·6 | 6·66 | 81·5 | 14·40 | 89·2 |
| 1935–6 | 3·10 | 179·4 | 4·86 | 200·5 | 6·88 | 111·5 | 15·30 | 141·0 | 1·22 | 93·7 | 7·08 | 154·5 | 7·10 | 86·9 | 16·57 | 102·6 |
| 1936–7 | 1·32 | 76·3 | 4·61 | 190·5 | 8·05 | 130·4 | 14·60 | 134·6 | 3·14 | 222·6 | 10·71 | 233·8 | 9·51 | 116·4 | 21·42 | 132·6 |
| 1937–8 | 1·68 | 97·1 | 4·46 | 184·3 | 8·18 | 132·6 | 15·44 | 142·2 | 1·52 | 107·9 | 9·93 | 216·2 | 9·62 | 118·0 | 21·37 | 132·2 |

# TABLE 54

## CAPITAL EXPENDITURE OF ELECTRICITY SUPPLY UNDERTAKINGS

(*£ millions*)

| | *Generation* | | | *Main transmission* | | | *Distribution* | | | | | *Apparatus on consumer's premises* | *Standardization of frequency* | *Other outlay* | *Grand total* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Land, buildings &c.* | *Plant and machines* | *Total* | *Grid* | *Other 33,000 volt and over* | *Total* | *Land, buildings &c.* | *Plant and machines* | *Mains, services* | *Other* | *Total* | | | | |
| **ALL UNDERTAKINGS** | | | | | | | | | | | | | | | |
| 1925–6 | 1·82 | 5·32 | 7·23 | .. | 1·28 | 1·28 | 0·80 | 2·12 | 9·45 | 0·37 | 12·74 | 0·89 | .. | 0·87 | 23·02 |
| 1926–7 | 3·06 | 3·11 | 4·90 | .. | 1·84 | 1·84 | 1·55 | 2·45 | 9·88 | −0·82 | 13·06 | 1·23 | .. | 0·66 | 21·69 |
| 1927–8 | 3·62 | 7·63 | 11·27 | .. | 2·43 | 2·43 | 0·72 | 2·55 | 10·32 | −0·28 | 13·41 | 1·23 | .. | 1·93 | 30·28 |
| 1928–9 | 4·12 | 6·59 | 10·71 | 0·28 | 0·93 | 1·21 | 0·71 | 2·13 | 11·90 | +0·55 | 15·29 | 1·03 | 0·06 | 0·71 | 28·94 |
| 1929–30 | 3·05 | 5·21 | 8·26 | 2·00 | 1·67 | 3·67 | 1·52 | 3·48 | 12·11 | 1·60 | 18·71 | 1·50 | 0·56 | 0·25 | 31·96 |
| 1930–1 | 2·29 | 3·35 | 5·64 | 5·19 | 1·60 | 6·79 | 0·84 | 2·03 | 12·75 | 0·78 | 16·40 | 1·62 | 1·19 | 1·77 | 33·39 |
| 1931–2 | 2·23 | 2·66 | 4·89 | 7·92 | 2·31 | 10·23 | 0·96 | 1·88 | 11·93 | 1·04 | 15·81 | 1·98 | 2·90 | 1·26 | 37·09 |
| 1932–3 | 1·27 | 2·17 | 3·44 | 8·19 | −1·92 | 6·27 | 1·00 | 3·22 | 13·31 | −3·62 | 13·91 | 4·64 | 4·32 | 3·10 | 35·71 |
| 1933–4 | 1·31 | 0·48 | 1·79 | 5·41 | −1·32 | 4·09 | 1·17 | 3·12 | 13·19 | −0·47 | 17·01 | 3·11 | 2·78 | 1·21 | 30·01 |
| 1934–5 | 0·62 | −0·21 | 0·41 | 3·08 | 0·70 | 3·78 | 1·28 | 3·11 | 11·83 | +0·55 | 16·77 | 3·52 | 2·25 | 2·02 | 28·68 |
| 1935–6 | 3·28 | 4·53 | 7·80 | 2·54 | 1·32 | 3·87 | 1·15 | 3·19 | 12·67 | −0·17 | 16·84 | 4·24 | 1·94 | 1·76 | 36·34 |
| 1936–7 | 3·11 | 6·02 | 9·13 | 1·74 | 1·82 | 3·56 | 1·36 | 3·84 | 15·74 | +0·06 | 21·00 | 5·45 | 0·67 | −1·36 | 38·42 |
| 1937–8 | 2·20 | 5·23 | 7·43 | 1·83 | 2·13 | 3·96 | 1·00 | 3·27 | 15·67 | 0·23 | 20·17 | 5·87 | 0·27 | 1·21 | 38·92 |
| **PUBLIC AUTHORITIES** | | | | | | | | | | | | | | | |
| 1925–6 | 0·97 | 3·80 | 4·77 | .. | −0·80 | .. | 0·45 | 1·29 | 7·02 | 0·33 | 9·09 | 0·59 | .. | 0·24 | 13·89 |
| 1926–7 | 0·96 | 2·65 | 3·40 | .. | 0·09 | .. | 0·59 | 1·65 | 7·35 | −0·28 | 9·31 | 0·86 | .. | 0·10 | 13·77 |
| 1927–8 | 1·36 | 4·26 | 5·62 | .. | 0·90 | .. | 0·38 | 1·30 | 6·93 | 0·17 | 8·78 | 0·84 | .. | 0·26 | 16·41 |
| 1928–9 | 1·63 | 3·29 | 4·92 | .. | 0·71 | .. | 0·48 | 1·22 | 6·62 | 0·44 | 8·76 | 0·82 | .. | 0·13 | 15·35 |
| 1929–30 | 0·46 | 2·00 | 2·45 | .. | 0·54 | .. | 1·20 | 2·74 | 6·88 | 0·54 | 11·36 | 1·01 | .. | 0·19 | 15·55 |
| 1930–1 | 0·88 | 2·06 | 2·94 | .. | 0·40 | .. | 0·52 | 1·24 | 7·77 | 0·69 | 10·22 | 1·28 | .. | 1·33 | 16·15 |
| 1931–2 | 0·57 | 1·55 | 2·13 | .. | 1·19 | .. | 0·23 | 0·94 | 7·12 | 0·89 | 9·18 | 1·44 | .. | 1·21 | 15·16 |
| 1932–3 | 0·03 | 0·34 | 0·37 | .. | −0·36 | .. | 0·56 | 1·80 | 7·45 | −3·17 | 6·64 | 3·55 | .. | 2·36 | 12·56 |
| 1933–4 | 0·10 | 0·16 | 0·26 | .. | −1·69 | .. | 0·80 | 1·90 | 8·16 | −2·06 | 8·80 | 2·14 | .. | 0·96 | 12·47 |
| 1934–5 | 0·32 | −0·26 | 0·06 | .. | −0·05 | .. | 0·89 | 2·24 | 6·71 | 0·19 | 10·03 | 2·90 | .. | 1·47 | 14·40 |
| 1935–6 | 0·72 | 2·62 | 3·34 | .. | −0·02 | .. | 0·50 | 1·32 | 7·12 | −0·08 | 8·86 | 3·14 | .. | 1·25 | 16·57 |
| 1936–7 | 2·43 | 4·07 | 6·50 | .. | 0·81 | .. | 0·72 | 2·25 | 8·70 | 0 | 11·67 | 4·38 | .. | −1·94 | 21·42 |
| 1937–8 | 0·91 | 3·41 | 4·32 | .. | 0·65 | .. | 0·61 | 1·94 | 8·97 | +0·01 | 11·53 | 4·57 | .. | 0·30 | 21·37 |
| **COMPANIES** | | | | | | | | | | | | | | | |
| 1925 | 0·85 | 1·52 | 2·46 | .. | 2·08 | .. | 0·35 | 0·83 | 2·43 | 0·04 | 3·65 | 0·30 | .. | 0·63 | 9·13 |
| 1926 | 2·09 | 0·46 | 1·50 | .. | 1·75 | .. | 0·96 | 0·80 | 1·53 | −0·54 | 3·75 | 0·37 | .. | 0·56 | 7·92 |
| 1927 | 2·26 | 3·38 | 5·65 | .. | 1·53 | .. | 0·34 | 1·25 | 3·39 | −0·36 | 4·63 | 0·39 | .. | 1·69 | 13·87 |
| 1928 | 2·49 | 3·30 | 5·79 | .. | 0·23 | .. | 0·23 | 0·91 | 5·28 | 0·11 | 6·53 | 0·19 | .. | 0·58 | 13·31 |
| 1929 | 2·59 | 3·21 | 5·80 | .. | 1·13 | .. | 0·32 | 0·74 | 5·23 | 1·06 | 7·35 | 0·49 | .. | 0·06 | 13·85 |
| 1930 | 1·41 | 1·29 | 2·70 | .. | 1·20 | .. | 0·32 | 0·79 | 4·98 | 0·09 | 6·18 | 0·34 | .. | 0·34 | 10·86 |
| 1931 | 1·66 | 1·11 | 2·77 | .. | 1·13 | .. | 0·73 | 0·94 | 4·81 | 0·15 | 6·63 | 0·54 | .. | 0·05 | 11·11 |
| 1932 | 1·24 | 1·83 | 3·07 | .. | −1·56 | .. | 0·44 | 1·42 | 5·86 | −0·45 | 7·27 | 1·09 | .. | 0·74 | 10·64 |
| 1933 | 1·21 | 0·32 | 1·53 | .. | 0·38 | .. | 0·37 | 1·22 | 5·03 | +1·59 | 8·21 | 0·97 | .. | 0·25 | 9·33 |
| 1934 | 0·30 | 0·05 | 0·35 | .. | 0·74 | .. | 0·39 | 0·87 | 5·12 | 0·36 | 6·74 | 0·62 | .. | 0·55 | 9·03 |
| 1935 | 2·56 | 1·91 | 4·46 | .. | 1·34 | .. | 0·65 | 1·87 | 5·55 | −0·09 | 7·98 | 1·10 | .. | 0·51 | 15·30 |
| 1936 | 0·68 | 1·95 | 2·63 | .. | 1·01 | .. | 0·64 | 1·59 | 7·04 | +0·05 | 9·33 | 1·07 | .. | 0·58 | 14·62 |
| 1937 | 1·29 | 1·82 | 3·11 | .. | 1·48 | .. | 0·39 | 1·33 | 6·70 | +0·22 | 8·64 | 1·30 | .. | 0·90 | 15·44 |

## TABLE 55

## LOANS SANCTIONED: PUBLIC AUTHORITIES (*including* C.E.B.)

(*£ millions*)

| | *Total* | *Purchase of land, buildings, &c.* | *Building and civil engineering works* | *Plant* | *Mains and services* | *Meters, instruments, &c.* | *Other purposes* | | | *C.E.B.* | *Total minus C.E.B.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Sub-total* | *Purchases of existing undertakings* | *Standardization of frequency* | | |
| 1923–4 | 9·76 | 0·05 | 1·01 | 4·35 | 3·75 | 0·13 | 0·49 | 0·10 | .. | .. | 9·76 |
| 1924–5 | 13·33 | 0·10 | 1·27 | 5·70 | 5·17 | 0·11 | 0·98 | 0·34 | .. | .. | 13·33 |
| 1925–6 | 9·64 | 0·04 | 0·78 | 3·05 | 5·18 | 0·18 | 0·42 | 0·11 | .. | .. | 9·64 |
| 1926–7 | 15·26 | 0·14 | 1·77 | 5·25 | 7·05 | 0·24 | 0·81 | 0·37 | .. | .. | 15·26 |
| 1927–8 | 17·88 | 0·13 | 1·16 | 5·71 | 8·30 | 0·32 | 2·25 | 1·45 | .. | .. | 17·88 |
| 1928–9 | 29·07 | 0·17 | 1·53 | 9·85 | 10·70 | 0·36 | 6·45 | 0·09 | .. | 13·90 | 15·17 |
| 1929–30 | 21·73 | 0·60 | 1·96 | 6·71 | 10·31 | 0·35 | 1·80 | 0·86 | .. | 4·00 | 17·73 |
| 1930–1 | 24·00 | 0·63 | 1·18 | 5·34 | 13·97 | 0·48 | 2·40 | 1·08 | 0·23 | 8·10 | 15·90 |
| 1931–2 | 20·88 | 0·12 | 1·41 | 4·59 | 9·05 | 0·59 | 5·11 | 1·60 | 0·11 | 6·80 | 14·08 |
| 1932–3 | 23·21 | 0·32 | 2·03 | 4·65 | 8·57 | 0·67 | 6·98 | 0·02 | .. | 9·13 | 14·08 |
| 1933–4 | 17·98 | 0·09 | 1·03 | 3·27 | 8·12 | 0·77 | 4·70 | 0·45 | 2·50 | 5·15 | 12·82 |
| 1934–5 | 23·57 | 0·23 | 2·09 | 7·52 | 8·67 | 0·77 | 4·29 | 0·40 | 1·50 | 5·36 | 18·21 |
| 1935–6 | 17·24 | 0·11 | 0·97 | 6·25 | 6·93 | 0·75 | 2·23 | 0·14 | .. | 0·70 | 16·54 |
| 1936–7 | 24·15 | 0·08 | 1·81 | 8·80 | 9·58 | 0·91 | 2·97 | 0·50 | .. | .. | 24·15 |
| Total since 1920 | 304·14 | 3·00 | 24·20 | 100·64 | 125·90 | 7·07 | 43·33 | 7·68 | .. | .. | .. |
| Percentage distribution | 100·0 | 0·98 | 7·96 | 33·09 | 41·39 | 2·33 | 14·25 | 2·26 | .. | .. | .. |

## TABLE 56

## CAPACITY OF GENERATING PLANT SANCTIONED

(*thousand kcs.*)

| | *Public authorities* | *Companies* | *Railways, &c.* | *Public authorities + companies* | *Total* |
|---|---|---|---|---|---|
| 1924–5 | 304 | 103 | 73 | 407 | 480 |
| 1925–6 | 264 | 293 | 29 | 557 | 586 |
| 1926–7 | 491 | 214 | 71 | 705 | 776 |
| 1927–8 | 288 | 328 | 53 | 616 | 668 |
| 1928–9 | 441 | 131 | 31 | 572 | 603 |
| 1929–30 | 118 | 118 | 57 | 236 | 293 |
| 1930–1 | 466 | 336 | 90 | 802 | 892 |
| 1931–2 | 78 | 13 | 62 | 91 | 153 |
| 1932–3 | 34 | 20 | 13 | 54 | 67 |
| 1933–4 | 4 | 109 | 0 | 113 | 114 |
| 1934–5 | 358 | 213 | 20 | 574 | 594 |
| 1935–6 | 472 | 215 | 13 | 687 | 700 |
| 1936–7 | 618 | 355 | 105 | 973 | 1,078 |

## TABLE 57

## MAINTENANCE EXPENDITURE

(*£ millions*)

| | *Generation repairs** | *Work done for consumers* | *Transmission and distribution†* | *Total‡* |
|---|---|---|---|---|
| ALL UNDERTAKINGS | | | | |
| 1925–6 | 2·14 | 0·82 | 3·11 | 6·38 |
| 1926–7 | 2·06 | 0·93 | 3·42 | 6·73 |
| 1927–8 | 2·16 | 1·07 | 3·74 | 7·34 |
| 1928–9 | 2·16 | 1·22 | 4·15 | 7·91 |
| 1929–30 | 2·25 | 1·40 | 4·55 | 8·63 |
| 1930–1 | 2·15 | 1·59 | 4·84 | 9·05 |
| 1931–2 | 2·00 | 1·71 | 5·17 | 9·36 |
| 1932–3 | 1·90 | 1·57 | 4·41 | 8·97 |
| 1933–4 | 1·89 | 1·66 | 4·66 | 9·44 |
| 1934–5 | 1·94 | 1·82 | 4·92 | 10·19 |
| 1935–6 | 1·99 | 2·00 | 5·39 | 11·22 |
| 1936–7 | 2·09 | 2·23 | 5·76 | 12·24 |
| PUBLIC AUTHORITIES | | | | |
| 1925–6 | 1·49 | 0·61 | 2·17 | 4·53 |
| 1926–7 | 1·44 | 0·69 | 2·34 | 4·74 |
| 1927–8 | 1·47 | 0·82 | 2·58 | 5·19 |
| 1928–9 | 1·49 | 0·86 | 2·82 | 5·50 |
| 1929–30 | 1·55 | 0·96 | 3·13 | 6·02 |
| 1930–1 | 1·44 | 1·07 | 3·35 | 6·27 |
| 1931–2 | 1·35 | 1·13 | 3·61 | 6·51 |
| 1932–3 | 1·31 | 1·15 | 2·95 | 6·32 |
| 1933–4 | 1·27 | 1·21 | 3·04 | 6·56 |
| 1934–5 | 1·32 | 1·26 | 3·25 | 7·08 |
| 1935–6 | 1·28 | 1·36 | 3·56 | 7·69 |
| 1936–7 | 1·33 | 1·50 | 3·76 | 8·32 |
| COMPANIES | | | | |
| 1925–6 | 0·64 | 0·21 | 0·95 | 1·85 |
| 1926–7 | 0·62 | 0·24 | 1·08 | 1·98 |
| 1927–8 | 0·68 | 0·26 | 1·16 | 2·15 |
| 1928–9 | 0·67 | 0·36 | 1·33 | 2·41 |
| 1929–30 | 0·70 | 0·44 | 1·42 | 2·61 |
| 1930–1 | 0·72 | 0·52 | 1·50 | 2·80 |
| 1931–2 | 0·65 | 0·58 | 1·56 | 2·85 |
| 1932–3 | 0·59 | 0·42 | 1·46 | 2·65 |
| 1933–4 | 0·62 | 0·46 | 1·62 | 2·89 |
| 1934–5 | 0·62 | 0·56 | 1·67 | 3·11 |
| 1935–6 | 0·70 | 0·64 | 1·83 | 3·52 |
| 1936–7 | 0·75 | 0·73 | 2·00 | 3·91 |

* Including expenditure on 'oil, water, and stores'.

† Total working expenses.

‡ Including other expenditure, e.g. on 'Public Lamps' and on 'Apparatus and Wiring'.

# TABLE 58

## MISCELLANEOUS SEMI-PUBLIC INVESTMENT

(£000's)

| | 1925–6 | 1926–7 | 1927–8 | 1928–9 | 1929–30 | 1930–1 | 1931–2 | 1932–3 | 1933–4 | 1934–5 | 1935–6 | 1936–7 | 1937–8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Forestry Commission* | | | | | | | | | | | | | |
| Government grants | 523 | 300 | 335 | 645 | 486 | 500 | 938 | 490 | 399 | 450 | 450 | 450 | |
| Total expenditure | 333 | 517 | 608 | 619 | 649 | 680 | 808 | 842 | 761 | 582 | 619 | 621 | |
| Expenditure excluding land, &c. | 279 | 389 | 466 | 510 | 521 | 523 | 587 | 632 | 565 | 505 | 519 | 547 | |
| Manual workers employed | 2,135 | 2,470 | 2,760 | 3,115 | 3,152 | 3,237 | 3,490 | 3,168 | 3,352 | 3,290 | 3,517 | 3,717 | |
| *British Broadcasting Corporation* | | | | | | | | | | | | | |
| Additions to land and buildings | .. | .. | .. | 38 | 53 | 31 | 818 | 101 | 124 | 99 | 385 | 199 | |
| Additions to plant and equipment | .. | .. | 10 | 27 | 99 | 53 | 89 | 144 | 127 | 140 | 179 | 130 | |
| Total net additions to capital | .. | .. | 10 | 65 | 152 | 84 | 907 | 245 | 251 | 239 | 564 | 329 | |
| Maintenance of plant, power, &c. | .. | .. | 131 | 160 | 179 | 193 | 212 | 252 | 293 | 335 | 387 | 490 | |
| *Imperial Airways Ltd.* | | | | | | | | | | | | | |
| Aircraft and engines at cost | 163 | 256 | 250 | 225 | 391 | 353 | 620 | 647 | 542 | 590 | 487 | | |
| Additions to aircraft, plant, &c. | 64 | 129 | .. | 12 | 260 | 44 | 380 | 150 | 28 | 137 | 74 | | |
| Payments on work in progress | .. | .. | .. | 64 | 92 | 258 | 25 | .. | 52 | 6 | 182 | | |
| Units written off or sold | 19 | 20 | .. | 25 | 78 | 77 | 103 | 119 | 165 | 33 | 366 | | |
| Horse-power of aircraft, 000's h.p. | .. | .. | .. | 22·2 | 41·3 | 48·1 | 58·8 | 58·0 | 60·1 | 58·9 | 55·6 | 171·0 | 185·1 |

## TABLE 59

## INCREASE OR DECREASE OF CENTRAL GOVERNMENT INDEBTEDNESS

(*£ millions*)

| *Fiscal years* | *1929* | *1930* | *1931* | *1932* | *1933* | *1934* | *1935* | *1936* | *1937* | *1938* |
|---|---|---|---|---|---|---|---|---|---|---|
| (1) Net Budget surplus [excess of current revenue* over Budget expenditure other than debt redemption] . . . . | +33·2 | +43·6 | +24·1 | −6·0 | +28·9 | +19·8 | +15·4 | +7·5 | | |
| (2) Social Insurance Funds [excess of income over expenditure] | +1·6 | −39·1 | −49·2 | −4·8 | +4·6 | +6·9 | +11·3 | +19·2 | | |
| (3) Road Fund [excess of income over expenditure] | +1·6 | −4·1 | −7·2 | −1·3 | +4·8 | +7·0 | +0·9 | −0·2 | −3·8 | |
| (4) Issues to meet Capital Expenditure [Post Office] . . . . | 10·5 | 11·0 | 9·7 | 7·5 | 6·5 | 7·4 | 10·5 | 13·5 | 16·9 | |
| Result: net reduction (−) or increase (+) of indebtedness . . . | −25·9 | +10·6 | +42·0 | +19·6† | −31·8† | −26·3† | −17·1† | −13·0† | | |

* Capital funds used as revenue in order to balance the Budget have been excluded.

† Borrowing to finance the Exchange Equalization Fund has been omitted.

## TABLE 60

## NUMBER AND ESTIMATED COST OF SCHEMES APPROVED BY THE UNEMPLOYMENT GRANTS COMMITTEE DURING VARIOUS PERIODS FROM DECEMBER 1920 TO JANUARY 1932

| *Period* | *Number* | *Total estimated cost* |
|---|---|---|
| | | *£ millions* |
| Dec. 1920 to Mar. 1922 | 3,523 | 26·574 |
| Mar. 1922 to June 1923 | 2,917 | 15·874 |
| July 1923 to June 1924 | 2,780 | 24·222 |
| July 1924 to June 1925 | 2,272 | 20·639 |
| July 1925 to June 1926 | 1,240 | 17·566 |
| July 1926 to June 1927 | 63 | 0·792 |
| July 1927 to June 1928 | 28 | 0·319 |
| July 1928 to 10 June 1929 | 352 | 6·181 |
| 11 June 1929 to Aug. 1929 | 147 | 1·665 |
| Sept. 1929 to Aug. 1930 | 2,026 | 41·770 |
| Sept. 1930 to Dec. 1931 | 2,274 | 35·234 |
| Jan. 1932 | 18 | 0·170 |
| Total . . . . | 17,640 | 191·006 |

[NOTE: At 31 Aug. 1932, after making adjustments due to revision of estimates, &c., the estimated capital cost of approved schemes was £190·862 millions.]
SOURCE: *Final Report U.G.C. 1933* [Cmd. 4354], p. 22.

## TABLE 61

## NET CHANGE IN FINANCIAL POSITION OF LOCAL AUTHORITIES ENGLAND AND WALES, 1929–37

(*£ thousands*)

| *Year* | *Gross addition to Loan Debt (receipts from loans)* (1) | *Amortization from revenue and capital A/cs.* (2) | *Net addition to Loan Debt (1) minus (2)* (3) | *Changes in balances of rate, trading, and special funds (revenue and capital A/cs.)* (4) | *Net new money absorbed (3) minus (4)* (5) |
|---|---|---|---|---|---|
| 1929–30 | 88,319 | 37,800 | 50,519 | −807 | +51,326 |
| 1930–1 | 100,014 | 42,320 | 57,694 | +19,279 | +38,415 |
| 1931–2 | 92,578 | 43,138 | 49,440 | +4,409 | +45,031 |
| 1932–3 | 80,849 | 45,886 | 34,963 | +19,742 | +15,221 |
| 1933–4 | 62,843 | 57,700 | 5,143 | +5,734 | −591 |
| 1934–5 | 64,838 | 49,383 | 15,455 | +2,446 | +13,009 |
| 1935–6 | 82,297 | 49,244 | 33,053 | +9,831 | +23,222 |
| 1936–7 | 101,066 | 53,208 | 47,858 | +13,678 | +34,170 |

## TABLE 62

## STATEMENT OF LOANS GUARANTEED BY THE CENTRAL GOVERNMENT OUTSTANDING AT THE END OF EACH YEAR ENDING 31 MARCH

(*£ millions*)

| | *1921* | *1922* | *1923* | *1924* | *1925* | *1926* | *1927* | *1928* | *1929* |
|---|---|---|---|---|---|---|---|---|---|
| Various loans under Trade Facilities Acts . | .. | .. | .. | 38·04 | 54·25 | 62·80 | 72·21 | 70·28 | 66·98 |
| | *1930* | *1931* | *1932* | *1933* | *1934* | *1935* | *1936* | *1937* | *1938* |
| Various loans under Trade Facilities Acts . | 64·61 | 62·21 | 59·74 | 55·33 | 51·08 | 42·31 | 32·01 | 30·14 | |
| Loans under sect. 25 of Fin. Act, 1934* . | .. | .. | .. | .. | .. | 3·59 | 4·41 | 7·41 | |
| Loans under the Development (Loan Guarantees and Grants) Act, 1929 . . . . . | .. | .. | .. | .. | 0·21 | 0·20 | 0·19 | 0·18 | |
| Loans under the Railway (Agreement) Act, 1935 | .. | .. | .. | .. | .. | .. | 27·00 | 27·00 | |
| Loans under the L.P.T.B. (Agreement) Act, 1935 . . . . . | .. | .. | .. | .. | .. | .. | 32·00 | 41·65 | |
| Loans under the Sugar Industry (Reorg.) Act, 1936 . . . . . | .. | .. | .. | .. | .. | .. | .. | 0·75 | |

* To redeem loans originally guaranteed under T.F.A.s 1921 to 1926.

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